

# Technical Memorandum: Full Scale ISCO Work Plan

GEORGETOWN FACILITY

SEATTLE, WASHINGTON

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## 1.0 INTRODUCTION

Dalton, Olmsted, and Fuglevand, Inc. (DOF), has prepared this Full Scale In-Situ Chemical Oxidation (ISCO) Work Plan (Work Plan) on behalf of Stericycle Environmental Solutions, Inc. (Stericycle). In 2016 Ecology approved a Remedial Design and Remedial Action Plan (RDRA) that described the planned approach to addressing 1,4-dioxane contamination in groundwater at the site (Figure 1), consistent with the Agreed Order (No. DE 7347). The primary objectives of 1,4-dioxane treatment are to reduce the contaminant mass and expedite groundwater concentration decline towards cleanup levels within the restoration timeframe defined in the Agreed Order (AO).

Stericycle conducted several bench and pilot studies in support of the RDRA between 2016 and 2018. Ecology and Stericycle met in October 2018 to discuss the conceptual design for Full Scale Implementation of the ISCO remedy. The preliminary layout for ISCO was presented to Ecology including the planned approach to injection and target areas. Stericycle commenced full scale design after that meeting and conducted additional bench scale and field sampling to support full scale design based on feedback from Ecology.

This Work Plan summarizes results of the most recently completed ISCO pilot and bench testing, as well as more recent data that has been collected in support of full scale implementation design since the RDRA.

## 2.0 SUMMARY OF PILOT STUDY RESULTS

There is no generally accepted industry standard for treatment of 1,4-dioxane in a heterogeneous aquifer under a mixed use residential/commercial area. All of the available methods have drawbacks that limit effectiveness, increase costs, and/or have significant health and safety implications. As a result, Stericycle performed several bench scale and pilot studies in order to assess which of the treatment methods was likely to meet objectives, given the limitations of the aquifer and limited control of the treatment area. The following studies were completed since the RDRA:

- Bench scale study to support ISCO;
- Pilot test of pressurized injection of unactivated persulfate;
- Pilot test of slow release injection of unactivated persulfate;
- Bench scale study of in-situ bioremediation (ISB) and bioaugmentation treatment of 1,4-dioxane; and
- Pilot test of ISB with bioaugmentation.

Results of these studies have been reported to Ecology over the past two years as Stericycle proceeded towards full scale treatment design. The original ISCO bench scale study found persulfate to be effective at treating 1,4-dioxane utilizing several different activation methods, as well as unactivated, due to the high amounts of iron available in the aquifer (DOF, 2016a). Unactivated persulfate was chosen for initial pilot testing, since that also released the fewest amount of metals during testing.

The first ISCO pilot program used pressurized injection of unactivated persulfate injected by direct push drilling methods at four injection points (IP-1 through IP-4) on June 23, 2016 near well CG-122-60 (Figure 2). Overall, the dose of oxidant achieved during the pilot study matched the design target, but the

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decline in 1,4-dioxane was considerably less than expected, ranging from 24 to 41% in the target treatment area (DOF, 2016b). The oxidant distribution did not occur according to the design and was highly variable. The high variance in 1,4-dioxane concentrations detected in the ISCO Pilot Study target area, and the delayed timing in detection of the high concentrations of sulfate indicate that the heterogeneous nature of the aquifer limited the effectiveness of pressurized injection of oxidant. Meanwhile, unexpectedly low injection pressures and notably sandy soils were observed. These findings indicated that a slow release oxidant treatment had a higher chance of working than previously considered since flow may be more uniform at typical aquifer flows and pressures.

An additional pilot study was then conducted in the area of CG-122-60 utilizing a slow release injection of unactivated persulfate approach. A mixture of oxidant and paraffin wax, shaped into cylinders approximately 18 inches long, were hung inside a mesh casing. The cylinders were then hung inside injection wells IP-5, IP-6, and IP-7, covering the entire screened portion of these three injection wells installed upgradient of CG-122-60. The cylinders were left to slowly release a small amount of persulfate directly into groundwater over a period exceeding 12 months. While persulfate was detected and lasted for greater than the design estimate of nine months, the treatment was largely ineffective. Some initial degradation of 1,4-dioxane was noted, but overall the slow release persulfate did not result in 1,4-dioxane concentrations decreasing faster when compared to trends from previous years. Based on monitoring data, the amount of iron available in-situ may have been insufficient to create enough of the persulfate radical to contact 1,4-dioxane in-situ. Stericycle submitted results of the slow release in-situ chemical oxidation (ISCO) pilot study to Ecology (via email) in late July 2018. Lab reports and boring logs are included in Appendix A.

Concurrent to ISCO pilot studies, Stericycle conducted a pilot study of ISB in the area of well cluster CG-127. A microbial community, produced by Sentinel Environmental was injected into two wells in June 2017. Subsequent groundwater monitoring was conducted to evaluate degradation of 1,4-dioxane and whether the bacteria populations could be sustained. Monitoring showed that slightly increased (3%) in well CG-127-40 and slightly decreased in well CG-127-75 (13%). The bacteria culture provided by Sentinel under perfect conditions is capable of degrading 1,4-dioxane from 500 ug/L to less than 25 ug/L in 22 days. Delays in effectiveness in the field were anticipated on the order of up to two months based on other field studies by Sentinel. However, in this pilot study, no substantial dioxane removal was detected in either well. Sentinel suspected that the problem was too little available dissolved oxygen to sustain the bacteria. The microbial analysis showed that the indigenous methanotropic and anerobic species became more abundant with each sampling event, replacing the injected bioaugmentation culture (Stericycle, 2018).

Stericycle, DOF, and Ecology met on August 1, 2018 to discuss the results of the pilot studies, the 1,4-dioxane concentrations across the site as of July 2018 (Appendix B), trends in concentration (Appendix B), and the path forward for full scale remediation of 1,4-dioxane. Based on results of the pilot studies, Ecology agreed that Stericycle should review ISCO full scale implementation options and develop a conceptual design for discussion with Ecology prior to preparation of a Full Scale Implementation Work Plan. This conceptual design included use of proprietary injection techniques to provide better contact between the oxidant and 1,4-dioxane in-situ. Ecology and Stericycle met again in October 2018 to discuss the conceptual design for Full Scale Implementation of the ISCO remedy. Stericycle identified two data gaps that were identified based on discussion with Ecology regarding the conceptual design for

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full scale implementation. Stericycle commenced data gap resolution in late 2018 as described in the subsection below.

Stericycle also reviewed the industry status of treatment of 1,4-dioxane treatment in anaerobic heterogeneous aquifers with Ecology. 1,4-dioxane is difficult to treat, especially as a low concentration (part per billion) secondary source from low permeability zones in an anaerobic aquifer. Pump and treat systems were found to be largely ineffective even after many decades and emerging ISB treatment is only effective with oxygen or use of co-metabolic strategies (such as propane injection). ISCO has emerged as the industry consensus as being the most effective method for treatment, but even with improved injection techniques and repeat injections, ISCO may not make a significant change in overall treatment timeline (as contact of oxidant and 1,4-dioxane in fine grained soils is sometimes not possible).

Given the limitations in treatment technology and that there are limited exposure pathways (the aquifer is not used for drinking water and 1,4-dioxane concentrations are below cleanup levels prior to reaching surface water discharge points) Ecology and Stericycle agreed that re-evaluation of the restoration timeframe specifically for 1,4-dioxane may be appropriate depending on the results of the full scale ISCO injections.

The full scale implementation design presented in this work plan was finalized based on the data gap information and results of the pilot and bench scale studies described above.

## 2.1 Summary of Data Gaps Results for Full Scale Design

Two data gaps for full scale design were identified after reviewing the pilot study results. These data gaps were:

- 1) The appropriate activation method for the persulfate. Unactivated persulfate was not as effective in the pilot studies as expected based on the original bench testing.
- 2) The horizontal and vertical extent of the highest mass of 1,4-dioxane. The areas for highest mass removal are less obvious because 1,4-dioxane concentrations have not declined uniformly in the wells originally identified in the RDRA target treatment area.

The first data gap relates to specifying the most appropriate activation for the persulfate. Originally a groundwater sample was planned for bench testing. As design proceeded a soil and groundwater combined bench test was recognized as preferable to facilitate getting more representative results and enable evaluation for the most applicable activation methods. Based on evaluation of the previous bench scale testing and pilot results, a new bench test was recommended using an increased soil to water ratio in order to better mimic in-situ chemistry and behavior. Collection of soil samples from the approximate planned depth of injection was deemed necessary, instead of only collecting water from an existing well and performing a groundwater-based bench test for activation.

The second data gap relates to current 1,4-dioxane concentrations observed in groundwater at locations sampled along 6th Avenue, in between well clusters CG-128 and CG-161. Conceptual full scale design proposed targeting injection around these wells because they are the areas of highest current concentrations and consistent with the objective of reducing the most contaminant mass. However, after thorough review of historical temporary and permanent well data, insufficient data were found for

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1,4-dioxane sampling locations between these points along 6<sup>th</sup> Avenue, making anticipated mass removal in this area challenging.

To address both data gaps Stericycle proposed to conduct one temporary boring in January 2019 for soil and groundwater sampling in-between well clusters CG-128 and CG-161. Ecology agreed to this approach (via email) on December 3, 2018. The full scale design was scheduled for submission on March 1, 2019. Due to permitting requirements, the sampling was conducted several weeks later than anticipated, with field work completed January 22-24, 2019 and Ecology agreed (via email) to extend the due date to April 8, 2019.

### 2.1.1 Data Gaps Field Work Summary

On January 22 and 23, 2019 DOF performed the additional direct push sampling at boring location DP-167 in an alley along 6<sup>th</sup> Ave South between well clusters CG-128 and CG-161 (Figure 2). This location was selected to:

- Provide soil samples for the activation bench scale study;
- Collect groundwater samples to supply additional data on the horizontal and vertical extent of 1,4-dioxane; and
- To expedite permitting with the City of Seattle by modifying a previous street use permit (versus pursuing permitting of sampling elsewhere in the right of way which could have taken much longer).

Soil was logged from approximately 40 to 80 feet below ground surface (bgs) via disposable acetate liners during drilling. The boring log is provided in Appendix C. Soil was placed in individual plastic bags for each depth interval logged and shipped via ice-filled coolers under chain of custody to ISOTEC for analysis as part of bench testing.

Groundwater was collected from four separate depths at DP-167, between 43 to 75 feet bgs. Samples were collected via decontaminated temporary stainless steel four foot long screens. Due to anticipated heaving sands, continuous sampling was not feasible but multiple depths were attempted for sampling to reflect the different depth zones of wells in the CG-128 and CG-161 clusters. Samples were collected via a peristaltic pump and dedicated disposable tubing for each grab sample. Groundwater was purged at a low flow rate and collected within approximately 10 minutes after commencing pumping. Samples were analyzed for total organic carbon (TOC), iron, and 1,4-dioxane; standard field parameters were also measured by a multi-parameter meter during purging (Table 1). 1,4-dioxane concentrations at DP-167 ranged from 130 to 220 µg/L, depending on depth (Table 1), with the highest concentrations in the 61 to 66 foot bgs interval. No noticeable difference in lithology was noted during logging to indicate a correlation between soil type and 1,4-dioxane results. These results are generally lower than those detected in the higher concentration wells located north and south of DP-167.

Groundwater for the ISOTEC bench scale study was collected on January 24, 2019 at well CG-127-75 by grab sample at low flow, utilizing the dedicated well pump and shipped via ice-filled cooler under chain of custody to ISTOEC. ISOTEC performed soil/groundwater mixing as part of the bench study, as described in the attached bench scale study treatability report (Appendix D).

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## 2.2 Proposed Treatment Areas

Recent average 1,4-dioxane concentrations and the trends in 1,4-dioxane concentrations in the target treatment area wells (updated through quarterly monitoring in the third quarter of 2018 and first quarter 2019, where available) are presented on Figure 2 (also see Appendix E). The most notable difference from the RDRA is that concentrations in CG-165-45 (averaging 217 µg/L) have decreased faster than at CG-128-45 (averaging 342 µg/L). 1,4-dioxane concentrations at DP-167 (220 µg/L) indicate that concentrations drop below 300 µg/L in-between CG-128 to CG-161. Otherwise the areas with the highest mass of 1,4-dioxane remain the same (CG-122-60, CG-161-60, and the CG-127 well cluster).

Based on study results, Stericycle proposes to perform ISCO injections in the areas around the CG-122, CG-127, CG-128, and CG-161 well clusters, as shown on Figure 2 and described on Table 2. Targeted areas were selected because wells in those areas showed concentrations that historically averaged over 300 µg/L 1,4-dioxane, with emphasis placed on overlapping injections in the highest concentration areas.

Vertical extents of injection similarly target the depths where 1,4-dioxane concentrations have averaged over 300 µg/L. This resulted in a design that includes two depths of injection around the CG-127 well cluster.

## 2.3 Activation Design

Based on the bench scale study results, ISOTEC recommended modified Fenton's reagent with carbohydrate (MFR+CHASP) as the activation strategy for sodium persulfate (Appendix D). The MFR+CHASP ISCO approach will be implemented with a sequential chemical injection at each injection interval:

1. Chelated Iron Catalyst;
2. Stabilized Hydrogen Peroxide;
3. Sodium Persulfate + Carbohydrate Activator.

The chelated iron catalyst and stabilized hydrogen peroxide will constitute approximately 20% and 40% of the injection volume, respectively for each interval. The sodium persulfate with carbohydrate solution will constitute approximately the remaining 40% of the total volume at each interval. Based on the total oxidant demand (TOD), an oxidant dose of 2.50 g/kg (i.e. 1.25+1.25 g/kg) was recommended for field application. The treatability report noted that decreases in pH and increases in metals occurred during the bench study but, based on previous experience, the metals and pH changes are likely to be temporary in nature. ISOTEC also noted that based on past experience under similar conditions, pH and metals concentrations typically return to background values in a matter of months following post-ISCO aquifer equilibration.

## 3.0 BASIS OF DESIGN

As described in Sections 2.2 and 2.3, the full scale ISCO remedy will consist of direct injections at approximately 35-40 locations adjacent to wells that have shown the highest concentrations of 1,4-dioxane at depths of ranging from 35 to 75 feet bgs (Table 2, Figure 2). Reagent solutions (activation chemicals, stabilizers, and sodium persulfate) will be injected into the temporary screens installed in the



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direct push borings using an injection skid that will provide flow control, flow measurements, and pressure indicators (see ISOTEC procedures in Appendix F). ISOTEC's procedures include target injection design parameters, a summary of health and safety procedures, injection procedures, as well as chemical handling and storage procedures. The chemical oxidant solution flow rates, injection volumes, and injection pressures are based on delivering a solution strength of sodium persulfate dosage of 11-12% and a hydrogen peroxide dosage of 9-10%, based on the results of the ISOTEC Treatability Study, which achieves the desirable total oxidant dosage of 2.5 g/kg soil.

The basis of design for the full scale injection program are listed below.

1. All injections will occur in the public right-of-way.
2. Persulfate will be used as the chemical oxidant in the ISCO injections.
3. From the effectiveness testing results discussed in Section 2.3, a sodium persulfate dosage of 11-12% and a hydrogen peroxide dosage of 9-10%, based on the results of the ISOTEC Treatability Study (Attachment D), which achieves the desirable total oxidant dosage of 2.5 g/kg soil. This dose corresponds to greater than 90% destruction of 1,4-dioxane over a 5-day period. It is anticipated that there will be sufficient chemical oxidant persisting in the aquifer to continue to degrade 1,4-dioxane beyond the 5-day target period, which will be verified by ongoing monitoring events.
4. Based on the previous ISCO pilot study results and updated bench scale testing, injecting the target volume is unlikely to be an issue in general, but there may be direct push refusal at any given point. As long as the target volume is reached for each target area, it is unlikely changes to concentration or amount of total volume injected will be necessary. However, if injections need to be significantly modified (change in volume or reagents +/- 25%), Stericycle will notify Ecology prior to continuing with injections.
5. Based on the previous ISCO pilot study results, high pressures are unlikely. However, injection pressures to distribute the activation chemicals and sodium persulfate solution into the formation will be kept below 45 pounds per square inch (psi) (Appendix F). If pressures are too high at one interval, any remaining amount will be injected at the next injection interval as pressures allow.
6. A 10-15-foot radius of influence, or area of oxidant distribution, is assumed based on ISOTEC's previous experience. As indicated in Section 2.3, ISCO injections will target four locations adjacent to CG-122, CG-127, CG-128, and CG-161 over varying depth intervals (approximately 35-75feet bgs, Table 2, Figure 2) . For the purpose of estimating sodium persulfate mass requirements areas of treatment were estimated by ISOTEC (ISTOEC Proposal Appendix F, Table 3).
7. The proposed 9-10% sodium persulfate solution is only slightly higher than the previous pilot scale injection concentration and falls within the range of 5–25% sodium persulfate solution strength (by weight) previously reported by FMC and ISOTEC (DOF 2016a) for ISCO injections. Target dose and sodium persulfate solution strength are provided for each area in ISOTEC's proposal (Appendix F, Table 3). It is anticipated that roughly 40,000 gallons of solution will be

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injected in total (varying per injection point based on vertical treatment area), and the injected solution volume will occupy approximately 18-20% of the effective pore space.

8. A flow rate range of 1-2 gpm will be targeted per injection location over each 1-2 foot injection interval, based on ISOTEC's previous experience. This falls with the literature ranges (1-2 gpm over a 0.5-2 foot interval recommended by Huling and Pivetz [2006]).

The approximate targets and acceptable ranges for solution strength and the ranges for the sodium persulfate dose, injection flow rates, injection volumes, and injection pressures based on a target sodium persulfate solution strength of 9-10% are included in Appendix F.

## 4.0 FULL SCALE ISCO IMPLEMENTATION PLAN

Stericycle has selected ISOTEC to perform the ISCO injections because they are able to provide a robust method of direct push injection that may improve the contact of oxidant and 1,4-dioxane in the low permeability soil units present at the site. This approach also includes the change in activation to more aggressively approach 1,4-dioxane destruction. Existing wells (IP-5, 6, and 7) will be used for injections in the CG-122-60 area, but direct push injections will be used for the remainder of the injections. The general construction plan, site setup, and operations are described in the subsections below. A detailed description of ISOTEC's operational plan is included in Appendix F.

### 4.1 Construction Plan

This section describes the elements of construction and site mobilization for the ISCO injections. Work will be completed per the Quality Assurance Project Plan (Appendix G).

The sequence of work will generally consist of the following steps:

1. Obtain required permit approvals outlined below and provide permit approvals to the Ecology site manager.
2. Work with Ecology to update the public notice for the ISCO injections and distribute to residences and businesses in the immediate vicinity of the work area.
3. Mark the locations of the proposed injection wells. Perform One-Call and a private locate to confirm utility locations for areas with proposed push probe injections.
4. Mobilize to the site and perform a tailgate health and safety meeting outlining all of the anticipated hazards and hazard mitigation with all workers.
5. Setup the work zone, traffic control components, and spill prevention measures.
6. Remove the wax candles from the three semi-permanent wells (IP-5, -6, and -7) upgradient of CG-122-60.
7. Perform groundwater monitoring per the performance monitoring plan (Section 5.1).
8. Once monitoring event is complete, demobilize the work area and take down all temporary traffic control barriers and signage and move all equipment to the secure Stericycle property. Decontaminate all monitoring equipment and manage waste appropriately.
9. Perform ISCO injections at IP-5, 6, and 7.

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10. Perform ISCO direct push injections at the other target areas.
11. Perform groundwater monitoring per the performance monitoring plan (Section 5.1).
12. Once monitoring event is complete, demobilize the work area and take down all temporary traffic control barriers and signage and move all equipment to the secure Stericycle properly. Decontaminate all monitoring equipment and manage waste appropriately.
13. Perform steps 11 and 12 for groundwater monitoring events over the next four to five months.
14. Meet with Ecology to review results and assess if a secondary injection is necessary.

#### 4.2 Permitting and Approval Requirements

The project will be conducted under AO No. DE 7347 between Stericycle and Ecology, and therefore is exempt from the procedural requirements of certain Washington State laws and all local permits (WAC 173 340-710[9][b]). However, the cleanup remedy and its implementation must comply with the substantive requirements of these permits and must comply with any federal permits that may be required. The permitting exemption is not applicable if Ecology determines that the exemption would result in the loss of approval from a federal agency that may be necessary for the state to administer any federal law. In addition to the permits required, a SEPA checklist was completed for the remedial action addressing the Downgradient Area of the site as detailed in the Revised ISCO Pilot Study Work Plan. Ecology made a determination of non-significance in response to the SEPA checklist.

It is anticipated that the following permits will be required to complete the ISCO injections:

- Work performed in the public right-of-way will require a 51A-Well Installation Permit and a Utility Major Permit from the City of Seattle, Department of Transportation (SDOT). The expected time to obtain these SDOT permits is 8–12 weeks.
- Ecology will require an Underground Injection Control Permit for the ISCO injections. The expected time for obtaining these permits is four weeks.

The final permit approvals will be provided to Ecology prior to conducting any of the injection field work.

No Seattle Department of Development and Planning permits or additional site access permission will be required, as no work will be performed on private property. A traffic control plan is required as part of the SDOT Utility Major Permit. Previously developed plans will be re-used for the Utility Major Permit application that will limit street closure on South Findlay Street as well as 6<sup>th</sup>, Lucile and Maynard Avenues to the extent practicable. Most new injection locations are off to the side of the streets in the right of way, rather than in traffic lanes. However, some injections are planned in South Findlay Street. The traffic control plan will mitigate potential traffic issues that could result from the injection points and monitoring work that will occur in the public right of way.

The total area of disturbance is less than 1,000 square feet. This area of disturbed soils would not trigger state or county stormwater requirements or trigger City of Seattle Drainage review.

#### 4.3 Construction Activities

The construction components, elements, and approach to implementation in the field are described in this section. All geologic and hydrogeologic work will be performed under the supervision and direction

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of a geologist licensed in the State of Washington or under the direct supervision of an engineer licensed in the State of Washington. All engineering work will be performed by or under the direct supervision of an engineer licensed in the State of Washington.

Construction activities will include installation of temporary direct push borings with injection of activated persulfate reagent in the areas around the CG-127, CG-128, and the CG-161 well clusters and injection of activated persulfate reagent in the three semi-permanent wells (IP-5,-6 and -7) near CG-122-60, as shown on Figure 2 and Table 2. Two days of post-injection temporary direct push boring groundwater monitoring events at will be performed in addition to additional groundwater monitoring at existing wells (per the performance monitoring plan in Section 5.1).

Prior to mobilization to the site, Stericycle will update businesses/residences in the vicinity of the pilot study locations in accordance with a revised public notice (prepared in cooperation with Ecology) to provide the following information:

- A summary of work to be performed in relation to the 1,4-dioxane cleanup action proposed, a schedule of the work, the work duration, and potential site impacts;
- A summary of traffic control plans and plans to minimize impacts to local businesses;
- Hazards associated with the work being performed and hazard mitigation; and
- Project contact information.

Stericycle will work with businesses and residences in the immediate vicinity of the work area to minimize impacts to the local businesses and residences.

Subsurface utilities will be identified prior to the start of any subsurface drilling. Stericycle personnel will mark the proposed drilling locations on the ground. The utilities underground location center (1-800-424-5555) will be contacted, and a private utility locate will be conducted within the work areas to at least 20 feet beyond the limits of subsurface work, where possible. The intended well locations might be modified in the field if they interfere or appear to interfere with subsurface utilities.

Remediation personnel will mobilize to the site and complete site setup prior to starting construction activities. All equipment will be demobilized at the end of each day and all chemicals and wastes will be stored at the fenced in and secure Stericycle Georgetown facility.

Prior to commencing site setup, a health and safety tailgate meeting will be completed with all field personnel. The tailgate meeting will cover all known and anticipated hazards and mitigation or control of all hazards as per the updated HASP (see section 5.1.1). Upon completion of the tailgate meeting, site setup will include establishing temporary facilities, implementing the traffic control plan, and installing stormwater controls. Temporary fencing or clear site delineation will be set up around the work area prior to implementation of drilling to prevent public access into dedicated work zones.

The persulfate injections will be performed based on the design and specifications presented in ISOTEC's proposal (Appendix F). Temporary direct-push injection points using ISOTEC proprietary laser-cut stainless-steel screens will be used in multiple intervals across the total vertical thickness. The screens are designed such that the injected reagent material enters the direct push rod and contracts within the ISOTEC screen to create a "pressurized jet flow" that allows the reagent to discharge under low pressure

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throughout the vertical depth interval of the screen by maintaining a continuous flow that completely fills the entire screen interval. Due to the small diameter (1 cm), a very small volume of water fills the screen (<0.1 gallon) allowing uniform discharge. The ISOTEC screens are available in lengths ranging from one foot to eight feet in length in one-foot increments. In order to focus injection delivery to the thin lenses of finer grain material, ISOTEC will use one-foot or two-foot length screens to preferentially distribute oxidant solutions to that smaller vertical interval and to target the finer grained lenses within.

Contaminated soil, decontamination water, and purge water from the temporary borings will be managed at the Stericycle Georgetown facility in accordance with the Revised Waste Management Plan (Appendix K of the EDR).

Activated persulfate ISCO reagent will be injected in the wells per ISTOEC procedures (Appendix F). The data sheet and Safety Data Sheet for the activated persulfate are provided in Appendix H.

Direct-push ISCO injection borings will be abandoned by filling the casing from total depth to ground surface with bentonite following drilling and injections. Care will be taken not to over-pressurize grout and thereby make it less prone to migrate into the surrounding formation. The ground surface will be repaired to similar conditions as found prior to drilling. A field marker will be placed to denote the drilling location (via paint mark and/or nailed flag), and field measurements will be taken to maintain accurate mapping of where the injection locations occurred.

To prevent potential spills or off-site migration of sodium persulfate or activation chemicals, the reagents will be covered and stored in secondary containment and nearby catch basins will be temporarily blocked during injections. In addition, a neutralization kit including sorbent materials (i.e., vermiculite or sand), a 5-gallon high density polyethylene bucket, and neutralization chemicals (such as sodium bisulfite) will be available within the staging area.

## 5.0 MONITORING

This section describes the monitoring events associated with the ISCO full scale implementation. The results of the first ISCO pilot study illustrated the difficulties of estimating mass removal in a heterogeneous aquifer (DOF 2017), even with improved injection techniques performance evaluation is planned to take approximately a year to assess the impacts of ISCO injections on 1,4-dioxane concentrations in the target area. The data gathered will provide the information necessary to allow to assess effectiveness of treatment and to inform planning for long term monitoring.

Long term monitoring as described in the Long Term Monitoring Plan (Appendix D in the EDR) will take place concurrently with the monitoring described in this section, and will continue once the remedial action monitoring period is over. In addition, the supplemental semi-annual monitoring for 1,4-dioxane will continue through implementation of the 1,4-dioxane remedy. If warranted, the Long Term Monitoring Plan may be modified to address specific locations identified during cleanup implementation and performance monitoring.

### 5.1 Protectiveness and Performance Monitoring Plan

A groundwater monitoring program will be implemented area after completion of the injections to evaluate the objectives defined in Section 1 and to ensure that downgradient receptors are protected

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during and after implementation of the remedy. The monitoring program will consist of a baseline monitoring event conducted prior to injections, monitoring for persulfate soon after injection, followed by three monitoring events over a period of approximately five months after injections. Prior to mobilization for each of the four monitoring events, field data collected during the previous injection/monitoring event will be evaluated and discussed with Ecology to adjust monitoring locations, if necessary. A summary of the monitoring events is described below and detail is provided in Table 3 and monitoring locations are shown in Figure 3.

- Event 1: Initial baseline samples will be collected from wells in each area of injection prior to the first round of injections (CG-122, IMW-1, IMW-2, CG-127, CG-128, CG-161 clusters). In addition, baseline samples will be collected from wells within one block of injections on 6th Avenue (CG-160-65, CG-60-45, and CG-131-40) during the third quarter 2019 monitoring event.
- Event 2: Within 48 hours after injection groundwater samples will be collected and for field persulfate testing in the wells nearest to injection areas (CG-122, IMW-1, IMW-2, CG-127, CG-128, CG-161 clusters).
- Event 3: Two to four weeks after injection wells in targeted areas (CG-122, IMW-1, IMW-2, CG-127, CG-128, CG-161 clusters), as well as several direct push borings (with water samples collected from two depths at each boring) will be sampled to evaluate ROI. One of the direct push borings will be completed immediately south of the southernmost injection point (10-15 feet away), and one will be completed west of injection points between CG-127 and CG-161 cluster.
- Events 4 and 5: A monitoring event will take place approximately two months post injection and four months post injection, prior to implementation of long term monitoring. These monitoring events will include wells in the targeted injection areas and wells within one block of injections on 6th Avenue (CG-160-65, CG-60-45, and CG-131-40).
- Events 6 and 7: For the following two standard semi-annual monitoring events (as required under the Long Term Monitoring Plan) that occur after Event 5, additional analysis will be added to extend assessment of downgradient impacts from the injections to over a year.

### 5.1.1 Protectiveness Monitoring Plan

Working conditions during injections will be monitored following procedures described in the revised HASP (amended from the HASP provided in Appendix J of the EDR; AMEC Geomatrix, 2011). The revised HASP includes provisions for air monitoring using a photoionization detector (PID) and specifies appropriate air quality action levels. A PID will be kept on site and will be used to monitor breathing zone air quality and air quality at the perimeter of the work area during active drilling and injection events. The PID is provided as a precaution, as elevated levels of volatile organic compounds are not anticipated to be encountered in soil or groundwater during active injection or monitoring work based on historical groundwater monitoring data (Stericycle, 2015). To address the hazards associated with the ISCO injection work, a job hazard analysis pertaining to chemical oxidant handling and injections was prepared as part of the pilot study phase.

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The major hazards for full scale ISCO injection are the same as detailed in the previous ISCO pilot study (working in a trafficked area and with strong oxidizing agents), but the work locations, scale of injections, and types of reagents being used have changed. ISOTEC has provided SDS and general safety procedures summarizing the approach (Appendix F). The work area will be controlled to prevent members of the public from being exposed to any liquid leaks or spills. PPE and safe working areas (hot zones) to eliminate public exposures shall be identified in ISOTEC's updated HASP and updated traffic control plans. In addition, given the changes in traffic patterns and road construction since the last round of injections the route to the local medical facility identified in the revised HASP shall be reviewed and updated if necessary. The revised HASP will be updated and submitted to Ecology for review prior to the start of injection work (once ISOTEC has provided their HASP to Stericycle for review).

In addition, spill controls (secondary containment, spill kits, etc.) have been included to protect public infrastructure (roads, pavement, utilities) and to prevent releases to the environment.

### 5.1.2 Performance Monitoring Plan

This section describes the approach to performance monitoring during the full scale implementation phase of ISCO.

#### 5.1.2.1 Monitoring Objectives

Monitoring of ISCO implementation will evaluate the initial extent of mass removal within the vicinity of the treatment, and monitoring permanent wells over time will evaluate whether the pretreatment concentrations rebound and if so, to what level and for how long. The specific monitoring objectives include:

- Estimating the performance of ISCO for 1,4-dioxane mass destruction;
- Observing oxidant distribution and persistence over space and time;
- Observing the degree and persistence of any metals mobilization associated with ISCO;
- Observing the degree and persistence of changes in groundwater pH and other geochemical parameters associated with ISCO; and
- Observing the degree and persistence of increased levels of dissolved sulfate.

#### 5.1.2.2 Monitoring Approach

The monitoring approach will include a pre-injection baseline sampling event, followed by four post-injection monitoring events conducted after the injection event. A combination of permanent monitoring wells and direct-push borings will be sampled to provide flexibility for sample locations. The direct-push borings will allow for responding to variable field conditions and to verify where the sodium persulfate has been distributed.

Prior to each monitoring event, Stericycle will work with Ecology to evaluate the appropriateness of proposed sampling locations and may adjust locations based on field data collected prior to each monitoring event. Communications with Ecology may consist of conference calls or in-person meetings to discuss field data collected during the previous monitoring event. Data evaluation and communication with Ecology will allow for an adaptive program for the monitoring events to improve

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the data generated from each monitoring event and select locations that are most likely to adequately address the objectives.

#### *5.1.2.3 Monitoring Methods and Sampling Program*

Groundwater samples will be collected from monitoring wells listed in Table 3 prior to ISCO injections to establish baseline water quality conditions (Event 1). Baseline groundwater samples will be analyzed for 1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), temperature, and specific conductance.

After injection, one monitoring event will be conducted immediately following injection to assess persulfate distribution to targeted well areas (Event 2), then one event will be conducted within the expected time interval of the chemical oxidant persistence (Event 3), followed by four additional monitoring events after persulfate is expected to have been consumed and mass of 1,4-dioxane will have time to begin rebounding in groundwater due to release from interbedded silts or clays (Events 4 through 7).

Figure 3 includes preliminary locations for the direct push borings and wells to be sampled during the monitoring events. Locations may be changed based on surface and subsurface obstructions. Sample locations may also be adjusted prior to any monitoring event based on field data collected and communications with Ecology. Table 3 summarizes the samples to be collected and analyses to be conducted during each monitoring event.

### **5.1.3 Groundwater Sampling Methods**

Groundwater samples collected from monitoring wells during the course of ISCO full scale implementation will generally follow the low-flow groundwater collection procedures and 1,4-Dioxane Remediation QAPP (DOF and Amec Foster Wheeler, 2016). However, the presence of persulfate in groundwater during sampling may damage equipment typically used under the low-flow method. During monitoring Events 2 and 3, groundwater will be purged at a low flow rate for approximately 15 minutes prior to collecting the groundwater sample. Water level drawdown will be monitored and flow rates adjusted to reduce drawdown. However, in order to prevent damaging the equipment by the persulfate, groundwater quality parameters will not be monitored for stabilization prior to sample collection.

Groundwater samples from direct push sampling locations during Event 3 will be collected via peristaltic pump and disposable tubing or equivalent method. Approximately 1-1.5 times the peristaltic tubing volume will be purged prior to collecting the groundwater samples so that the groundwater sample will be representative of the localized area proximate to the boring location. The groundwater quality parameters will not be monitored prior to groundwater sample collection due to the potential for persulfate in groundwater samples collected as part of this event.

Water quality parameters, including turbidity, DO, specific conductivity, ORP, temperature, and pH, will be measured and recorded in the field prior to collecting the groundwater samples by default during Event 1 and Events 4 through 7. Persulfate will be analyzed in the field during each event using a field test kit (refer to Appendix H for field kit details).



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Non-disposable sampling equipment will be decontaminated between sample locations according to Stericycle SOP-200, provided in Attachment D-2 of the Long-Term Monitoring Plan (Appendix D of EDR; AMEC Geomatrix, 2011). De-ionized water will be run over drilling equipment and collected as an equipment blank sample to test the effectiveness of decontamination procedures. One equipment blank sample will be collected during the direct-push event (Event 3).

Groundwater samples collected will be submitted to Stericycle's contracted state-certified laboratory, ALS Environmental, for analysis of dissolved MTCA metals, sulfate, sulfide, and 1,4-dioxane, based on the sampling and analysis schedule in Table 3. All samples submitted to ALS during Event 3 will be preserved using ascorbic acid to quench the chemical oxidant following the procedures outlined in the 1,4-dioxane remediation QAPP (DOF and Amec Foster Wheeler, 2016). Groundwater samples for analysis of dissolved MTCA metals will be field filtered prior to collection using a 0.45-micrometer filter to remove sediment and other particles, which may skew sample results. Additional quality assurance/quality control (QA/QC) protocols for sampling and data validation will be conducted in accordance with the QAPP included in Appendix D of the EDR (AMEC Geomatrix, 2011) and the 1,4-Dioxane Remediation QAPP (DOF and Amec Foster Wheeler, 2016).

#### 5.1.4 Temporary Boring Drilling and Sampling Methodology

This section summarizes the methodology related to direct-push groundwater sampling. Direct-push drilling will be conducted in accordance with WAC 173-160.

##### 5.1.4.1 Site Preparation

Prior to the commencement of drilling, the following steps will be taken:

- Verify that all permits are in place and available at the work site.
- Notify residents and businesses in the immediate area of the drilling.
- Inspect the potential drilling location in the field for potential access problems (e.g., overhead obstructions or hazards, excessive slopes, on-site materials, equipment obstructing access, and other pertinent conditions).
- Clear drilling location of any brush or debris that might be present.
- Remove any equipment or materials that might be stored in the immediate vicinity of the drilling location.
- Mark the ground locations of the proposed drilling site.
- Notify Ecology's project manager prior to the commencement of drilling in case it is necessary to modify the location of a proposed drilling site, and the modified location is more than 5 feet from the originally proposed location.

After the location of the drilling site has been finalized, and all required permits have been obtained, final site preparations may begin. Final preparations will include:

- Grade or level the drilling location, if necessary.
- Mark the final drilling locations on the ground.

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- Set up receptacles for temporary storage of investigation-derived wastes.
- Complete any concrete sawing or coring to remove surface pavement from the drilling location where the ground surface is paved with asphalt or concrete.

#### *5.1.4.2 Drilling Methods*

All direct-push borings will be completed by a Washington State licensed well driller under the direction of the field geologist. Care will be taken during drilling to maintain borings as close to vertical as possible, allowing for targeting the desired location at depth. This objective will be discussed with the drillers as part of drilling setup and monitored by the field team during drilling.

A detailed record or log of each temporary well will be recorded. The logs and descriptions will include at a minimum the following information:

- Date and time of construction;
- Drilling method and any drilling fluid used;
- Well location using an onsite GPS unit (surveyed to within 0.5 foot);
- Borehole diameter and well casing diameter;
- Temporary well depth (to within 0.1 foot);
- Casing materials;
- Screen material and design, including screen length and slot size;
- Boring abandonment methods.

Contaminated soil, decontamination water, and purge water from the well installations will be managed at the Stericycle Georgetown facility in accordance with the Revised Waste Management Plan (Appendix K of the EDR; AMEC Geomatrix, 2011).

#### *5.1.4.3 Groundwater Sample Collection and Analysis*

Groundwater samples will be collected from each direct-push boring at the approximate depth of upgradient ISCO treatment. The drilling subcontractor, under the direction of the field geologist, will advance a direct-push sampling apparatus to the specified depth for collection of a grab groundwater sample using the SP22 Groundwater Sampler from Geoprobe® or similar equipment. The groundwater sample will be collected at each boring through temporary 4-foot-long screened wells. A grab groundwater sample will be collected via peristaltic pump and disposable tubing or equivalent method as described in Section 4.1.3.

#### *5.1.4.4 Boring Abandonment*

Direct-push borings will be abandoned by filling the casing from total depth to ground surface with bentonite following drilling and sampling. Care will be taken not to pressurize grout and thereby make it less prone to migrate into the surrounding formation. The ground surface will be repaired to similar conditions as found pre-drilling. A field marker will be placed to denote the drilling location (via paint mark and/or nailed flag), and field measurements will be taken to maintain accurate mapping of where data are collected.

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## 5.2 Quality Assurance

A QAPP (DOF and Amec Foster Wheeler, 2016) was submitted and approved as part of the pilot study phases of 1,4-dioxane remediation. The QAPP outlined quality assurance procedures pertaining to sample collection and construction implementation specific to the 1,4-dioxane remedy that were not considered during preparation of the QAPP associated with the Long-Term Monitoring Plan (Appendix D of the EDR; AMEC Geomatrix, 2011). The approved QAPP is included in Appendix G.

## 6.0 DEMOBILIATION AND WASTE MANAGEMENT

Stericycle will properly handle, accumulate and temporarily store, transport, and dispose of project derived wastes in accordance with local, state, and federal requirements. Trained and experienced personnel will be present during active pilot study activities to arrange initial waste segregation, storage, and coordination of both on-site and off-site disposal activities. The primary project activities will include early identification and pre-planning for expected waste sources, characterization of wastes (analytical data, source and generator knowledge), interim and centralized accumulation and storage at the secure Stericycle Georgetown facility, and timely transportation and disposal of wastes. The anticipated waste sources include:

- Spent disposable personal protective equipment;
- Soil from temporary well installation activities;
- Spent persulfate reagent cylinders;
- Decontamination rinse water; and
- Groundwater sampling purge water.

Initial waste characterization will be carried out at the Stericycle Georgetown facility, based on the source or process generating the waste and the field staff's knowledge of the probable regulatory status of the wastes. All waste characterization and disposal for the remedy will follow the Revised Waste Management Plan, Appendix K of the EDR.

The spent persulfate cylinders will be removed from the wells and placed into labeled 55 gallon drums pending characterization for waste disposal.

## 7.0 UPDATED SCHEDULE

This section outlines a tentative schedule for implementation of the next stage of the 1,4-dioxane remedy.

The ISCO injection study will require UIC permitting with Ecology and permitting with SDOT. Typically this takes on the order of 12 weeks or more from the start of the permit application. However, Stericycle will endeavor to minimize this time since the work proposed will be very similar to work already completed under the previously permitted ISCO pilot study work. Ideally ISCO injections could begin as soon as July 2019 if permitting is expedited.

The results of the first ISCO pilot study illustrated the difficulties of estimating mass removal in a heterogeneous aquifer (DOF 2017), even with improved injection techniques performance evaluation is

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planned to take approximately a year to assess the impacts of ISCO injections on 1,4-dioxane concentrations in the target area. Given the approximate year of monitoring following treatment, it is expected the last round of monitoring would occur around August 2020.

Within 45 days of receiving the last analytical data packages from the ISCO injection performance monitoring, Stericycle will summarize the ISCO injection performance results as well as updated trends for the 1,4-dioxane plume and present them to Ecology for review with recommendations on the conceptual design of a second injection event (if necessary).

## 8.0 REFERENCES

AMEC Geomatrix, Inc., 2011, Revised Engineering Design Report, PSC Georgetown Facility, Seattle, Washington. September.

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AMEC Foster Wheeler, 2016, Response to Ecology Comments 1,4-Dioxane Remedial Design/Remedial Action ISCO Pilot Study Work Plan, Stericycle Georgetown Facility, Seattle, Washington. March.

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Stericycle, 2018, Fourth Quarter 2017 Progress Report, Stericycle Georgetown Facility, Seattle, Washington, February.

## 9.0 CLOSING AND SIGNATURE

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

April 8, 2019

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# Tables

**Table 1**  
**DP-167 and Bench Sample Results**  
**Stericycle Georgetown**

Well ID	Media	Date	Depth	Pumping rate	Volume Purged	pH	Conductivity	Temperature	Turbidity	Dissolve d Oxygen	Redox Potential	Ferric Fe3+	Ferrous Fe2+	Total Fe	Total Fe	Total Organic Carbon	Total Organic Carbon	1,4-Dioxane	1,4-Dioxane
				mL/min	Liters	standard	mS/cm	°C	NTU	mg/L	mV	mg/L	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	µg/L
DP-167	WATER	1/23/2019	43-48	500	2	7.49	1000	12.4	61.2	-	-	8.3	7.5	-	11.7	-	6.15	-	160
	WATER	1/23/2019	52-57	500	1.5	7.76	1060	13.0	106	-	-	2.66	0.4	-	17.9	-	6.56	-	130
	WATER	1/23/2019	61-66	500	1.5	7.65	1058	13.0	25.2	-	-	4.12	0.3	-	8.31	-	8.59	-	220
	WATER	1/23/2019	70-75	500	1.5	7.36	1004	13.9	405	-	-	7.76	11.5	-	36.8	-	5.21	-	140
	SOIL	1/22/2019	50-60	-	-	-	-	-	-	-	-	-	-	11,100	-	1230	-	0.0323	-
CG-127-65-75	WATER	1/24/2019	65-75	500	4.5	6.74	518	15.2	1.29	0.19	81.4	-	-	-	3.82	-	-	-	356

**Abbreviations:**

- = no sample taken  
 ug/L = micrograms per liter

mg/L = milliliters per liter  
 mL/min = milliliters per minute

mV = millivolts  
 ppm = parts per million

NTU = nephelometric turbidity units  
 mS/cm= millisiemens per centimeter

**Table 2  
Proposed ISCO Treatment Areas  
Stericycle Georgetown**

Treatment Area	Location	Injection Points <sup>1</sup>	Target Treatment Depths	Nearby Well Clusters	Average 1,4-Dioxane Concentration
		#	(ft bgs)		µg/L
1	Right of Way West side of Maynard Ave. north of S. Lucile St.	3	50-60	CG-122	310
2	Right of Way on south side of S. Findley St. (East of 6th ave S.) and East side of 6th Ave S (North of Findley St.)	12-15	50-60	CG-161	491
3	Right of Way on east side of 6th Ave. S. (North Row, South of Lucile St. )	5-7	35-45	CG-128	342
4	Right of Way on east side of 6th Ave. S. (East Row Near and South of Findlay St.)	10-13	50-60 and 65-75	CG-127-45	324
	Right of Way on east side of 6th Ave. S. (West Row South of Findlay St.)	5-7	35-45 and 55-65	CG-127-75	705
Total number of points		35-45			

Notes:

1) Number of injection points and exact injection intervals to be determined based on field conditions.



**Table 3**  
**Monitoring Requirements**

Monitoring Event	Monitoring Location	Sample Depth	Lab Sample Parameters <sup>1</sup>	Field Sample Parameters <sup>2</sup>
Monitoring Event #1	CG-122-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-122-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	IMW-1	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	IMW-2	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-127-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-127-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-128-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-161-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-131-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-160-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
CG-160-65	55-65 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance	
Monitoring Event #2	CG-122-60	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-122-75	65-75 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-1	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-2	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-40	30-40 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-75	65-75 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-128-45	35-45 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-161-60	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance

**Notes:**

1. MTCA metals include: Arsenic, Cadmium, Chromium, and Lead
2. Instrument field readings will not be taken for rounds where persulfate is found to be present to avoid damage to the instrument sensors.

**Abbreviations:**

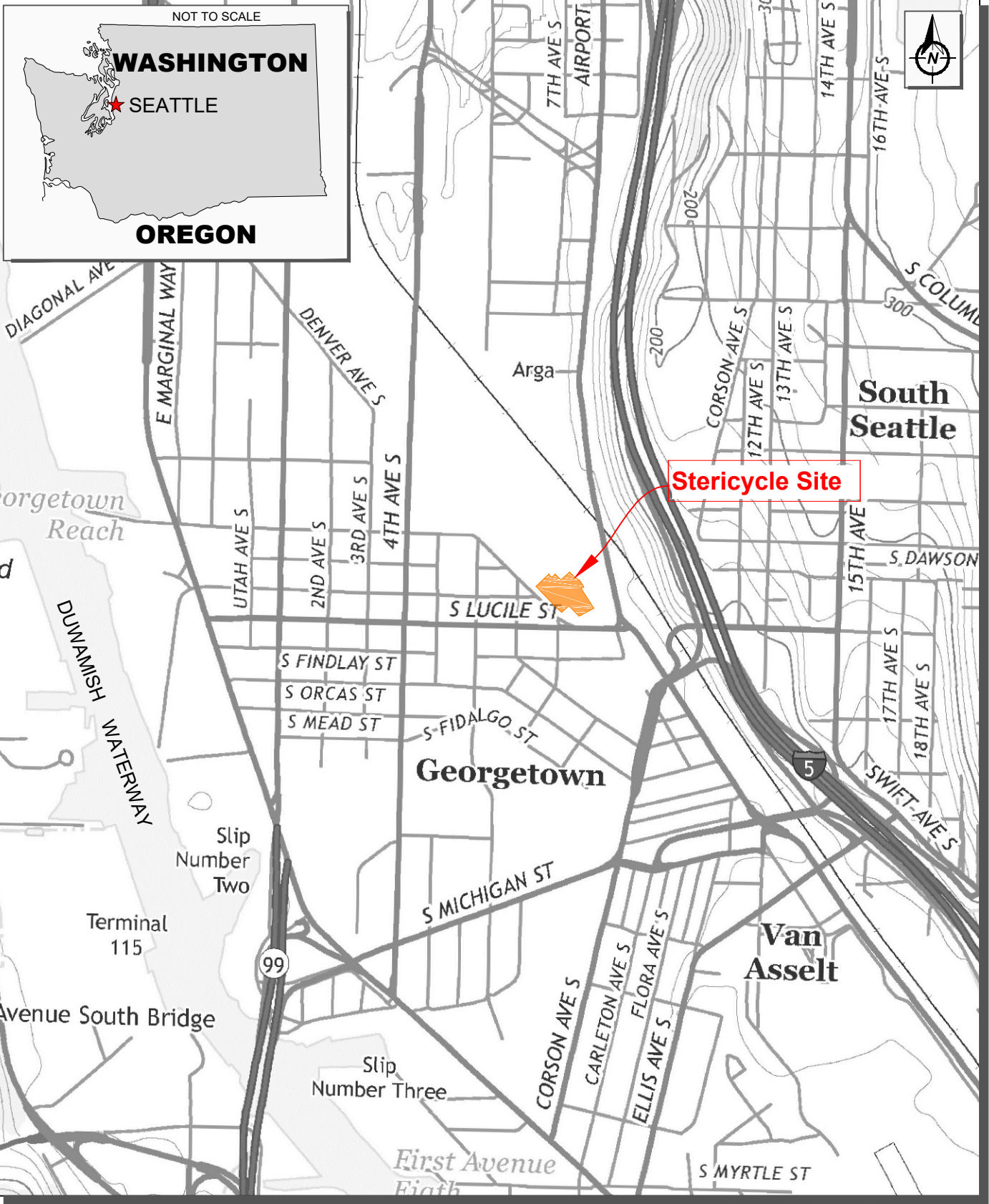
ft bgs = feet below ground surface

**Table 3  
Monitoring Requirements**

Monitoring Event #3	CG-122-60	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-122-75	65-75 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-1	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-2	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-40	30-40 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-75	65-75 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	DP-168	30-40 & 65-75 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-128-45	35-45 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	DP-169	50-60-ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-161-60	50-60 ft bgs	1,4-dioxane, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
Monitoring Events #4 and #5	CG-122-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-122-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-1	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	IMW-2	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-127-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-128-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-161-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	persulfate, pH, ORP, DO, temperature, and specific conductance
	CG-131-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-160-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
CG-160-65	55-65 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance	
Monitoring Events #6 and #7 (to be added performed with Long Term Groundwater Monitoring Plan standard semi-annual sampling)	CG-122-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-122-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-127-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-127-75	65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-128-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-161-60	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-131-40	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
	CG-160-45	35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
CG-160-65	55-65 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance	

# Figures

PLOT TIME: 11/15/2016 12:36 AM MOD TIME: 11/15/2016 12:31 AM USER: Lee Barras DWG: D:\Projects\Stericycle\Georgetown\Figures\2016-11-15 GT\_2016 PSR 1 Ft Site Loc.dwg



0 2000  
Scale in Feet

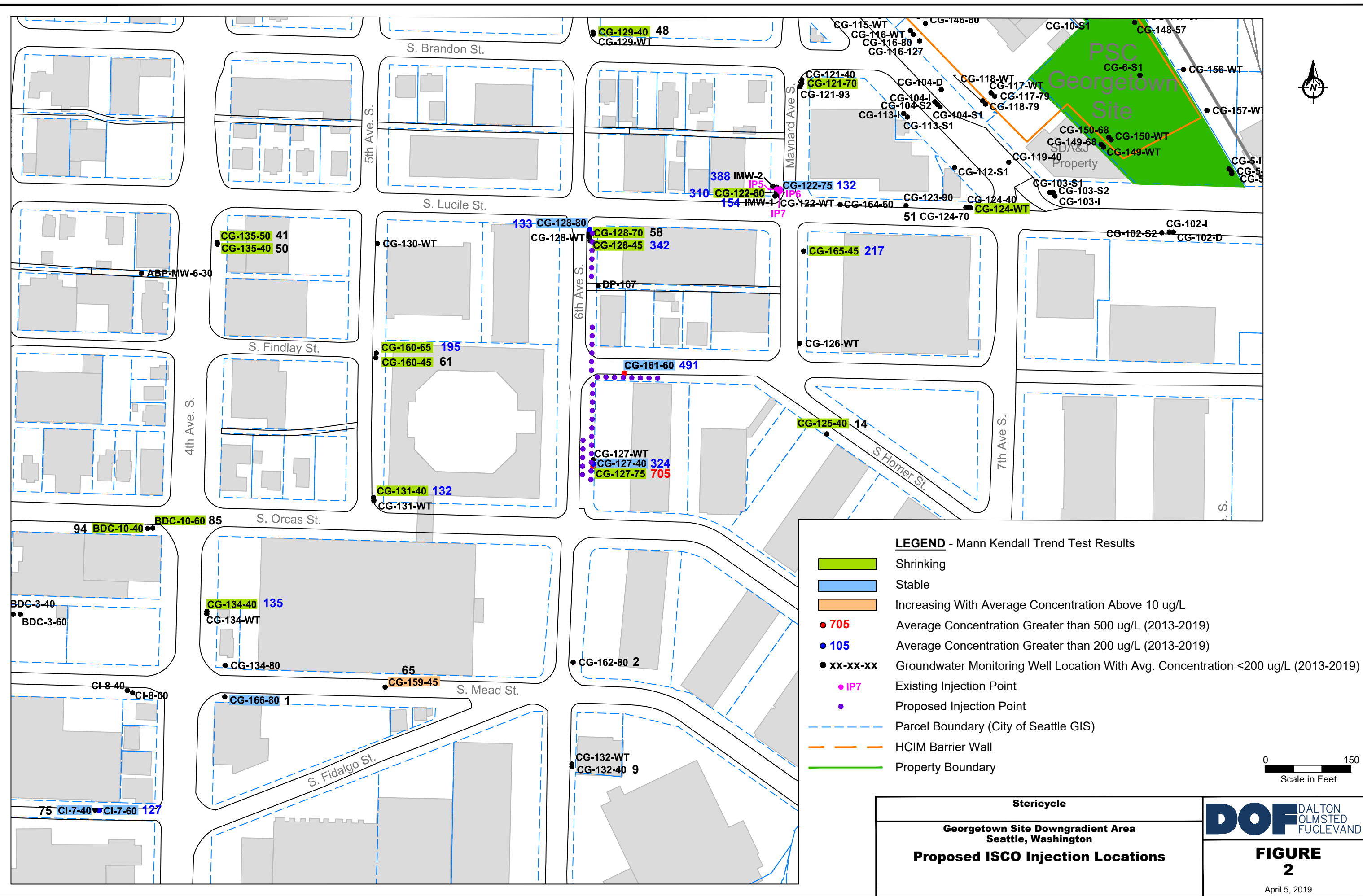
<b>Stericycle</b>	
<b>Georgetown Site</b>	
<b>Seattle, Washington</b>	
<b>Site Location</b>	

**DOF** DALTON OLMSTED FUGLEVAND

**Figure 1**

November 15, 2016

PLOT TIME: 4/5/2019 1:41 PM MOD TIME: 4/5/2019 1:12 PM USER: John Bliss DWG: P:\Stericycle\Georgetown\CAD\Figures\2019-03\2019-04-05 GT ISCO Injection Locations FIG 2.dwg



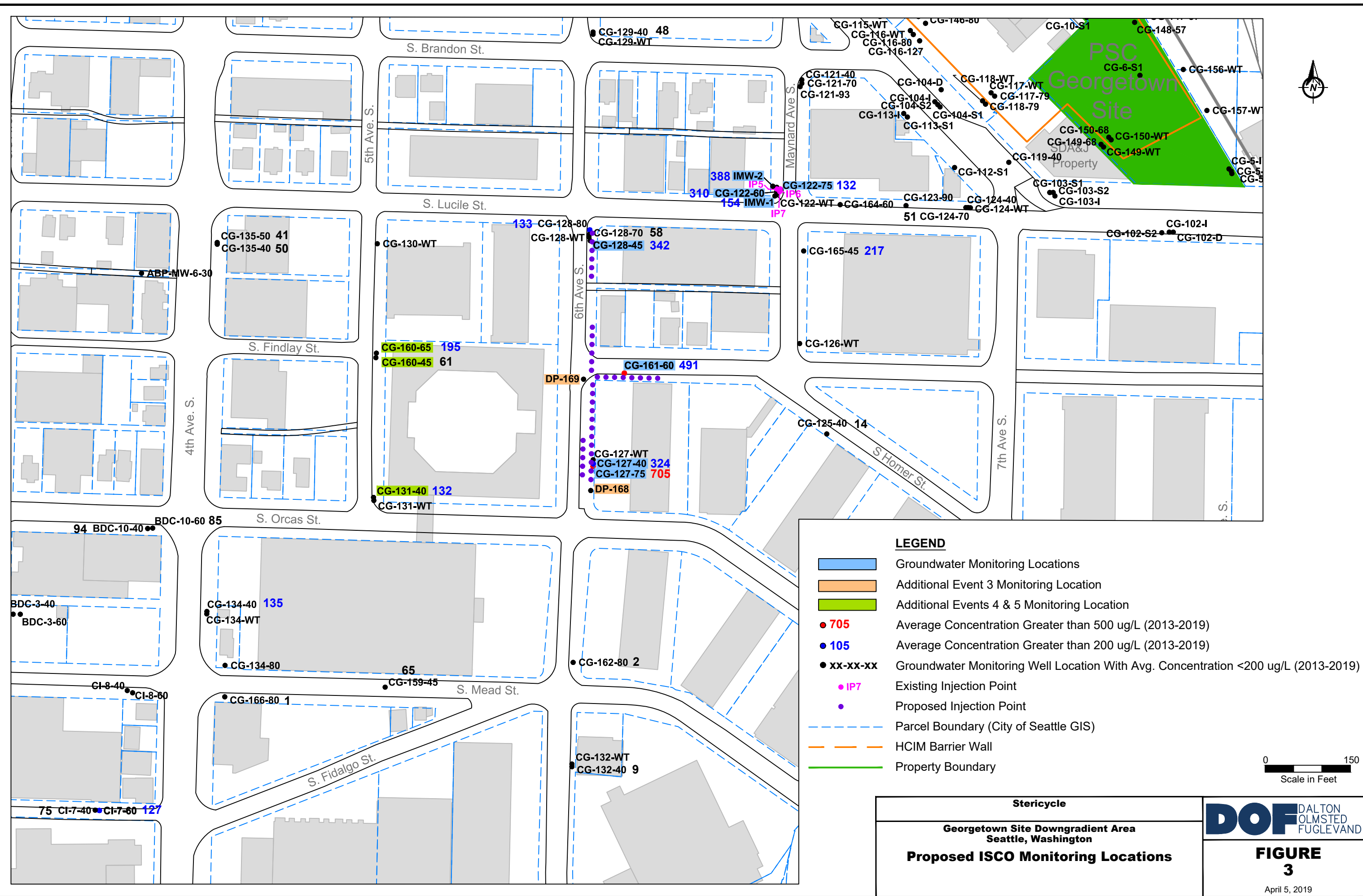
**LEGEND - Mann Kendall Trend Test Results**

- Shrinking
- Stable
- Increasing With Average Concentration Above 10 ug/L
- 705 Average Concentration Greater than 500 ug/L (2013-2019)
- 105 Average Concentration Greater than 200 ug/L (2013-2019)
- xx-xx-xx Groundwater Monitoring Well Location With Avg. Concentration <200 ug/L (2013-2019)
- IP7 Existing Injection Point
- Proposed Injection Point
- Parcel Boundary (City of Seattle GIS)
- HCIM Barrier Wall
- Property Boundary

0 150  
Scale in Feet

<p><b>Stericycle</b></p> <p>Georgetown Site Downgradient Area Seattle, Washington</p> <p><b>Proposed ISCO Injection Locations</b></p>	<p><b>DOF</b> DALTON OLMSTED FUGLEVAND</p> <p><b>FIGURE</b> <b>2</b></p> <p>April 5, 2019</p>
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PLOT TIME: 4/5/2019 1:42 PM MOD TIME: 4/5/2019 1:12 PM USER: John Bliss DWG: P:\Stericycle\Georgetown\CAD\Figures\2019-03\2019-04-05 GT ISCO Monitoring Locations FIG 3.dwg

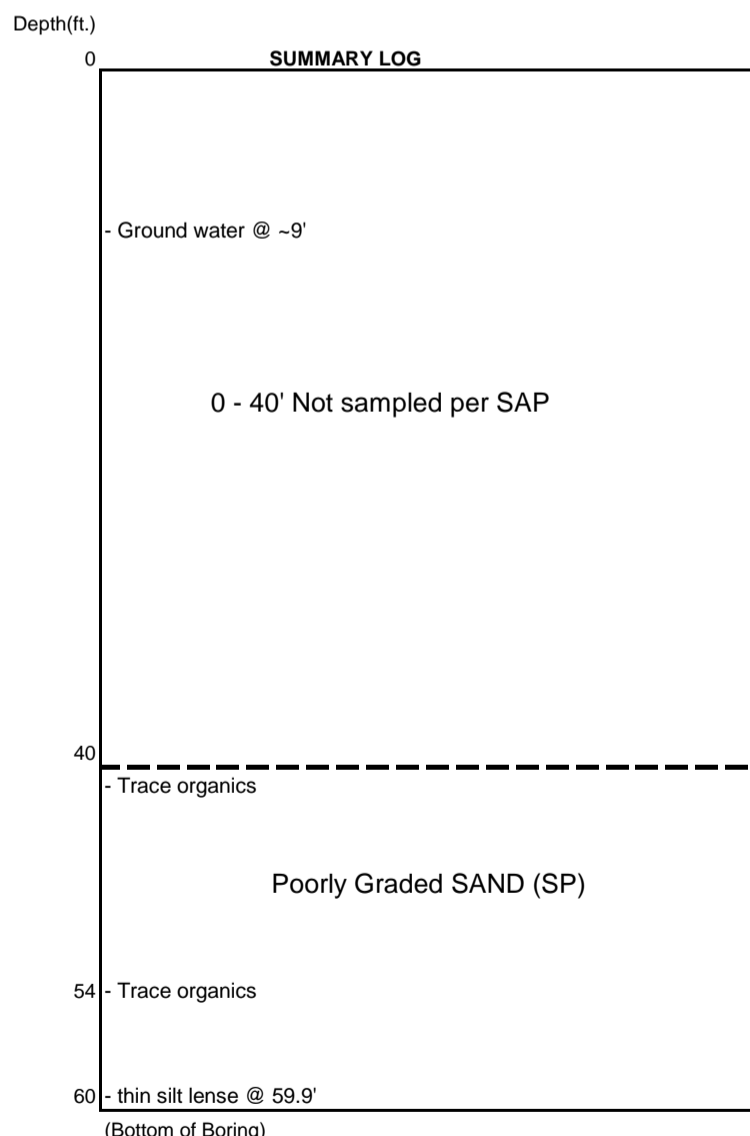


# Appendix A

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP1**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205463.9 E1271979.8 NAD83					
Driller: Kyle		Elevation (Ft.): 19.82 NAVD88		Ground Surface: soil			
Drill Type: Geoprobe 7730DT		Date Completed: 07/01/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
	40		0	40-45	60		40.0-41.0' Sat, V Dk Gry (7.5YR-3/1), F SAND, w/trace organics
	42		0				41.0-45.0' Sat, V Dk Gry, F SAND
	44		0				
	46		0	45-50	40		45.0-50.0' Sat, V DK Gry, F SAND
	48		0				
	53	1.4	0	50-55	60		50-54.5' Sat, V DK Gry, F SAND
	55	0.7	0				54.5'-55.0' Sat, V Dk Gry, silty, F SAND, w/trace organics
							Milky / turbid pore water
	57	0-0.7	0	55-60	60		55.0-57.0' Sat, V Dk Gry, F SAND
	60	0-0.7	0				57.0-60.0' Sat, V Dk Gry, F-M SAND
							Thin silt lense @ 59.9'



**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP1-070116 @ 1335

**Groundwater parameters:**

Temperature 19.5C  
pH 7.2  
Conductivity 791 uS/cm  
Turbidity 170 ntu  
ORP -84.2 mv  
DO 0.4 mg/l  
Sodium Persulfate 0 ppm

Completed boring backfilled with granular bentonite

**Abbreviations:**  
gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

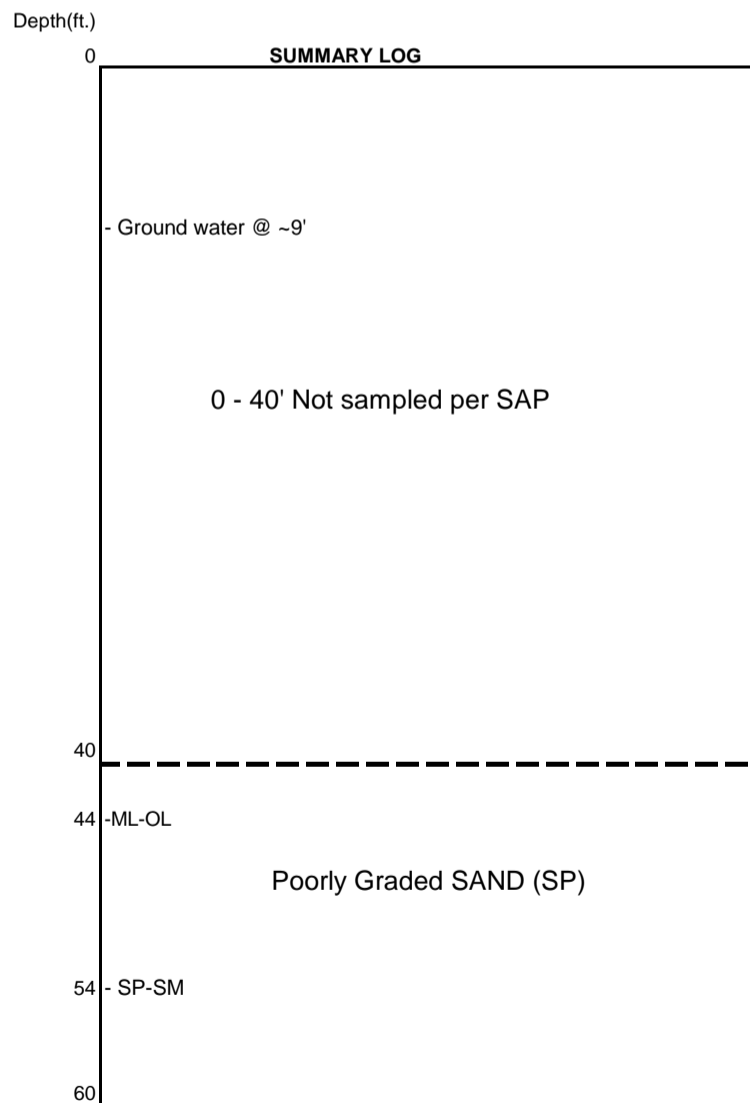
NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.



**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP2**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205453.6 E1271971.7 NAD83					
Driller: Kyle		Elevation (Ft.): 19.99 NAVD88		Ground Surface: Concrete sidewalk			
Drill Type: Geoprobe 7730DT		Date Completed: 07/01/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
	40		0	40-45	60		40.0-41.0' Sat, V Dk Gry (7.5YR-3/1), F SAND, w/some organics
	42		0				41.0-45.0' Sat, V Dk Gry, F SAND
	44		0				Thin organic silt interbed @ 44.8'
	46		0	45-50	50		45.0-50.0' Sat, V DK Gry, F SAND
	48		0				Trace silt @ 49.5-50'
	50		0				
	51	0.7	0	50-55	50		50-55' Sat, V DK Gry, F SAND, w/trace silt
	53	0.7	0				Silty fine sand interbed @ 54.8'
	55	0-0.3	0				Milky / turbid pore water
	57	0.0	0	55-60	60		55.0-59.2' Sat, V Dk Gry, F SAND
	59.5	0-0.7	0				59.2-60.0' Sat, V Dk Gry, F SAND, w/some silt



NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP2-070116 @ 1000

**Groundwater parameters:**

Temperature 18.6C  
pH 7.3  
Conductivity 1077 uS/cm  
Turbidity >1000 ntu  
ORP -61.3 mv  
DO 0.3 mg/l  
Sodium Persulfate 0 ppm

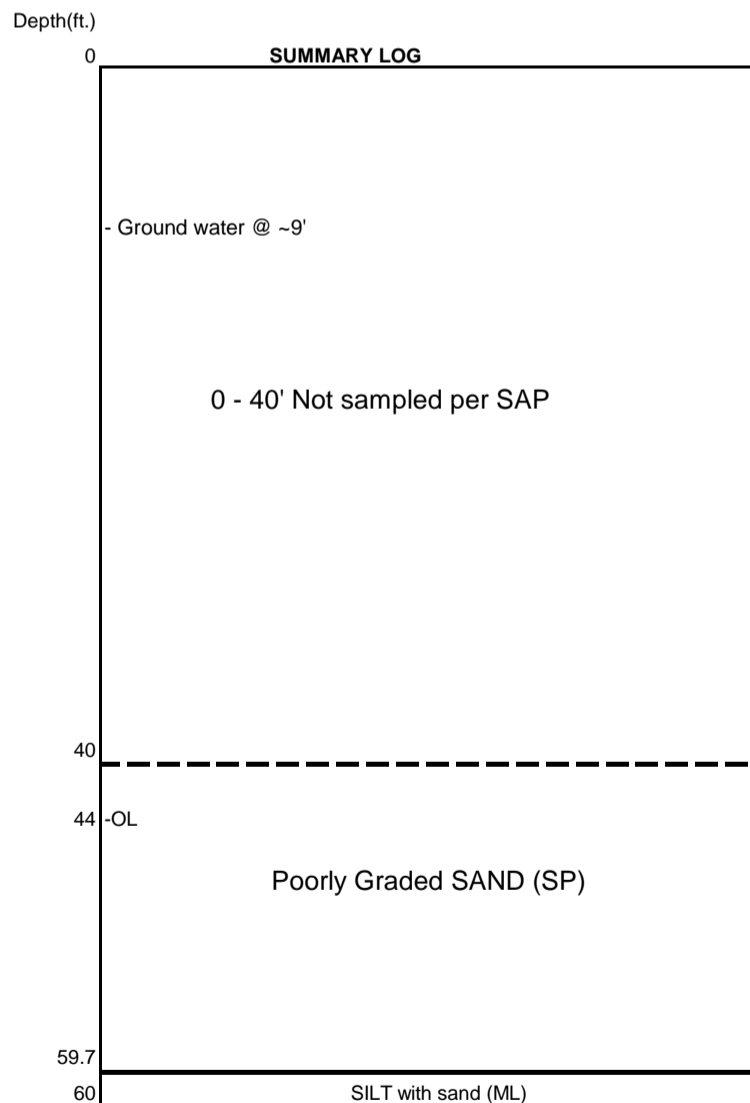
Completed boring backfilled with granular bentonite

**Abbreviations:**  
gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP3**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205463.4 E1271978.3 NAD83					
Driller: Kyle		Elevation (Ft.): 19.94 NAVD88		Ground Surface: Soil			
Drill Type: Geoprobe 6600		Date Completed: 07/08/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
				40-45	60		40.0-41.5' Sat, V Dk Gry (7.5YR-3/1), F SAND, w/trace organics
	42		1.5				41.5-45.0' Sat, V Dk Gry, F SAND
	44		0				0.1' organic interbed @ 44'
	46		0.6	45-50	60		45.0-50.0' Sat, V DK Gry, F SAND
	48		0.8				
	50		0				
	52		0.7	50-55	60		50-55' Sat, V DK Gry, F SAND
	54		0.3				54-55' Sat, V Dk Gry, Silty, F SAND
	56		0.5	55-60	60		55.0-59.0' Sat, V Dk Gry, F-M SAND
	58		0.4				59.0-59.7' Sat, V Dk Gry, silty, F SAND, w/trace organics
							59.7-60.0' Sat, V DK Gry, F sandy, SILT



(Bottom of Boring)

NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP3-070816 @ 1300

**Groundwater parameters:**

Temperature 18.9C  
pH 6.9  
Conductivity 366 uS/cm  
Turbidity 345 ntu  
ORP -20.2 mv  
DO 0.1 mg/l  
Sodium Persulfate 0.3 ppm

Completed boring backfilled with granular bentonite

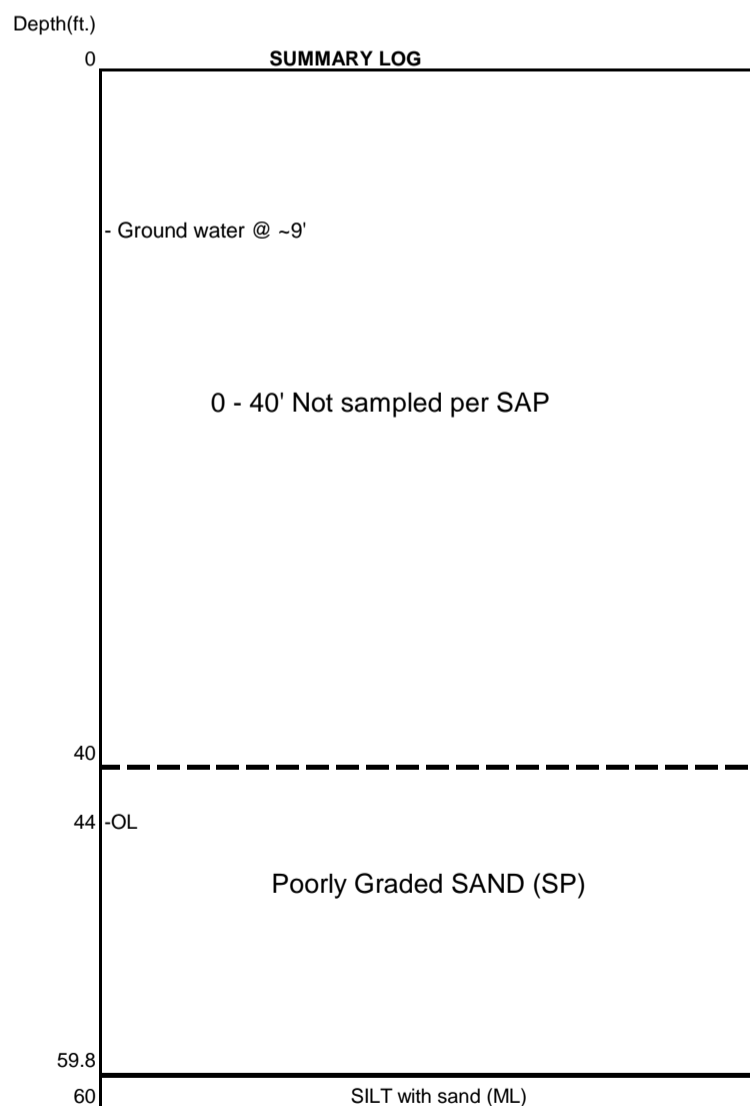
**Abbreviations:**

gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP4**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205454.3 E1271970.0 NAD83					
Driller: Kyle		Elevation (Ft.): 20.00 NAVD88		Ground Surface: Concrete sidewalk			
Drill Type: Geoprobe 6600		Date Completed: 07/08/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
				40-45	60		40.0-45' Sat, V Dk Gry (7.5YR-3/1), F-M SAND
	42		0				Competent organic (twig) @ 43.8
	44		0				Organic silt interbed @ 44.8'
	46		1.3	45-50	60		45.0-44.5' Sat, V DK Gry, F SAND
	48		1.8				44.5-50' Sat, V Dk Gry, silty, F SAND
	50		0.8				
	52		0.3	50-55	60		50-54.6' Sat, V DK Gry, F SAND
	54		1.6				54.6-55.0' Sat, V Dk Gry, Silty, F SAND , w/thin silt interbeds
	56		0	55-60	60		55.0-59.8' Sat, V Dk Gry, F SAND
	58		0				59.8-60.0' Sat, V Dk Gry, F sandy, SILT
	60		0				



**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP4-070816 @ 1030

**Groundwater parameters:**

Temperature 17.0C  
pH 7.1  
Conductivity 403 uS/cm  
Turbidity 18 ntu  
ORP -6.2 mv  
DO 0.2 mg/l  
Sodium Persulfate 1.4 ppm

Completed boring backfilled with granular bentonite

**Abbreviations:**  
gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

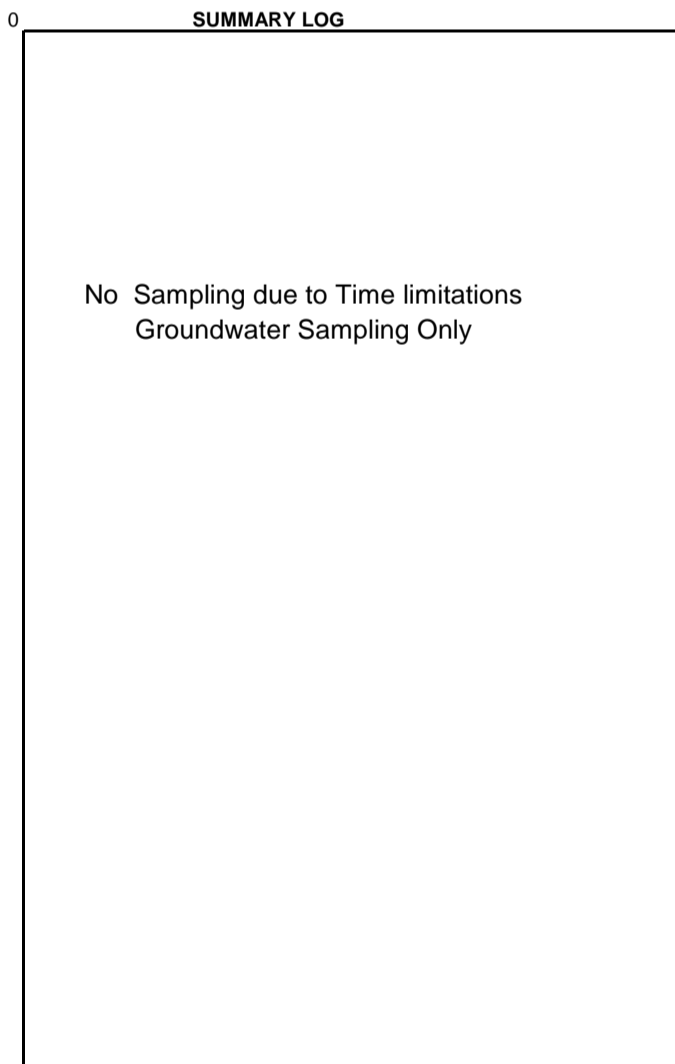
(Bottom of Boring)  
NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

BORING - DESCRIPTION OF SAMPLES & DATA

DP5

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205460.1 E1271970.7 NAD83					
Driller: Tim		Elevation (Ft.): 20.08 NAVD88		Ground Surface: Soil			
Drill Type: Geoprobe 7730DT		Date Completed: 07/15/16					
Size/Type Casing: 2"		Drill Type: Direct push			Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner		
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
							No Soil sampling
							Direct-Push to reveal groundwater screen

Depth(ft.)



NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot)  
Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs.  
Water sample collected: DP4-071516 @ 1030

- Groundwater parameters:**
- Temperature 23.3C
  - pH 7.4
  - Conductivity 989 uS/cm
  - Turbidity 279 ntu
  - ORP -12.1 mv
  - DO 0.4 mg/l
  - Sodium Persulfate 6 ppm

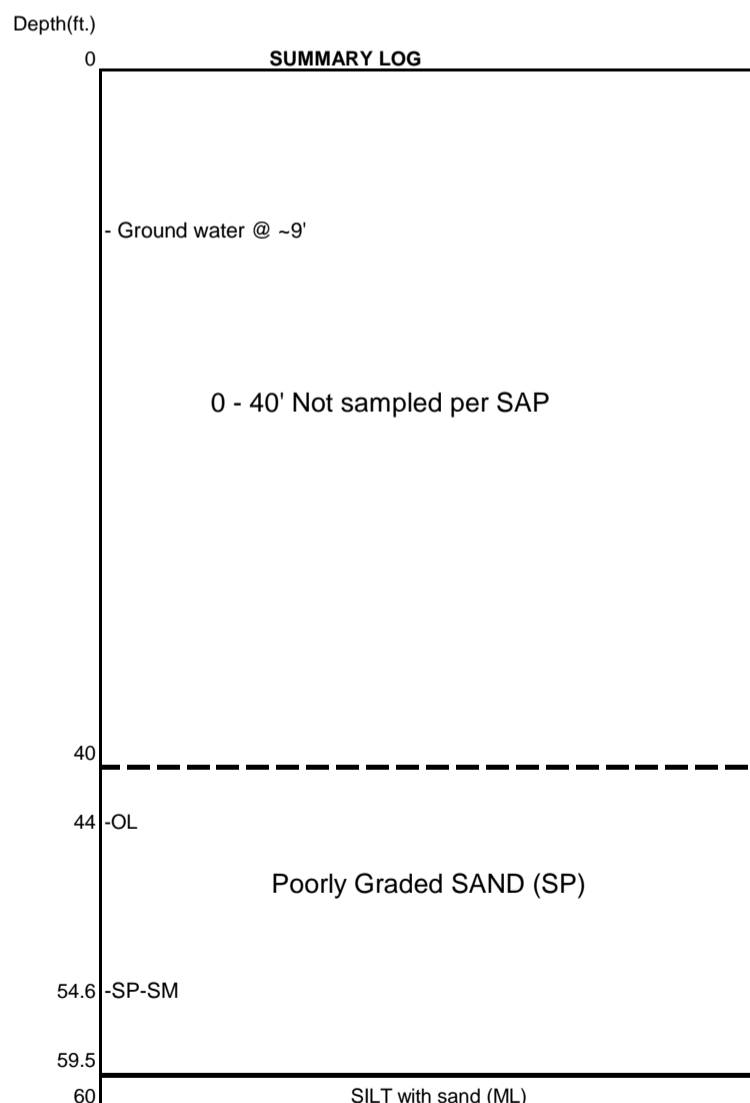
Completed boring backfilled with granular bentonite

**Abbreviations:**  
gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP6**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205452.2 E1271970.1 NAD83					
Driller: Tim		Elevation (Ft.): 20.00 NAVD88		Ground Surface: Concrete sidewalk			
Drill Type: Geoprobe 7730DT		Date Completed: 07/15/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
				40-45	60		40.0-45' Sat, V Dk Gry (7.5YR-3/1), F-M SAND
	42		0				Competent organic (wood) @ 44'
	44		0				Silty Sand interbed @ 44.8'
				45-50	0		Sat, V DK Gry, F SAND observed
					Liner jammed		
	52		0.3	50-55	60		50-54.6' Sat, V DK Gry, F SAND
	54		1.6				54.6-55.0' Sat, V Dk Gry, Silty, F SAND , w/thin silt interbeds
	57		0	55-60	60		55.0-59.5' Sat, V Dk Gry, F-M SAND
	59		0				59.5-60.0' Sat, V Dk Gry, F sandy, SILT



(Bottom of Boring)

NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP6-071516 @ 1510

**Groundwater parameters:**

Temperature 20.0C  
pH 7.2  
Conductivity 1002 uS/cm  
Turbidity 363 ntu  
ORP -7.6 mv  
DO 0.4 mg/l  
Sodium Persulfate 3.5 ppm

Completed boring backfilled with granular bentonite

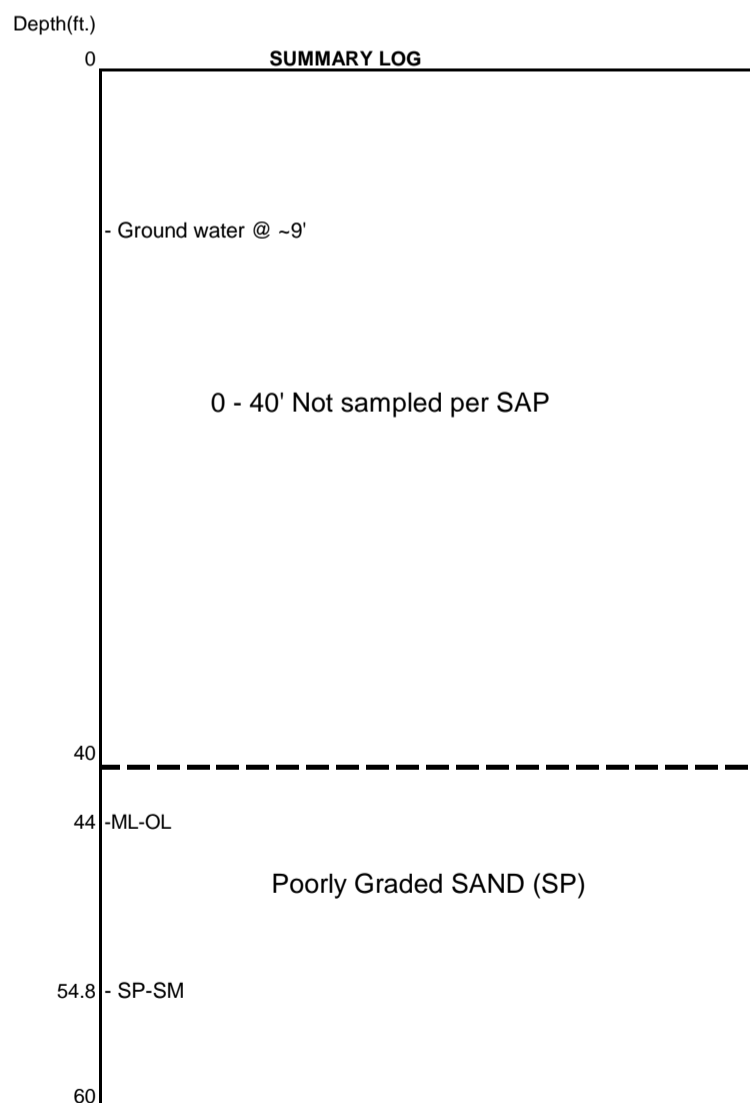
**Abbreviations:**

gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP7**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205460.0 E1271968.2 NAD83					
Driller: Kyle		Elevation (Ft.): 20.11 NAVD88		Ground Surface: Concrete sidewalk			
Drill Type: Geoprobe 6600		Date Completed: 08/05/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
				40-45	60		40.0-44.0' Sat, V Dk Gry (7.5YR-3/1), F-M SAND
	42		0				44.6-45.0' Sat, V Dk Gry, F Sandy, SILT, interbedded, trace organics
	44		0				
	46		0.9	45-50	50		45.0-50.0' Sat, V DK Gry, F-M SAND, w/trace gravel
	48		1.2				
	50		1.3				
	52		0	50-55	50		50-55' Sat, V DK Gry, F-M SAND
	54		0.4				F Sandy Silt interbed @ 54.8'
			0.5				
	56		0.9	55-60	60		55.0-60.0' Sat, V Dk Gry, F-M SAND, w/trace gravel
	58		1.7				
	60		0.5				



NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP7-080516 @ 1330

**Groundwater parameters:**

Temperature 17.8C  
pH 7.1  
Conductivity 1307 uS/cm  
Turbidity 160 ntu  
ORP -1.2 mv  
DO 0.05 mg/l  
Sodium Persulfate 0.7 ppm

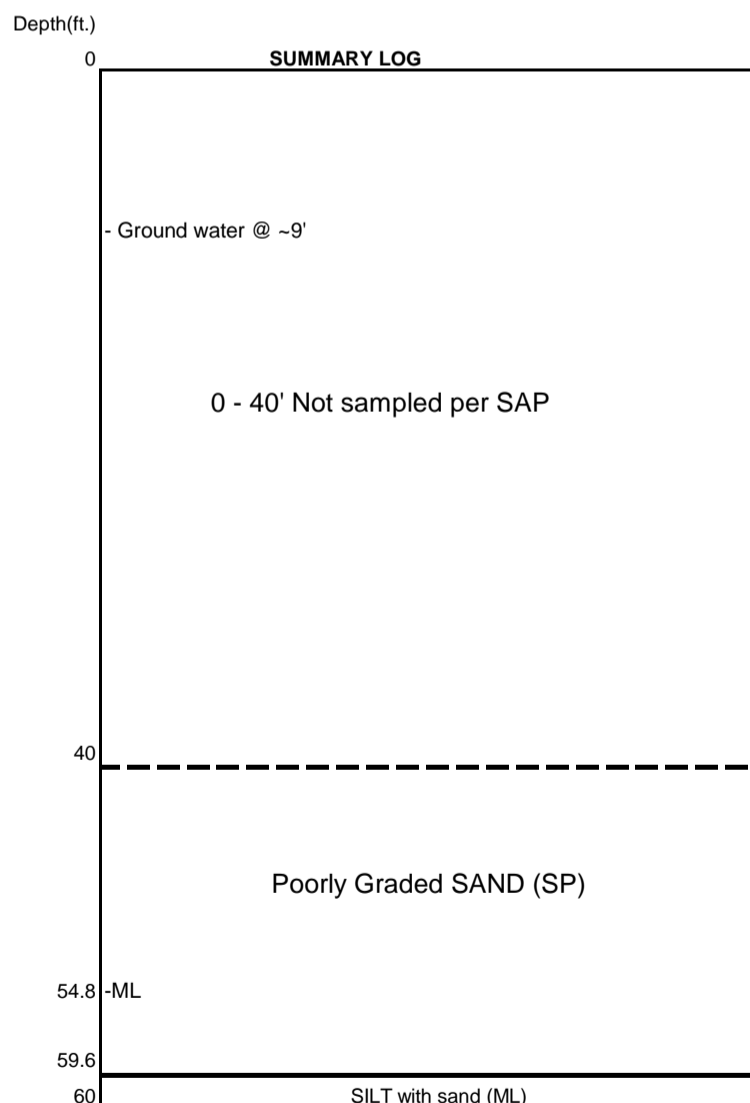
Completed boring backfilled with granular bentonite

**Abbreviations:**  
gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

**BORING - DESCRIPTION OF SAMPLES & DATA**

**DP8**

Field Rep: DG Cooper L.G.		Reviewed By: D. Cooper LG, LHG.					
Drilling Co.: Cascade		Location: N205452.4 E1271967.7 NAD83					
Driller: Tim		Elevation (Ft.): 20.05 NAVD88		Ground Surface: Concrete sidewalk			
Drill Type: Geoprobe 7730DT		Date Completed: 08/05/16					
Size/Type Casing: 2"		Drill Type: Direct push		Sampler Type: 5' long x 2" dia. Macro retained in an acrylic liner			
Sample Number	Sample Interval (ft. bgs.)	Sodium Persulfate (ppm)	PID (ppm)	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
				0-40			No sampling from 0-40' per SAP
				40-45	60		40.0-45' Sat, V Dk Gry (7.5YR-3/1), F-M SAND
	42		0				
	44		0				
	46		0	45-50	60		45.0-49.0' Sat, V Dk Gry, F SAND, w/trace silt
	48		0				49.0-50.0' Sat, V Dk Gry, F-M SAND
	50		0				
	52		0	50-55	60		50-54.8' Sat, V DK Gry, F-M SAND
	54		0				54.8-55.0' Sat, V Dk Gry, F Sandy, SILT
	56		0	55-60	60		55.0-59.6' Sat, V Dk Gry, F-M SAND
	58		0				59.6-60.0' Sat, V Dk Gry, F sandy, SILT
	60		0				



**Notes:** Temporary Screen set @ 53-57' below ground surface consisting of Geoprobe SP16 SS screen (0.004 slot) Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 55' bgs. Water sample collected: DP8-080516 @ 1100

**Groundwater parameters:**

Temperature 23.5C  
pH 6.9  
Conductivity 429 uS/cm  
Turbidity 102 ntu  
ORP 63.0 mv  
DO 0.17 mg/l  
Sodium Persulfate 2.8 ppm

Completed boring backfilled with granular bentonite

**Abbreviations:**

gry = gray; bwn = brown; blk = black; mot = mottled  
Sheen - NS= none, LS = Light, MS = Moderate, HS = Heavy  
Odor - NO= None, SLO = Slight, MO = Moderate, STO = Strong  
F = fine; M = medium  
Sat = Pores saturated with water

NOTE: The summary log is an interpretation based on samples, drill action and interpolation. Variations between what is shown and actual conditions should be anticipated.

**IMW-1**

**DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION - MONITORING WELL NO.**

Field Rep: D. Cooper		Reviewed by: D. Cooper, LG, LHG	
Drilling Co.: Cascade		Location: N205475.6 E1271970.6 NAD83	
Driller: Kyle		Ground surface elevation: 20.05 NAVD 88 Ground Surface:	
Drill Type: GeoProbe 7730DT		Date Completed: 6/16/2016	
Size/Type Casing: 2"		Drill Type: Direct-Push Sampler Type: 5' long x 2" dia. Macro retained in an acrylic sleeve	

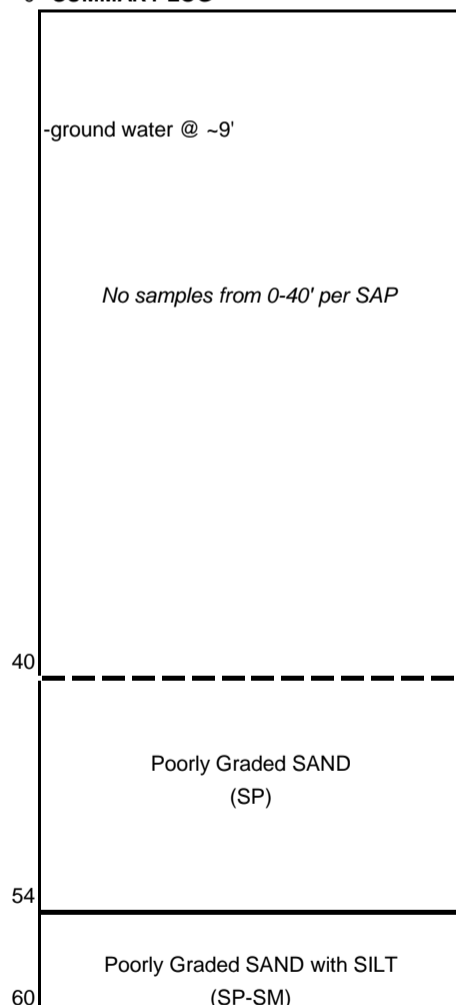
  

Spl. No.	Sample Interval (ft. bgs.)	PID (ppm)	Odor/Sheen	Spl Depth (Ft.) From - To	Spl length (inches)	Time	Sample Description
				0-40			No sampling from 0-40' according to SAP
	40	0.3	NO/NS	40-45	60		40.0-44.0' Sat, V Dk Gry (7.5YR-3/1), F-M SAND
	42	0.1	NO/NS			44.0-45.0' Sat, V Dk Gry, F SAND, w/trace silt	
	44	0.2	NO/NS			F Sandy, SILT interbed @ 44.0-44.2'	
	46	0.0	NO/NS	45-50	60		45.0-50.0' Sat, V Dk Gry, F-M SAND
	48	0.0	NO/NS				
	50	0.0	NO/NS				
	52	0.0	NO/NS	50-55	60		50.0-54.0' Sat, V Dk Gry, F-M SAND
	54	0.2	NO/NS			54.0-55.0' Sat, V Dk Gry, F SAND, w/trace to some silt	
			NO/NS				
	56	0.2	NO/NS	55-60	60		55.0-60.0' Sat, V Dk Gry, F SAND, w/some silt
	58	0.1	NO/NS			1/4" silt interbeds @ 59.5'	
	60	0.3	NO/NS				

Bottom of boring @ 60.0'

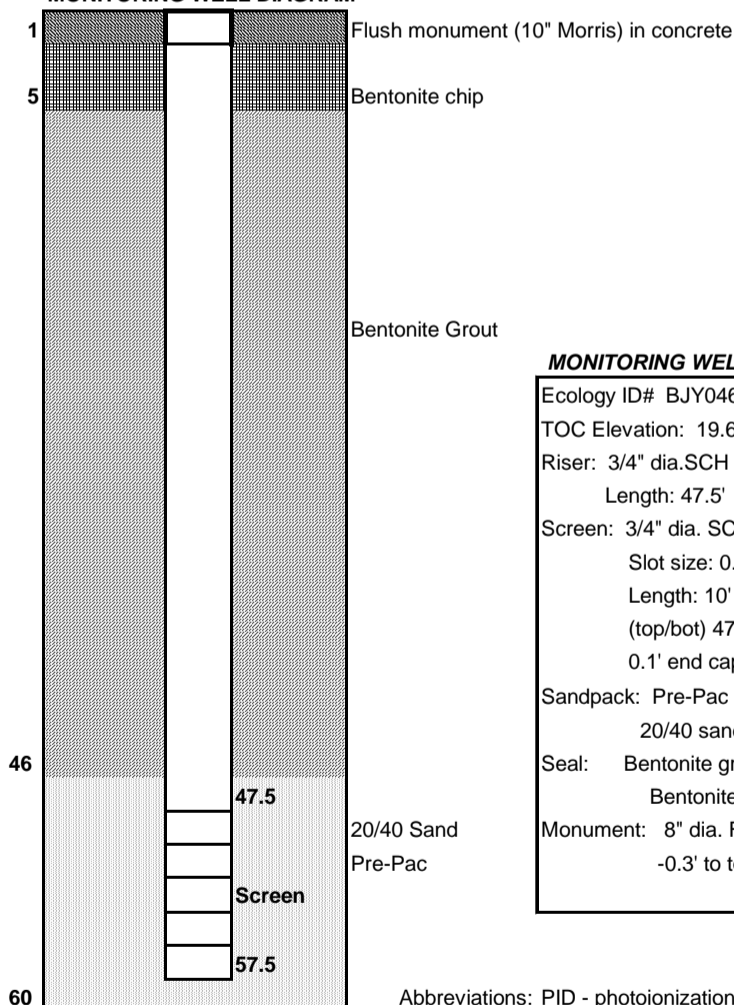
Depth(ft.)

**0 SUMMARY LOG**



(Bottom of Boring)

**MONITORING WELL DIAGRAM**



**MONITORING WELL INFORMATION**

Ecology ID# BJY046  
 TOC Elevation: 19.69 NAVD 88  
 Riser: 3/4" dia. SCH 40 PVC  
 Length: 47.5'  
 Screen: 3/4" dia. SCH 40 PVC  
 Slot size: 0.010"  
 Length: 10'  
 (top/bot) 47.5'/57.5'  
 0.1' end cap  
 Sandpack: Pre-Pac 20/40 colorado sand  
 20/40 sand backfill (top/bot) 46'/58'  
 Seal: Bentonite grout (top/bot) 5'/46'  
 Bentonite chip (top/bot) 1'/5'  
 Monument: 8" dia. Flush Mount (Morris)  
 -0.3' to top of PVC/TOC

Abbreviations: PID - photoionization detector - MiniRAE 3000

- F - fine
- M - medium
- Sat. - saturated
- mot - mottled
- NS - no sheen
- NO - no odor

NOTE: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.



**IMW-2**

**DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION - MONITORING WELL NO.**

Field Rep: D. Cooper		Reviewed by: D. Cooper, LG, LHG	
Drilling Co.: Cascade		Location: N205474.5 E1271967.1 NAD83	
Driller: Kyle		Ground surface elevation: 20.14 NAVD 88 Ground Surface:	
Drill Type: GeoProbe 7730DT		Date Completed: 6/16/2016	
Size/Type Casing: 2"		Drill Type: Direct-Push Sampler Type: 5' long x 2" dia. Macro retained in an acrylic sleeve	

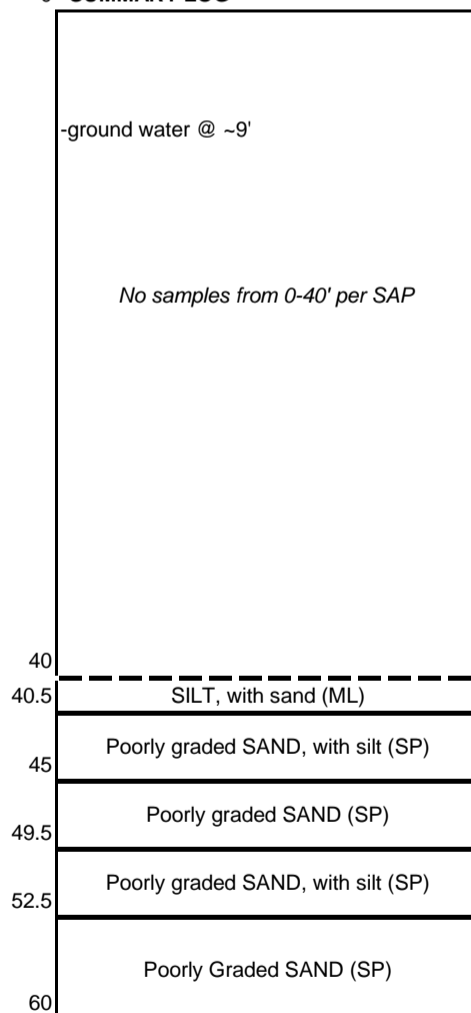
  

Spl. No.	Sample Interval (ft. bgs.)	PID (ppm)	Odor/Sheen	Spl Depth (Ft.) From - To	Spl length (inches)	Time	Sample Description
				0-40			No sampling from 0-40' according to SAP
	40	1.6	NO/NS	40-45	60		40.0-40.5' Sat, V Dk Gry (7.5YR-3/1), SILT, w/some sand
	42	0.3	NO/NS				40.5-45.0' Sat, V Dk Gry, F SAND, w/some silt
	44	0.2	NO/NS				Thin SILT interbed @ 44.0-44.2'
	46	0.0	NO/NS	45-50	60		45.0-49.5' Sat, V Dk Gry, F-M SAND
	48	0.0	NO/NS				49.5-50' Sat, V DK Gry, F SAND, w/trace silt
	50	0.0	NO/NS				
	52	0.0	NO/NS	50-55	60		50.0-52.5' Sat, V Dk Gry, F SAND, w/trace silt
	54	0	NO/NS				52.5-55.0' Sat, V Dk Gry, F-M SAND, w/trace organics
	56	0.8	NO/NS	55-60	60		55.0-59.0' Sat, V Dk Gry, F-M SAND
	58	0.0	NO/NS				59.0-60.0' Sat, V Dk Gry, F SAND, w/silty F Sand interbeds
	60	0.0	NO/NS				

Bottom of boring @ 60.0'

Depth(ft.)

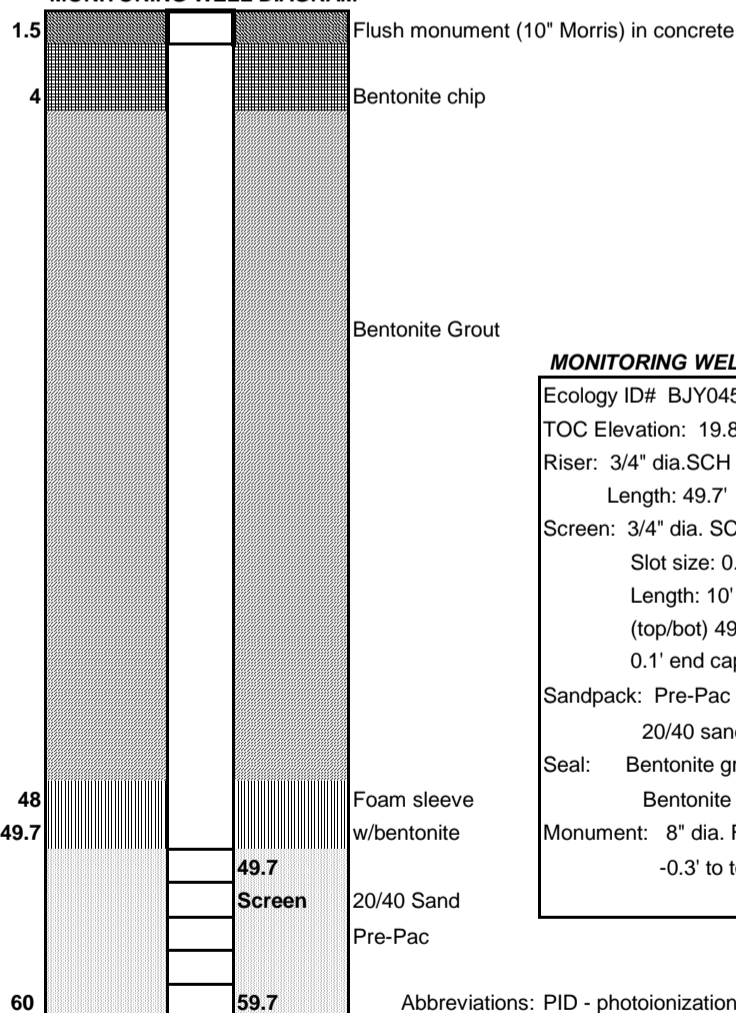
**0 SUMMARY LOG**



(Bottom of Boring)

NOTE: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

**MONITORING WELL DIAGRAM**



**MONITORING WELL INFORMATION**

Ecology ID# BJY045  
 TOC Elevation: 19.82 NAVD 88  
 Riser: 3/4" dia. SCH 40 PVC  
 Length: 49.7'  
 Screen: 3/4" dia. SCH 40 PVC  
 Slot size: 0.010"  
 Length: 10'  
 (top/bot) 49.7'/59.7'  
 0.1' end cap  
 Sandpack: Pre-Pac 20/40 colorado sand  
 20/40 sand backfill (top/bot) 46'/58'  
 Seal: Bentonite grout (top/bot) 4'/49.7'  
 Bentonite chip (top/bot) 1.5'/4'  
 Monument: 8" dia. Flush Mount (Morris)  
 -0.3' to top of PVC/TOC

Abbreviations: PID - photoionization detector - MiniRAE 3000

F - fine  
 M - medium  
 Sat. - saturated  
 mot - mottled  
 NS - no sheen  
 NO - no odor

PROJECT: STRCL-001 375.08	COORDINATES: 205469.7N 1271973.9E (NAD83)	
LOCATION: Intersection of Lucile St. and Maynard	SURFACE ELEVATION: 20'	
DRILLING CONTRACTOR: Cascade	DATE: 5/9/17	
DRILLING EQUIPMENT: CME-75	TOTAL DEPTH OF BORING: 60.5'	
DRILLING METHOD: Truck Mounted 10" OD Hollow-Stem Auger	LOGGED BY: D. Cooper	
SAMPLING METHOD: N/A	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600

DEPTH (feet)	SAMPLES				VISUAL SOIL DESCRIPTION  Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Lab Sample	Sample Recovery	Blows/Foot	PID (ppm)		
0						Mounument Type: 8" Diameter Morris Flush Mount
0-3.0'						Concrete to 3.0'
3.0'-50.0'					Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East	Riser Material: 2" diameter SCH 40 PVC
3.0'-50.0'						Grout Type: 3-45', CETCO Pure Gold medium bentonite chip
50.0'-60.0'						Riser Bottom Depth: 50.0'
50.0'-60.0'						Screen Top: 50'
50.0'-60.0'						Screen Material/Diameter: 10'-0.3' Diameter Johnson PVC Vee-Wire
50.0'-60.0'						Screen Type: Pre-Pac, 0.20" Slot, 10-20 sand
50.0'-60.0'						Sand Pack: 48-60.5', Colorado 10-20
60.0'-60.4'						Screen Bottom: 60.0'
60.0'-60.4'						End Cap Bottom: 60.4'
Drilling Comments						
Drilled Directly to 60' with auger plugged using wood plug. Auger Charged with water (~50 gallons). Plug pushed out and well installed. No Sampling No noticable heaving. Fine sand (SP) on auger flights, some silt with depth ~ 10%						

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

PROJECT: STRCL-001 375.08	COORDINATES: 205469.7N 1271979.9E (NAD83)	
LOCATION: Intersection of Lucile St. and Maynard	SURFACE ELEVATION: 20'	
DRILLING CONTRACTOR: Cascade	DATE: 5/8/17	
DRILLING EQUIPMENT: CME-75	TOTAL DEPTH OF BORING: 60.5'	
DRILLING METHOD: Truck Mounted 10" OD Hollow-Stem Auger	LOGGED BY: D. Cooper	
SAMPLING METHOD: N/A	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600

Ecology Tag #BKA-141

DEPTH (feet)	SAMPLES				VISUAL SOIL DESCRIPTION  Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Lab Sample	Sample Recovery	Blows/Foot	PID (ppm)		
5					Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East	Monument Type: 8" Diameter Morris Flush Mount Concrete to 3.0' Riser Material: 2" diameter SCH 40 PVC
10						Grout Type: 3-45', CETCO Pure Gold medium bentonite chip
15					Drilling Comments Drilled Directly to 60' with auger plugged using wood plug. Auger Charged with water (~50 gallons). Plug pushed out and well installed. No Sampling No noticeable heaving. Fine to medium sand (SP) on auger flights	
20						
25						
30						
35						
40						
45						45'-48', Pel Plug TR30 bentonite pellets
50						Riser Bottom Depth: 49.6' Screen Top: 49.6' Screen Material/Diameter: 10.0'- 0.3' Diameter Johnson PVC Vee-Wire Screen Type: Pre-Pac, 0.20" Slot, 10-20 sand Sand Pack: 48-60.5', Colorado 10-20
55						
60						Screen Bottom: 59.6' End Cap Bottom: 60.0'

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

PROJECT: STRCL-001 375.08	COORDINATES: 205464.8N 1271979.5E (NAD83)	
LOCATION: Intersection of Lucile St. and Maynard	SURFACE ELEVATION: 20'	
DRILLING CONTRACTOR: Cascade	DATE: 5/8/17	
DRILLING EQUIPMENT: CME-75	TOTAL DEPTH OF BORING: 60.5'	
DRILLING METHOD: Truck Mounted 10" OD Hollow-Stem Auger	LOGGED BY: D. Cooper	
SAMPLING METHOD: N/A	RESPONSIBLE PROF.: D. Cooper	REG. NO.: 1600

Ecology Tag #BKA-141

DEPTH (feet)	SAMPLES					VISUAL SOIL DESCRIPTION  Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Lab Sample	Sample Recovery	Blows/Foot	PID (ppm)			
5						Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East	Monument Type: 8" Diameter Morris Flush Mount Concrete to 3.0' Riser Material: 2" diameter SCH 40 PVC Grout Type: 3-45', CETCO Pure Gold medium bentonite chip
10							
15							
20							
25							
30						Drilled Comments Drilled Directly to 60' with auger plugged using wood plug. Auger Charged with water (~50 gallons). Plug pushed out and well installed. No Sampling No noticeable heaving. Fine to medium sand (SP) on auger flights	
35							
40							
45							45'-48', Pel Plug TR30 bentonite pellets
50							Riser Bottom Depth: 49.8' Screen Top: 49.8' Screen Material/Diameter: 10.0' - 0.3' Diameter Johnson PVC Vee-Wire Screen Type: Pre-Pac, 0.20" Slot, 10-20 sand Sand Pack: 48-60.5', Colorado 10-20
55							
60							Screen Bottom: 59.8' End Cap Bottom: 60.2'

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

## QA/QC SOLUTIONS, LLC



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July 30, 2018

William Beck and Duane Beery  
Stericycle Environmental Solutions, Inc.  
1800 72nd Avenue South, Suite 217  
Kent, Washington 98032

Subject: Georgetown ISB and ISCO Phase II Downgradient Area Revised Pilot Study  
Data Validation Review  
Client Project No.: 375.08 and STRCL-001  
QA/QC Solutions, LLC Project No.: 071416.1 (QA/QC Support, GT Pilot Study)

Dear Bill and Duane:

This letter documents the results of the data validation review of chemical analyses of selected inorganic and organic compounds completed on groundwater samples. The validated data are associated with Stericycle Environmental Solutions, Inc. Georgetown ISB and ISCO Phase II Downgradient Area Revised Pilot Study (DOF 2017) investigation completed in 2017 and 2018. Details on this investigation may be found in the project work plan (DOF 2017a) and the quality assurance project plan (DOF 2017b).

The data were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the data set, the analytical methods used to complete the chemical analyses, the data validation procedures used, and the overall assessment of data quality is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratories during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 81 results reported as detected were qualified as estimated (assigned a J qualifier).
- No results reported as detected required restatement as undetected (assigned a U qualifier).
- No results required rejection (R).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical

data that were reported as undetected (*U*) by the laboratory are usable. A summary of the qualified sample data and the reason(s) for qualification is presented in Table 2.

***\*Data users must note that results may be qualified for more than one reason. A summary of the qualified data and reasons for qualification are in Table 2.***

## Data Set

The data set consisted of aqueous samples collected during 13 events between May 2017 and May 2018. Sampling was completed by Dalton, Olmsted & Fuglevand, Inc. on behalf of Stericycle Environmental Solutions, Inc. A summary of the samples collected and the analyses completed is presented in Table 1.

Analyses for organic and inorganic compounds were completed by ALS Group USA Corp. dba ALS Environmental (ALS) located in Kelso, Washington. The data were reported in 13 service requests (see Table 1). ALS submitted complete hardcopy data validation deliverables and electronic data deliverables (EDDs).

## Analytical Methods

The analytical methods used by the laboratories to complete the chemical analyses included the following:

- Sulfate by ion chromatography using U.S. EPA Method 300.0 (U.S. EPA 1993).
- 1,4-Dioxane by separatory funnel extraction and analysis by GC/MS operated in the SIM mode to achieve lower reporting limits using U.S. EPA SW-846 Methods 3510C and 8270D, respectively (U.S. EPA 2018).
- Hexavalent chromium by spectrophotometric (diphenyl carbazide colorimetric) detection using U.S. EPA SW-846 Method 7196A (U.S. EPA 2018).
- Ferrous iron (divalent iron) by UV-Vis spectrophotometry using laboratory standard operating procedure (SOP) ApplEnvMic7-87-1536-1540.
- Dissolved metals (arsenic and chromium) by filtration through 0.45 µm filter, digestion with 1% nitric acid, and analysis by ICP-MS using U.S. EPA SW-846 Method 6020A (U.S. EPA 2018).
- Nitrite + Nitrate by automated colorimetry using U.S. EPA Method 353.2 (U.S. EPA 1993).

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 2B” review per U.S. EPA 2009, which is equivalent to “Level EPA2B” for use with the Washington Department of Ecology EIMS database). Data validation was completed according to requirements specified in the QAPP (DOF 2017b). of the Long-Term Groundwater Monitoring Plan (AMEC 2016). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002)

- *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review*. Final. OSWER 9240.1-45. USEPA/540/R-08/01 (U.S. EPA 2008).
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., sulfate) that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs or laboratory summary result forms to verify analytical holding times were met.
- Results for applicable instrument tuning, initial calibration, and continuing calibration verification (CCV) results to assess instrument performance.
- Results for applicable instrument blanks (i.e., initial calibration blanks [ICBs] and continuing calibration blanks [CCBs]), method blanks, trip blanks, and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory, during transport of samples, or during field sampling, respectively.
- Results for applicable internal standards performance (1,4-Dioxane analyses) to verify that instrument sensitivity and response was stable during the analysis of the samples.
- Results for applicable method-specific quality control measurements (e.g., ICP serial dilution and interference check samples for metals analyses) to assess potential matrix interference effects.
- Results for applicable surrogate compound, laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and matrix spike duplicate (MSD) recoveries to assess analytical accuracy.
- Results for applicable laboratory duplicate sample, duplicate LCS, and MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the data validation review. There may be

analytical problems that could only be identified by reviewing every instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory and applicable control limits specified in the analytical methods were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S. EPA (2002, 2008, and 2010) to the EDDs when applicable QC measurement criteria were not met and qualification of the data was warranted.

### Reasons for Data Qualification

The reasons for data qualification and a summary of the qualified data are summarized in Table 2, which included the following:

#### **Nitrite + Nitrate, Sulfate, Ferrous Iron, Hexavalent Chromium, Dissolved Arsenic, and 1,4-Dioxane Analyses:**

- A total of 26 results that were reported as detected at a concentration above the method detection limit (MDL), but less than the method reporting limit (MRL) were qualified as estimated (*J*). These qualified results may exhibit a greater degree of uncertainty than a concentration that is reported above the MRL.

#### **Nitrite + Nitrate Analyses:**

- A total of 4 results reported as undetected and/or detected were qualified as estimated (*J*) because the analysis was completed slightly past the method-specific holding time criterion of 48 hrs. from the date and time of sampling.

#### **Ferrous Iron Analyses:**

- A total of 51 results reported as undetected and/or detected were qualified as estimated (*J*) because the analysis was completed slightly past the method-specific holding time criterion of 24 hrs. from the date and time of sampling.

#### **Hexavalent Chromium Analyses:**

- A total of nine (9) results reported as undetected and/or detected were qualified as estimated (*J*) because the analysis was completed slightly past the method-specific holding time criterion of 48 hrs. from the date and time of sampling.

During data validation, it was determined that selected data-validation-specific and/or method-specific QA/QC measurement criteria were not met. Qualification of the sample results was not required because the overall quality of the data reported was not affected and, therefore, are not summarized herein.

In some instances, selected samples required dilution prior to analysis (as is required by the analytical methods) to obtain concentrations that were within the linear range of the instrument or to minimize the effects of matrix interferences to obtain reportable results.



William Beck and Duane Beery  
July 30, 2018  
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**Confidential & Privileged Client  
Communication and Work Product**

This concludes the data quality summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*  
James J. Mc Ateer, Jr., Managing Member

cc: Natasya Gray, L.G., Dalton, Olmsted & Fuglevand, Inc.

Attachments

## References

AMEC 2016. Quality Assurance Plan, 1,4-Dioxane Remediation, Stericycle Georgetown Facility Downgradient Area. March 2016. Prepared for Burlington Environmental, LLC (a wholly owned subsidiary of PSC Environmental Services, LLC, which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc.), Kent, Washington. Prepared by AMEC Foster Wheeler Environment & Infrastructure, Seattle, Washington and Dalton, Olmsted & Fuglevand, Inc., Kirkland, Washington.

DOF 2017a. Technical Memorandum: ISB and ISCO Phase II Downgradient Area Revised Pilot Study Work Plan. January 19, 2017. Prepared by Dalton, Olmsted & Fuglevand, Inc., Kirkland, Washington. Prepared for Stericycle Environmental Solutions, Inc., Corrective Actions Group. Kent, Washington.

DOF 2017b. Addendum: Quality Assurance Project Plan April 19, 2017. Prepared by Dalton, Olmsted & Fuglevand, Inc., Kirkland, Washington. Prepared for Stericycle Environmental Solutions, Inc., Corrective Actions Group. Kent, Washington.

U.S. EPA. 1993. Methods for the determination of inorganic substances in environmental samples. EPA/600/R-93/100. August. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

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U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

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U.S. EPA 2018. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on July 12, 2018). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

**Table 1. Summary of Samples Collected for ISB and ISCO Phase II Downgradient Area Revised Pilot Study I Sampling Events**

Sample Number	Laboratory Sample Number	Sample Date	Sample Time	Sample Depth	Sulfate by EPA 300.0	1,4-Dioxane by SW-846 8270D SIM	Hexavalent Chromium by SW-846 7196A	Ferrous Iron by laboratory SOP	Dissolved Metals by SW-846 Method 6020A	Nitrate + Nitrite by EPA 353.2	SW-846 Method 6010C
<b>Service Request No. K1704506</b>											
CG-161-60-0517	K1704506-001	5/4/17	11:13	54.5	✓	✓					
CG-127-40-0517	K1704506-002	5/4/17	12:00	35	✓	✓					
CG-127-75-0517	K1704506-003	5/4/17	12:33	70	✓	✓					
CG-9-127-75-0517	K1704506-004	5/4/17	12:33	70	✓	✓					
<b>Service Request No. K1705839</b>											
IMW-1-55-BL-060617	K1705839-001	6/6/17	11:00	Not specified	✓	✓	✓	✓	✓		
IMW-2-57.5-BL-060617	K1705839-002	6/6/17	11:40	Not specified	✓	✓	✓	✓	✓		
IP-5-58-BL-060617	K1705839-003	6/6/17	12:40	Not specified	✓	✓	✓	✓	✓		
IP-6-58-BL-060617	K1705839-004	6/6/17	13:30	Not specified	✓	✓	✓	✓	✓		
IP-7-58-BL-060617	K1705839-005	6/6/17	14:20	Not specified	✓	✓	✓	✓	✓		
CG122-60-BL-060617	K1705839-006	6/6/17	15:25	Not specified	✓	✓	✓	✓	✓		
CG122-75-BL-060617	K1705839-007	6/6/17	17:00	Not specified	✓	✓	✓	✓	✓		
IP-D-BL-060617	K1705839-008	6/6/17	13:35	Not specified	✓	✓	✓	✓	✓		
IP-FB-BL-060617	K1705839-009	6/6/17	17:30	0	✓	✓	✓	✓	✓		
<b>Service Request No. K1706268</b>											
CG127-40-BL-061517	K1706268-001	6/15/17	10:45	Not specified		✓		✓		✓	✓
CG127-75-BL-061517	K1706268-002	6/15/17	09:50	Not specified		✓		✓		✓	✓
CG-DU-061517	K1706268-003	6/15/17	09:55	Not specified		✓		✓		✓	✓
CG-FB-061517	K1706268-004	6/15/17	11:00	0		✓		✓		✓	✓
<b>Service Request No. K1706565</b>											
CG-127-40-062217	K1706565-001	6/22/17	11:15	Not specified		✓		✓			✓
CG-9-127-40-062217	K1706565-002	6/22/17	11:20	Not specified		✓		✓			✓
CG-127-75-0612217	K1706565-003	6/22/17	12:05	Not specified		✓		✓			✓
<b>Service Request No. K1706876</b>											
CG-127-40-062917	K1706876-001	6/29/17	11:55	Not specified		✓		✓		✓	✓
CG-9-127-40-062917	K1706876-002	6/29/17	12:00	Not specified		✓		✓		✓	✓
CG-127-75-062917	K1706876-003	6/29/17	11:08	Not specified		✓		✓		✓	✓
Field Blank	K1706876-004	6/29/17	11:30	0		✓					

Table 1, continued

Sample Number	Laboratory Sample Number	Sample Date	Sample Time	Sample Depth	Sulfate by EPA 300.0	1,4-Dioxane by SW-846 8270D SIM	Hexavalent Chromium by SW-846 7196A	Ferrous Iron by laboratory SOP	Dissolved Metals by SW-846 Method 6020A	Nitrate + Nitrite by EPA 353.2	SW-846 Method 6010C
<b>Service Request No. K1707384</b>											
CG-127-40-1G-07132017	K1707384-001	7/13/17	12:55	Not specified		✓		✓		✓	✓
CG-127-40-07132017	K1707384-002	7/13/17	13:20	Not specified		✓		✓		✓	✓
CG-127-75-1G-07132017	K1707384-003	7/13/17	13:40	Not specified		✓		✓		✓	✓
CG-127-75-07132017	K1707384-004	7/13/17	14:00	Not specified		✓		✓		✓	✓
CG-127-75-9-07132017	K1707384-005	7/13/17	14:05	Not specified		✓		✓		✓	✓
Field Blank 07132017	K1707384-006	7/13/17	14:15	0		✓					
<b>Service Request No. K1707614</b>											
IMW-1-07192017	K1707614-001	7/19/17	10:00	Not specified	✓	✓		✓			✓
IMV-2-07192017	K1707614-002	7/19/17	10:50	Not specified	✓	✓		✓			✓
IP-5-07192017	K1707614-003	7/19/17	11:45	Not specified	✓	✓					✓
IP-6-07192017	K1707614-004	7/19/17	12:30	Not specified	✓	✓					✓
IP-7-07192017	K1707614-005	7/19/17	13:00	Not specified	✓	✓					✓
CG-122-60-07192017	K1707614-006	7/19/17	15:00	Not specified	✓	✓		✓			✓
CG-122-75-07192017	K1707614-007	7/19/17	14:20	Not specified	✓	✓		✓			✓
CG-9-122-75-07192017	K1707614-008	7/19/17	14:25	Not specified	✓	✓		✓			✓
FB1-07192017	K1707614-009	7/19/17	15:05	0	✓	✓		✓			✓
<b>Service Request No. K1709181</b>											
IMW-1-08302017	K1709181-001	8/30/17	11:30	Not specified	✓	✓		✓			✓
IMW-2-08302017	K1709181-002	8/30/17	12:15	Not specified	✓	✓		✓			✓
IP-5-08302017	K1709181-003	8/30/17	14:20	Not specified	✓	✓					✓
IP-6-08302017	K1709181-004	8/30/17	13:45	Not specified	✓	✓					✓
IP-7-08302017	K1709181-005	8/30/17	13:15	Not specified	✓	✓					✓
CG-122-60-08302017	K1709181-006	8/30/17	10:15	Not specified	✓	✓		✓			✓
CG-122-75-08302017	K1709181-007	8/30/17	09:35	Not specified	✓	✓		✓			✓
CG-9-122-75-08302017	K1709181-008	8/30/17	09:40	Not specified	✓	✓		✓			✓
FB01-08302017	K1709181-009	8/30/17	10:20	0	✓	✓		✓			✓
<b>Service Request No. K1709916</b>											
CG-127-40-1G-091717	K1709916-001	9/17/17	10:02	Not specified		✓		✓		✓	✓

Table 1, continued

Sample Number	Laboratory Sample Number	Sample Date	Sample Time	Sample Depth	Sulfate by EPA 300.0	1,4-Dioxane by SW-846 8270D SIM	Hexavalent Chromium by SW-846 7196A	Ferrous Iron by laboratory SOP	Dissolved Metals by SW-846 Method 6020A	Nitrate + Nitrite by EPA 353.2	SW-846 Method 6010C
CG-127-40-091717	K1709916-002	9/17/17	10:30	Not specified		✓		✓		✓	✓
CG-09-127-40-091717	K1709916-003	9/17/17	10:35	Not specified		✓		✓		✓	✓
CG-127-75-1G-091717	K1709916-004	9/17/17	11:50	Not specified		✓		✓		✓	✓
CG-127-75-091717	K1709916-005	9/17/17	12:15	Not specified		✓		✓		✓	✓
<b>Service Request No. K1712610</b>											
IMW-1-112017	K1712610-001	11/20/17	10:40	Not specified	✓	✓		✓			✓
IMW-2-112017	K1712610-002	11/20/17	11:30	Not specified	✓	✓		✓			✓
CG-122-60-112017	K1712610-003	11/20/17	12:25	Not specified	✓	✓		✓			✓
CG-9-122-60-112017	K1712610-004	11/20/17	12:30	Not specified	✓	✓		✓			✓
IP-5-112017	K1712610-005	11/20/17	14:50	Not specified	✓	✓		✓			✓
IP-6-112017	K1712610-006	11/20/17	15:25	Not specified	✓	✓		✓			✓
IP-7-112017	K1712610-007	11/20/17	16:00	Not specified	✓	✓		✓			✓
CG-122-75-112017	K1712610-008	11/20/17	13:05	Not specified	✓	✓		✓			✓
FB1-112017	K1712610-009	11/20/17	13:00	0	✓	✓		✓			✓
<b>Service Request No. K1713453</b>											
CG-127-40-1G-121317	K1713453-001	12/13/17	11:40	Not specified		✓		✓		✓	✓
CG-127-40-121317	K1713453-002	12/13/17	12:05	Not specified		✓		✓		✓	✓
CG-9-127-40-121317	K1713453-003	12/13/17	12:10	Not specified		✓		✓		✓	✓
CG-127-75-1G-121317	K1713453-004	12/13/17	12:35	Not specified		✓		✓		✓	✓
CG-127-75-121317	K1713453-005	12/13/17	13:05	Not specified		✓		✓		✓	✓
FB-01	K1713453-006	12/13/17	12:50	0		✓		✓		✓	✓
<b>Service Request No. K1801813</b>											
IMW-1-022618	K1801813-001	2/26/18	13:20	Not specified	✓	✓		✓			✓
IMW-2-022618	K1801813-002	2/26/18	14:05	Not specified	✓	✓		✓			✓
IP-5-022618	K1801813-003	2/26/18	15:45	Not specified	✓	✓		✓			✓
IP-6-022618	K1801813-004	2/26/18	14:40	Not specified	✓	✓		✓			✓
IP-7-022618	K1801813-005	2/26/18	15:15	Not specified	✓	✓		✓			✓
CG-122-60-022618	K1801813-006	2/26/18	11:35	Not specified	✓	✓		✓			✓
CG-122-75-022618	K1801813-007	2/26/18	10:50	Not specified	✓	✓		✓			✓

Table 1, continued

Sample Number	Laboratory Sample Number	Sample Date	Sample Time	Sample Depth	Sulfate by EPA 300.0	1,4-Dioxane by SW-846 8270D SIM	Hexavalent Chromium by SW-846 7196A	Ferrous Iron by laboratory SOP	Dissolved Metals by SW-846 Method 6020A	Nitrate + Nitrite by EPA 353.2	SW-846 Method 6010C
CG-9-122-60-022618	K1801813-008	2/26/18	11:40	Not specified	✓	✓		✓			✓
FB-1-022618	K1801813-009	2/26/18	10:45	0	✓	✓		✓			✓
<b>Service Request No. K1804907</b>											
IMW-1-052318	K1804907-001	5/23/18	10:10	Not specified	✓	✓		✓	✓		✓
IMW-2-052318	K1804907-002	5/23/18	11:10	Not specified	✓	✓		✓	✓		✓
CG-122-60-052318	K1804907-003	5/23/18	11:55	Not specified	✓	✓		✓	✓		✓
CG-122-75-052318	K1804907-004	5/23/18	14:35	Not specified	✓	✓		✓	✓		✓
IP-5-052318	K1804907-005	5/23/18	15:20	Not specified	✓	✓		✓	✓		✓
IP-6-052318	K1804907-006	5/23/18	15:50	Not specified	✓	✓		✓	✓		✓
IP-7-052318	K1804907-007	5/23/18	16:20	Not specified	✓	✓		✓	✓		✓
CG-9-122-60-052318	K1804907-008	5/23/18	12:00	Not specified	✓	✓		✓	✓		✓
FB-01-052318	K1804907-009	5/23/18	14:40	0	✓	✓		✓	✓		✓
<b>Notes:</b>					<b>Total Number of Samples:</b>						
					58	86	9	74	18	23	71

**Table 2. Summary of Qualified Data for Georgetown Revised In Situ Chemical Oxidation Pilot Study Sampling Event<sup>a</sup>**

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Data		Quality Control Reason	Quality Control Result	Possible Bias <sup>b,c,d</sup>
							Laboratory Data Flag	Validation Qualifier			
<b>Conventional Parameters</b>											
CG-127-40-1G-091717	K1709916-001	Nitrite as Nitrogen	ND	mg/L	0.25	0.01	U	J	Method-specific holding time criterion not met	Sample analyzed >48 hrs. from date and time of collection	Low or high
CG-127-40-091717	K1709916-002	Nitrite as Nitrogen	ND	mg/L	0.25	0.01	U	J	Method-specific holding time criterion not met	Sample analyzed >48 hrs. from date and time of collection	Low or high
CG-09-127-40-091717	K1709916-003	Nitrite as Nitrogen	ND	mg/L	0.25	0.01	U	J	Method-specific holding time criterion not met	Sample analyzed >48 hrs. from date and time of collection	Low or high
CG-127-75-1G-091717	K1709916-004	Nitrite as Nitrogen	ND	mg/L	0.50	0.02	U	J	Method-specific holding time criterion not met	Sample analyzed >48 hrs. from date and time of collection	Low or high
CG-127-40-121317	K1713453-002	Nitrate+Nitrite as Nitrogen	0.031	mg/L	0.050	0.020	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-9-127-40-121317	K1713453-003	Nitrate+Nitrite as Nitrogen	0.033	mg/L	0.050	0.020	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-127-75-1G-121317	K1713453-004	Nitrate+Nitrite as Nitrogen	0.020	mg/L	0.050	0.020	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-127-75-121317	K1713453-005	Nitrate+Nitrite as Nitrogen	0.026	mg/L	0.050	0.020	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-122-75-022618	K1801813-007	Sulfate	0.07	mg/L	0.20	0.02	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-122-75-052318	K1804907-004	Sulfate	0.08	mg/L	0.20	0.02	J	J	Concentration >MDL, <MRL	NA	Low or high
<b>Metals</b>											
IMW-1-55-BL-060617	K1705839-001	Iron, Ferrous, Fe+2	0.25	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-2-57.5-BL-060617	K1705839-002	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-5-58-BL-060617	K1705839-003	Iron, Ferrous, Fe+2	1.30	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-6-58-BL-060617	K1705839-004	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-6-58-BL-060617	K1705839-004	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-7-58-BL-060617	K1705839-005	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG122-60-BL-060617	K1705839-006	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG122-75-BL-060617	K1705839-007	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-D-BL-060617	K1705839-008	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-FB-BL-060617	K1705839-009	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG127-40-BL-061517	K1706268-001	Iron, Ferrous, Fe+2	9.59	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high

Table 2, continued

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Data Laboratory Validation		Quality Control Reason	Quality Control Result	Possible Bias <sup>b,c,d</sup>
							Data Flag	Qualifier			
CG127-75-BL-061517	K1706268-002	Iron, Ferrous, Fe+2	0.62	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-DU-061517	K1706268-003	Iron, Ferrous, Fe+2	0.54	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-FB-061517	K1706268-004	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-062217	K1706565-001	Iron, Ferrous, Fe+2	11.0	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-9-127-40-062217	K1706565-002	Iron, Ferrous, Fe+2	12.6	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-0612217	K1706565-003	Iron, Ferrous, Fe+2	0.78	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-062917	K1706876-001	Iron, Ferrous, Fe+2	7.95	mg/L	0.40	0.10		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-9-127-40-062917	K1706876-002	Iron, Ferrous, Fe+2	12.4	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-062917	K1706876-003	Iron, Ferrous, Fe+2	0.59	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-1G-07132017	K1707384-001	Iron, Ferrous, Fe+2	10.5	mg/L	0.40	0.10		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-07132017	K1707384-002	Iron, Ferrous, Fe+2	3.90	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-1-07192017	K1707614-001	Iron, Ferrous, Fe+2	0.84	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMV-2-07192017	K1707614-002	Iron, Ferrous, Fe+2	1.87	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-1-08302017	K1709181-001	Iron, Ferrous, Fe+2	1.96	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-122-60-08302017	K1709181-006	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-122-75-08302017	K1709181-007	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-9-122-75-08302017	K1709181-008	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
FB01-08302017	K1709181-009	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-1G-091717	K1709916-001	Iron, Ferrous, Fe+2	5.6	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high



Table 2, continued

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Data Laboratory Validation		Quality Control Reason	Quality Control Result	Possible Bias <sup>b,c,d</sup>
							Data Flag	Qualifier			
CG-127-40-091717	K1709916-002	Iron, Ferrous, Fe+2	7.8	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-09-127-40-091717	K1709916-003	Iron, Ferrous, Fe+2	5.9	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-1G-091717	K1709916-004	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-091717	K1709916-005	Iron, Ferrous, Fe+2	ND	mg/L	0.20	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-1-112017	K1712610-001	Iron, Ferrous, Fe+2	9.6	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-2-112017	K1712610-002	Iron, Ferrous, Fe+2	12.6	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-122-60-112017	K1712610-003	Iron, Ferrous, Fe+2	6.9	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-9-122-60-112017	K1712610-004	Iron, Ferrous, Fe+2	6.9	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-1G-121317	K1713453-001	Iron, Ferrous, Fe+2	6.8	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-40-121317	K1713453-002	Iron, Ferrous, Fe+2	10.6	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-9-127-40-121317	K1713453-003	Iron, Ferrous, Fe+2	12.9	mg/L	1.0	0.3		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-1G-121317	K1713453-004	Iron, Ferrous, Fe+2	0.80	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-127-75-121317	K1713453-005	Iron, Ferrous, Fe+2	0.13	mg/L	0.20	0.05	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
FB-01	K1713453-006	Iron, Ferrous, Fe+2	0.06	mg/L	0.20	0.05	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
IP-5-022618	K1801813-003	Iron, Ferrous, Fe+2	5.00	mg/L	0.20	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-1-052318	K1804907-001	Iron, Ferrous, Fe+2	2.68	mg/L	0.4	0.1		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-2-052318	K1804907-002	Iron, Ferrous, Fe+2	1.09	mg/L	0.2	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-122-60-052318	K1804907-003	Iron, Ferrous, Fe+2	1.1	mg/L	0.2	0.05		J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
CG-122-75-052318	K1804907-004	Iron, Ferrous, Fe+2	0.08	mg/L	0.2	0.05	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high

Table 2, continued

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Data		Quality Control Reason	Quality Control Result	Possible Bias <sup>b,c,d</sup>
							Laboratory Data Flag	Validation Qualifier			
CG-9-122-60-052318	K1804907-008	Iron, Ferrous, Fe+2	0.68	mg/L	0.2	0.05	J		Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
FB-01-052318	K1804907-009	Iron, Ferrous, Fe+2	ND	mg/L	0.2	0.05	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IMW-1-55-BL-060617	K1705839-001	Chromium, Hexavalent	0.039	mg/L	0.05	0.004	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
IMW-2-57.5-BL-060617	K1705839-002	Chromium, Hexavalent	0.005	mg/L	0.05	0.004	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
IP-5-58-BL-060617	K1705839-003	Chromium, Hexavalent	ND	mg/L	0.05	0.004	U	J	Method-specific holding time criterion not met	Sample analyzed >24 hrs. from date and time of collection	Low or high
IP-6-58-BL-060617	K1705839-004	Arsenic, Dissolved Chromium, Hexavalent	0.00043	mg/L mg/L	0.0005 0.05	8E-05 0.004	J U	J J	Concentration >MDL, <MRL Method-specific holding time criterion not met	NA Sample analyzed >24 hrs. from date and time of collection	Low or high Low or high
IP-7-58-BL-060617	K1705839-005	Chromium, Hexavalent	0.01	mg/L	0.05	0.004	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
CG122-60-BL-060617	K1705839-006	Chromium, Hexavalent	0.008	mg/L	0.05	0.004	J	J	Method-specific holding time criterion not met and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
CG122-75-BL-060617	K1705839-007	Arsenic, Dissolved Chromium, Hexavalent	0.00017 0.013	mg/L mg/L	0.00050 0.050	0.00008 0.004	J J	J J	Concentration >MDL, <MRL Method-specific holding time criterion not met and concentration >MDL, <MRL	NA Sample analyzed >24 hrs. from date and time of collection and NA	Low or high Low or high
IP-D-BL-060617	K1705839-008	Arsenic, Dissolved Chromium, Hexavalent	0.00046 0.011	mg/L mg/L	0.00050 0.050	0.00008 0.004	J J	J J	Concentration >MDL, <MRL Method-specific holding time criterion not met and concentration >MDL, <MRL	NA Sample analyzed >24 hrs. from date and time of collection and NA	Low or high Low or high
IP-FB-BL-060617	K1705839-009	Chromium, Dissolved Chromium, Hexavalent	0.00007 ND	mg/L mg/L	0.00020 0.050	0.00004 0.004	J U	J J	Concentration >MDL, <MRL Method-specific holding time criterion not met	NA Sample analyzed >24 hrs. from date and time of collection	Low or high Low or high
CG-FB-061517	K1706268-004	Iron	18	ug/L	21	3	J	J	Concentration >MDL, <MRL	NA	Low or high
FB1-112017	K1712610-009	Iron	0.003	mg/L	0.010	0.0003	J	J	Concentration >MDL, <MRL	NA	Low or high
CG-122-75-052318	K1804907-004	Arsenic, Dissolved	0.00010	mg/L	0.00050	0.00009	J	J	Concentration >MDL, <MRL	NA	Low or high
IP-7-052318	K1804907-007	Chromium, Dissolved	0.0025	mg/L	0.0040	0.0006	J	J	Concentration >MDL, <MRL	NA	Low or high
FB-01-052318	K1804907-009	Chromium, Dissolved Iron	0.00004 0.0016	mg/L mg/L	0.00020 0.0020	0.00003 0.0003	J J	J J	Concentration >MDL, <MRL Concentration >MDL, <MRL	NA NA	Low or high Low or high
<b>1,4-Dioxane</b>											
FB-1-022618	K1801813-009	1,4-Dioxane	0.27	ug/L	0.40	0.16	J	J	Concentration >MDL, <MRL	NA	Low or high

Notes:

- J - estimated
- MDL - method detection limit
- MRL - method reporting limit
- ND - not detected
- U - undetected at detection limit shown

Total results qualified "J" =	81
Total results qualified "U" =	0
Total results qualified "UJ" =	0
Total results qualified "R" =	0

<sup>a</sup> Summary of qualified data is for natural and field quality control samples only

<sup>b</sup> Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported

<sup>c</sup> High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported

<sup>d</sup> False positive - compound is likely not present



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F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

June 30, 2017

**Analytical Report for Service Request No: K1705839**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown / STRCL-001**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory June 08, 2017  
For your reference, these analyses have been assigned our service request number **K1705839**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Kurt Clarkson  
Client Services  
Manager



---

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1705839  
**Project:** PSC Georgetown/STRCL-001      **Date Received:** 06/08/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Nine water samples were received for analysis at ALS Environmental on 06/08/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C/frozen at -20°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Hexavalent Chromium by EPA Method 7196A and Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

All samples were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

##### **Hexavalent Chromium by EPA Method 7196A:**

The Relative Percent Difference (RPD) criterion for the replicate analysis in sample IMW-1-55-BL-060617 was not applicable because the analyte concentration was not significantly greater than the Method Reporting Limit (MRL). Analytical values derived from measurements close to the detection limit are not subject to the same accuracy and precision criteria as results derived from measurements higher on the calibration range for the method.

#### Dissolved Metals

No anomalies associated with the analysis of these samples were observed.

#### Semivolatile Organic Compounds by EPA Method 8270

No anomalies associated with the analysis of these samples were observed.

Approved by





# Chain of Custody

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1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



CHAIN OF CUSTODY

79991

003

SR# K1705839  
 COC Set \_\_\_\_\_ of \_\_\_\_\_  
 COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
 www.alsglobal.com

Project Name <b>RSC GEDGETOWN</b>		Project Number <b>STRCL-001</b>		NUMBER OF CONTAINERS	24H	7D	28D	180D	Remarks	
Project Manager <b>TRACY GRAY</b>		Company <b>DOF</b>			7196A / Cr6	Appl/Env/Mtr/7-87-1536-1540/	8270D / 1,4-Dioxane	300.0 / SO4		5020A / Metals D
Address <b>10327 NE 68TH ST, SUITE B, WILKLAND WA</b>		Phone # <b>206-375-0211</b>								
Sampler Signature <i>[Signature]</i>		Sampler Printed Name <b>NG COOPER</b>								
email <b>NGRAY@DOF.NW.COM</b>										
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	1	2	3	4	5	6
1. <b>IMW1-55-BL-060617</b>		<b>6/6/17</b>	<b>1100</b>	<b>WATER</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
2. <b>IMW-2-57.5-BL-060617</b>			<b>1140</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
3. <b>IP-5-58-BL-060617</b>			<b>1240</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
4. <b>IP-6-58-BL-060617</b>			<b>1330</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
5. <b>IP-7-58-BL-060617</b>			<b>1420</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
6. <b>CG122-60-BL-060617</b>			<b>1525</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
7. <b>CG122-75-BL-060617</b>			<b>1700</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
8. <b>IP-D-BL-060617</b>			<b>1335</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
9. <b>IP-F3-BL-060617</b>			<b>1730</b>		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
10.										

- Report Requirements**
- I. Routine Report: Method Blank, Surrogate, as required
  - II. Report Dup., MS, MSD as required
  - III. CLP Like Summary (no raw data)
  - IV. Data Validation Report
  - V. EDD

**Invoice Information**

P.O.# **375.08**

Bill To: **BILL BELK**  
**SPRACYCLZ**

**Turnaround Requirements**

24 hr.  48 hr.

Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Dissolved Metals: Al (As) Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: \*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other \_\_\_\_\_ (Circle One)

**- DISSOLVED METALS SAMPLES FIELD FILTERED DRY**  
**- USE EXACT SAMPLE VOLUME TO PERFORM MS/MSD**

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <i>[Signature]</i>	Signature <i>[Signature]</i>	Signature <i>[Signature]</i>	Signature <i>[Signature]</i>	Signature <i>[Signature]</i>	Signature <i>[Signature]</i>
Printed Name <b>NG COOPER</b>	Printed Name <b>PERVEX LINDA CARTON</b>	Printed Name <b>STRCL</b>	Printed Name <b>ALS</b>	Printed Name <b>ALS</b>	Printed Name <b>ALS</b>
Firm <b>DOF</b>	Firm <b>STRCL</b>	Firm <b>STRCL</b>	Firm <b>6/8/17 0930</b>	Firm <b>6/8/17 0930</b>	Firm <b>6/8/17 0930</b>
Date/Time <b>6/7/17 1200</b>	Date/Time <b>6/8/17 1200</b>	Date/Time <b>6/8/17 1200</b>	Date/Time <b>6/8/17 0930</b>	Date/Time <b>6/8/17 0930</b>	Date/Time <b>6/8/17 0930</b>



PC KL

### Cooler Receipt and Preservation Form

Client DOF Service Request K17 05839  
 Received 6/8/17 Opened: 6/8/17 By: [Signature] Unloaded: 6/8/17 By: [Signature]

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other NA
- Were custody seals on coolers? NA  Y  N If yes, how many and where? one front  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
4.8	4.6	5.8	5.6	-0.2	381		7868 2636 9637	

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.* NA  Y  N
- Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: No extra volume rec'd for QC.

**SHORT HOLD TIME**



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
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Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1705839  
**Date Collected:** 06/6/17  
**Date Received:** 06/8/17  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-55-BL-060617	K1705839-001	<b>906</b>	20	2	200	06/26/17 17:14	6/26/17	
IMW-2-57.5-BL-060617	K1705839-002	<b>686</b>	10	1	100	06/26/17 17:24	6/26/17	
IP-5-58-BL-060617	K1705839-003	<b>1170</b>	20	2	200	06/26/17 17:34	6/26/17	
IP-6-58-BL-060617	K1705839-004	<b>328</b>	5.0	0.5	50	06/26/17 17:44	6/26/17	
IP-7-58-BL-060617	K1705839-005	<b>497</b>	10	1	100	06/26/17 17:55	6/26/17	
CG122-60-BL-060617	K1705839-006	<b>167</b>	5.0	0.5	50	06/26/17 18:05	6/26/17	
CG122-75-BL-060617	K1705839-007	ND U	0.20	0.02	2	06/26/17 14:01	6/26/17	
IP-D-BL-060617	K1705839-008	<b>333</b>	5.0	0.5	50	06/26/17 18:15	6/26/17	
IP-FB-BL-060617	K1705839-009	ND U	0.10	0.01	1	06/26/17 12:50	6/26/17	
Method Blank	K1705839-MB	ND U	0.10	0.01	1	06/26/17 10:19	6/26/17	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1705839  
**Date Collected:** NA  
**Date Received:** NA

**Units:** mg/L  
**Basis:** NA

**Replicate Sample Summary**  
**Sulfate**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
Batch QC	K1705942-001DUP	0.20	0.02	7.67	7.58	7.62	1	20	06/26/17
Batch QC	K1705942-002DUP	0.20	0.02	12.7	12.7	12.7	<1	20	06/26/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 06/26/17  
**Date Extracted:** 06/26/17

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1705942-001 **Basis:** NA  
**Analysis Method:** 300.0  
**Prep Method:** Method

Analyte Name	Sample Result	Result	Matrix Spike K1705942-001MS		Duplicate Matrix Spike K1705942-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	7.67	18.1	10.0	105	18.0	10.0	104	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 06/26/17  
**Date Extracted:** 06/26/17

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1705942-002 **Basis:** NA  
**Analysis Method:** 300.0  
**Prep Method:** Method

Analyte Name	Sample Result	Result	Matrix Spike K1705942-002MS		Duplicate Matrix Spike K1705942-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	12.7	23.2	10.0	105	23.0	10.0	104	90-110	<1	20

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Analyzed:** 06/26/17  
**Date Extracted:** 06/26/17

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 551488

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1705839-LCS	5.21	5.00	104	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	551488	KQ1708592-01	06/26/17 10:29	5.00	5.19	104	90-110
CCV2	551488	KQ1708592-02	06/26/17 12:30	5.00	5.10	102	90-110
CCV3	551488	KQ1708592-03	06/26/17 14:31	5.00	5.11	102	90-110
CCV4	551488	KQ1708592-04	06/26/17 16:33	5.00	5.11	102	90-110
CCV5	551488	KQ1708592-05	06/26/17 18:35	5.00	5.11	102	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:**K1705839

**Continuing Calibration Blank (CCB) Summary**  
**Sulfate**

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	551488	KQ1708592-06	06/26/17 10:39	0.10	0.01	ND	U
CCB2	551488	KQ1708592-07	06/26/17 12:40	0.10	0.01	ND	U
CCB3	551488	KQ1708592-08	06/26/17 14:42	0.10	0.01	ND	U
CCB4	551488	KQ1708592-09	06/26/17 16:44	0.10	0.01	ND	U
CCB5	551488	KQ1708592-10	06/26/17 18:46	0.10	0.01	ND	U

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 7196A  
**Prep Method:** None

**Service Request:** K1705839  
**Date Collected:** 06/6/17  
**Date Received:** 06/8/17  
**Units:** mg/L  
**Basis:** NA

Chromium, Hexavalent

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-55-BL-060617	K1705839-001	0.039 J	0.050	0.004	1	06/08/17 12:29	*
IMW-2-57.5-BL-060617	K1705839-002	0.005 J	0.050	0.004	1	06/08/17 12:29	*
IP-5-58-BL-060617	K1705839-003	ND U	0.050	0.004	1	06/08/17 12:29	*
IP-6-58-BL-060617	K1705839-004	ND U	0.050	0.004	1	06/08/17 12:29	*
IP-7-58-BL-060617	K1705839-005	0.010 J	0.050	0.004	1	06/08/17 12:29	*
CG122-60-BL-060617	K1705839-006	0.008 J	0.050	0.004	1	06/08/17 12:29	*
CG122-75-BL-060617	K1705839-007	0.013 J	0.050	0.004	1	06/08/17 12:29	*
IP-D-BL-060617	K1705839-008	0.011 J	0.050	0.004	1	06/08/17 12:29	*
IP-FB-BL-060617	K1705839-009	ND U	0.050	0.004	1	06/08/17 12:29	*
Method Blank	K1705839-MB	ND U	0.050	0.004	1	06/08/17 12:29	*

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/08/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1705839-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Chromium, Hexavalent	7196A	0.050	0.004	0.039 J	0.008 J	0.0232	135 *	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/8/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Chromium, Hexavalent**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001  
**Analysis Method:** 7196A  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike K1705839-001MS		Duplicate Matrix Spike K1705839-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Chromium, Hexavalent	0.039 J	0.346	0.400	77	0.346	0.400	77	75-125	<1	20

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Analyzed:** 06/08/17  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Chromium, Hexavalent**

**Analysis Method:** 7196A  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 548901

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1705839-LCS	0.941	0.918	103	80-120



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

### Continuing Calibration Verification (CCV) Summary

#### Chromium, Hexavalent

**Analysis Method:** 7196A

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	548901	KQ1707450-01	06/08/17 12:29	0.500	0.508	102	90-110
CCV2	548901	KQ1707450-02	06/08/17 12:29	0.500	0.505	101	90-110
CCV3	548901	KQ1707450-03	06/08/17 12:29	0.500	0.506	101	90-110
CCV4	548901	KQ1707450-04	06/08/17 12:29	0.500	0.509	102	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Continuing Calibration Blank (CCB) Summary**  
**Chromium, Hexavalent**

**Analysis Method:** 7196A

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	548901	KQ1707450-05	06/08/17 12:29	0.050	0.004	ND	U
CCB2	548901	KQ1707450-06	06/08/17 12:29	0.050	0.004	ND	U
CCB3	548901	KQ1707450-07	06/08/17 12:29	0.050	0.004	ND	U
CCB4	548901	KQ1707450-08	06/08/17 12:29	0.050	0.004	ND	U

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1705839  
**Date Collected:** 06/6/17  
**Date Received:** 06/8/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-55-BL-060617	K1705839-001	<b>0.25</b>	0.20	0.05	1	06/08/17 14:45	*
IMW-2-57.5-BL-060617	K1705839-002	ND U	0.20	0.05	1	06/08/17 14:45	*
IP-5-58-BL-060617	K1705839-003	<b>1.30</b>	0.20	0.05	1	06/08/17 14:45	*
IP-6-58-BL-060617	K1705839-004	ND U	0.20	0.05	1	06/08/17 14:45	*
IP-7-58-BL-060617	K1705839-005	ND U	0.20	0.05	1	06/08/17 14:45	*
CG122-60-BL-060617	K1705839-006	ND U	0.20	0.05	1	06/08/17 14:45	*
CG122-75-BL-060617	K1705839-007	ND U	0.20	0.05	1	06/08/17 14:45	*
IP-D-BL-060617	K1705839-008	ND U	0.20	0.05	1	06/08/17 14:45	*
IP-FB-BL-060617	K1705839-009	ND U	0.20	0.05	1	06/08/17 14:45	*
Method Blank	K1705839-MB	ND U	0.20	0.05	1	06/08/17 14:45	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/08/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1705839-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	0.25	0.24	0.245	4	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/8/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1705839-001MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	0.25	2.48	2.00	112	75-125

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	548939	KQ1707477-05	06/08/17 14:45	4.00	4.35	109	90-110
CCV2	548939	KQ1707477-06	06/08/17 14:45	4.00	4.34	109	90-110
CCV3	548939	KQ1707477-07	06/08/17 14:45	4.00	4.12	103	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:**K1705839

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	548939	KQ1707477-02	06/08/17 14:45	0.20	0.05	ND	U
CCB2	548939	KQ1707477-03	06/08/17 14:45	0.20	0.05	ND	U
CCB3	548939	KQ1707477-04	06/08/17 14:45	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001

**Service Request:** K1705839  
**Date Collected:** 06/06/17 11:00  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.00050	0.00008	1	06/21/17 09:42	06/19/17	
Chromium	6020A	<b>0.00043</b>	mg/L	0.00020	0.00004	1	06/21/17 09:42	06/19/17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-57.5-BL-060617  
**Lab Code:** K1705839-002

**Service Request:** K1705839  
**Date Collected:** 06/06/17 11:40  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00008	1	06/21/17 10:06	06/19/17	
Chromium	6020A	<b>0.00040</b>	mg/L	0.00020	0.00004	1	06/21/17 10:06	06/19/17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-5-58-BL-060617  
**Lab Code:** K1705839-003

**Service Request:** K1705839  
**Date Collected:** 06/06/17 12:40  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00065</b>	mg/L	0.00050	0.00008	1	06/21/17 10:10	06/19/17	
Chromium	6020A	<b>0.00034</b>	mg/L	0.00020	0.00004	1	06/21/17 10:10	06/19/17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-6-58-BL-060617  
**Lab Code:** K1705839-004

**Service Request:** K1705839  
**Date Collected:** 06/06/17 13:30  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00043 J</b>	mg/L	0.00050	0.00008	1	06/21/17 10:14	06/19/17	
Chromium	6020A	<b>0.00034</b>	mg/L	0.00020	0.00004	1	06/21/17 10:14	06/19/17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-7-58-BL-060617  
**Lab Code:** K1705839-005

**Service Request:** K1705839  
**Date Collected:** 06/06/17 14:20  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00082</b>	mg/L	0.00050	0.00008	1	06/21/17 10:17	06/19/17	
Chromium	6020A	<b>0.00035</b>	mg/L	0.00020	0.00004	1	06/21/17 10:17	06/19/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG122-60-BL-060617  
**Lab Code:** K1705839-006

**Service Request:** K1705839  
**Date Collected:** 06/06/17 15:25  
**Date Received:** 06/08/17 09:30

**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.00050	0.00008	1	06/21/17 10:20	06/19/17	
Chromium	6020A	<b>0.00032</b>	mg/L	0.00020	0.00004	1	06/21/17 10:20	06/19/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG122-75-BL-060617  
**Lab Code:** K1705839-007

**Service Request:** K1705839  
**Date Collected:** 06/06/17 17:00  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00017 J</b>	mg/L	0.00050	0.00008	1	06/21/17 10:23	06/19/17	
Chromium	6020A	<b>0.00077</b>	mg/L	0.00020	0.00004	1	06/21/17 10:23	06/19/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-D-BL-060617  
**Lab Code:** K1705839-008

**Service Request:** K1705839  
**Date Collected:** 06/06/17 13:35  
**Date Received:** 06/08/17 09:30  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00046 J</b>	mg/L	0.00050	0.00008	1	06/21/17 10:26	06/19/17	
Chromium	6020A	<b>0.00038</b>	mg/L	0.00020	0.00004	1	06/21/17 10:26	06/19/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-FB-BL-060617  
**Lab Code:** K1705839-009

**Service Request:** K1705839  
**Date Collected:** 06/06/17 17:30  
**Date Received:** 06/08/17 09:30

**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.00050	0.00008	1	06/21/17 10:29	06/19/17	
Chromium	6020A	<b>0.00007 J</b>	mg/L	0.00020	0.00004	1	06/21/17 10:29	06/19/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1708083-01

**Service Request:** K1705839  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.00050	0.00008	1	06/21/17 09:36	06/19/17	
Chromium	6020A	ND U	mg/L	0.00020	0.00004	1	06/21/17 09:36	06/19/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/21/17

**Replicate Sample Summary**  
**Dissolved Metals**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1708083-03 Result			
Arsenic	6020A	0.00050	0.00008	ND U	ND U	ND	-	20
Chromium	6020A	0.00020	0.00004	0.00043	0.00040	0.00042	8	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/17  
**Date Received:** 06/08/17  
**Date Analyzed:** 06/21/17  
**Date Extracted:** 06/19/17

**Matrix Spike Summary**  
**Dissolved Metals**

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1708083-04

<b>Analyte Name</b>	<b>Sample Result</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Arsenic	ND U	0.0544	0.0500	109	75-125
Chromium	0.00043	0.0103	0.0100	98	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Analyzed:** 06/21/17

**Lab Control Sample Summary**  
**Dissolved Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1708083-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Arsenic	6020A	0.0554	0.0500	111	80-120
Chromium	6020A	0.0103	0.0100	103	80-120

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dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:**K1705839

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**290868

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
IMW-1-55-BL-060617	K1705839-001	6/6/17	6/8/17	25 mL	25 mL	
IMW-2-57.5-BL-060617	K1705839-002	6/6/17	6/8/17	25 mL	25 mL	
IP-5-58-BL-060617	K1705839-003	6/6/17	6/8/17	25 mL	25 mL	
IP-6-58-BL-060617	K1705839-004	6/6/17	6/8/17	25 mL	25 mL	
IP-7-58-BL-060617	K1705839-005	6/6/17	6/8/17	25 mL	25 mL	
CG122-60-BL-060617	K1705839-006	6/6/17	6/8/17	25 mL	25 mL	
CG122-75-BL-060617	K1705839-007	6/6/17	6/8/17	25 mL	25 mL	
IP-D-BL-060617	K1705839-008	6/6/17	6/8/17	25 mL	25 mL	
IP-FB-BL-060617	K1705839-009	6/6/17	6/8/17	25 mL	25 mL	
Method Blank	KQ1708083-01MB	NA	NA	25 mL	25 mL	
Lab Control Sample	KQ1708083-02LCS	NA	NA	25 mL	25 mL	
Duplicate	KQ1708083-03DUP	6/6/17	6/8/17	25 mL	25 mL	
Matrix Spike	KQ1708083-04MS	6/6/17	6/8/17	25 mL	25 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Arsenic	6020A	550473	25.0	25.7	103	25.0	25.3	101	25.0	24.8	99
Chromium	6020A	550473	10.0	9.78	98	25.0	24.6	98	25.0	24.5	98

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Arsenic	6020A	550473				25.0	25.0	100	25.0	24.7	99
Chromium	6020A	550473				25.0	24.4	98	25.0	23.7	95



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Arsenic	6020A	550473				25.0	24.7	99			
Chromium	6020A	550473				25.0	24.0	96			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Arsenic	6020A	550473	0.08	U	0.08	U	0.08	U	0.08	U
Chromium	6020A	550473	0.04	U	0.04	U	0.04	U	0.04	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Arsenic	6020A	550473			0.08	U	0.08	U		
Chromium	6020A	550473			0.04	U	0.04	U		

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

Sample ID	Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
LLICV								
	Arsenic	6020A	550473	0.5	0.5	107	70-130	06/21/17 08:07
	Chromium	6020A	550473	0.2	0.2	105	70-130	06/21/17 08:07
LLCCV								
	Arsenic	6020A	550473	0.5	0.5	103	70-130	06/21/17 10:03
	Chromium	6020A	550473	0.2	0.2	98	70-130	06/21/17 10:03
LLCCV								
	Arsenic	6020A	550473	0.5	0.5	99	70-130	06/21/17 10:42
	Chromium	6020A	550473	0.2	0.2	92	70-130	06/21/17 10:42

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Arsenic	6020A	550473	0.08	-	-	-	06/21/17 08:10
Chromium	6020A	550473	0.64	-	-	-	06/21/17 08:10

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Arsenic	6020A	550473	28.9	25.0	115	80-120	06/21/17 08:13
Chromium	6020A	550473	51.8	50.0	104	80-120	06/21/17 08:13

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1705839-001A	Arsenic	6020A	550473	0.08 U	53.0	50.0	106	80-120	06/21/17 09:51
	Chromium	6020A	550473	0.43	47.2	50.0	93	80-120	06/21/17 09:51

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1705839-001SDL	Arsenic	6020A	550473	0.08 U	0.4 U	14	10	06/21/17 09:48
	Chromium	6020A	550473	0.4	0.4 J	3	10	06/21/17 09:48



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Arsenic	75	ug/L	0.5	0.08	6020A
Chromium	52	ug/L	0.2	0.04	6020A

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-05

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Arsenic 75	3000	6020A
Chromium 52	3000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 550473

Sample	Dilution Factor	Date/Time	A	C
ZZZZZZ	1	06/21/17 07:49		
ZZZZZZ	1	06/21/17 07:52		
ICV	1	06/21/17 07:55	X	X
CCV	1	06/21/17 07:58	X	X
ICB	1	06/21/17 08:01	X	X
CCB	1	06/21/17 08:04	X	X
LLICVW	1	06/21/17 08:07	X	X
ICSA	1	06/21/17 08:10	X	X
ICSAB	1	06/21/17 08:13	X	X
ZZZZZZ	1	06/21/17 08:16		
ZZZZZZ	1	06/21/17 08:19		
ZZZZZZ	1	06/21/17 08:23		
ZZZZZZ	1	06/21/17 08:26		
ZZZZZZ	1	06/21/17 08:29		
ZZZZZZ	1	06/21/17 08:35		
ZZZZZZ	1	06/21/17 08:38		
ZZZZZZ	1	06/21/17 08:41		
ZZZZZZ	1	06/21/17 08:44		
ZZZZZZ	1	06/21/17 08:47		
CCV	1	06/21/17 08:50	X	X
CCB	1	06/21/17 08:53	X	X
ZZZZZZ	1	06/21/17 08:56		
ZZZZZZ	1	06/21/17 08:59		
ZZZZZZ	1	06/21/17 09:02		
ZZZZZZ	1	06/21/17 09:05		
ZZZZZZ	1	06/21/17 09:08		
ZZZZZZ	1	06/21/17 09:11		
ZZZZZZ	1	06/21/17 09:15		
ZZZZZZ	1	06/21/17 09:18		
ZZZZZZ	1	06/21/17 09:21		
ZZZZZZ	1	06/21/17 09:24		
CCV	1	06/21/17 09:27	X	X
CCB	1	06/21/17 09:30	X	X
ZZZZZZ	1	06/21/17 09:33		
KQ1708083-01MB	1	06/21/17 09:36	X	X
KQ1708083-02LCS	1	06/21/17 09:39	X	X
K1705839-001	1	06/21/17 09:42	X	X

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 550473

<b>Sample</b>	<b>Dilution Factor</b>	<b>Date/Time</b>	<b>A</b>	<b>C</b>
K1705839-001DUP	1	06/21/17 09:45	X	X
K1705839-001SDL	1	06/21/17 09:48	X	X
K1705839-001PS	1	06/21/17 09:51	X	X
K1705839-001MS	1	06/21/17 09:54	X	X
CCV	1	06/21/17 09:57	X	X
CCB	1	06/21/17 10:00	X	X
LLCCVW	1	06/21/17 10:03	X	X
K1705839-002	1	06/21/17 10:06	X	X
K1705839-003	1	06/21/17 10:10	X	X
K1705839-004	1	06/21/17 10:14	X	X
K1705839-005	1	06/21/17 10:17	X	X
K1705839-006	1	06/21/17 10:20	X	X
K1705839-007	1	06/21/17 10:23	X	X
K1705839-008	1	06/21/17 10:26	X	X
K1705839-009	1	06/21/17 10:29	X	X
CCV	1	06/21/17 10:32	X	X
CCB	1	06/21/17 10:35	X	X
ZZZZZZ	1	06/21/17 10:38		
LLCCVW	1	06/21/17 10:42	X	X

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 550473

Sample	Date/Time	Ge72He	Ge72H2	In115He	Lu175He
ZZZZZZ	06/21/17 07:49				
ZZZZZZ	06/21/17 07:52				
ICV	06/21/17 07:55	97	97	98	96
CCV	06/21/17 07:58	97	98	99	97
ICB	06/21/17 08:01	98	98	99	98
CCB	06/21/17 08:04	97	97	99	98
LLICVW	06/21/17 08:07	98	96	98	98
ICSA	06/21/17 08:10	90	85	90	94
ICSAB	06/21/17 08:13	93	86	92	94
ZZZZZZ	06/21/17 08:16				
ZZZZZZ	06/21/17 08:19				
ZZZZZZ	06/21/17 08:23				
ZZZZZZ	06/21/17 08:26				
ZZZZZZ	06/21/17 08:29				
ZZZZZZ	06/21/17 08:35				
ZZZZZZ	06/21/17 08:38				
ZZZZZZ	06/21/17 08:41				
ZZZZZZ	06/21/17 08:44				
ZZZZZZ	06/21/17 08:47				
CCV	06/21/17 08:50	107	105	106	101
CCB	06/21/17 08:53	106	105	104	100
ZZZZZZ	06/21/17 08:56				
ZZZZZZ	06/21/17 08:59				
ZZZZZZ	06/21/17 09:02				
ZZZZZZ	06/21/17 09:05				
ZZZZZZ	06/21/17 09:08				
ZZZZZZ	06/21/17 09:11				
ZZZZZZ	06/21/17 09:15				
ZZZZZZ	06/21/17 09:18				
ZZZZZZ	06/21/17 09:21				
ZZZZZZ	06/21/17 09:24				
CCV	06/21/17 09:27	108	103	108	102
CCB	06/21/17 09:30	106	102	106	102
ZZZZZZ	06/21/17 09:33				
KQ1708083-01MB	06/21/17 09:36	108	100	109	104
KQ1708083-02LCS	06/21/17 09:39	105	98	107	103
K1705839-001	06/21/17 09:42	99	86	97	98

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 550473

Sample	Date/Time	Ge72He	Ge72H2	In115He	Lu175He
K1705839-001DUP	06/21/17 09:45	101	87	98	100
K1705839-001SDL	06/21/17 09:48	110	101	106	103
K1705839-001PS	06/21/17 09:51	102	89	99	99
K1705839-001MS	06/21/17 09:54	105	90	100	98
CCV	06/21/17 09:57	116	107	112	104
CCB	06/21/17 10:00	113	108	111	103
LLCCVW	06/21/17 10:03	113	107	110	103
K1705839-002	06/21/17 10:06	102	91	99	99
K1705839-003	06/21/17 10:10	102	89	97	98
K1705839-004	06/21/17 10:14	113	96	107	103
K1705839-005	06/21/17 10:17	107	94	101	98
K1705839-006	06/21/17 10:20	112	99	104	101
K1705839-007	06/21/17 10:23	113	102	106	101
K1705839-008	06/21/17 10:26	110	98	104	100
K1705839-009	06/21/17 10:29	121	111	116	105
CCV	06/21/17 10:32	117	108	113	103
CCB	06/21/17 10:35	114	106	111	104
ZZZZZZ	06/21/17 10:38				
LLCCVW	06/21/17 10:42	110	104	108	100



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Cover Page - Organic Analysis Data Package  
 1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
IMW-1-55-BL-060617	K1705839-001	06/06/2017	06/08/2017
IMW-2-57.5-BL-060617	K1705839-002	06/06/2017	06/08/2017
IP-5-58-BL-060617	K1705839-003	06/06/2017	06/08/2017
IP-6-58-BL-060617	K1705839-004	06/06/2017	06/08/2017
IP-7-58-BL-060617	K1705839-005	06/06/2017	06/08/2017
CG122-60-BL-060617	K1705839-006	06/06/2017	06/08/2017
CG122-75-BL-060617	K1705839-007	06/06/2017	06/08/2017
IP-D-BL-060617	K1705839-008	06/06/2017	06/08/2017
IP-FB-BL-060617	K1705839-009	06/06/2017	06/08/2017
IP-FB-BL-060617MS	KWG1704847-1	06/06/2017	06/08/2017
IP-FB-BL-060617DMS	KWG1704847-2	06/06/2017	06/08/2017



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IMW-1-55-BL-060617  
**Lab Code:** K1705839-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	150	D	2.0	0.80	5	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IMW-2-57.5-BL-060617  
**Lab Code:** K1705839-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	370	D	8.0	3.2	20	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	84	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-5-58-BL-060617  
**Lab Code:** K1705839-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	300	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	87	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-6-58-BL-060617  
**Lab Code:** K1705839-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	250	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-7-58-BL-060617  
**Lab Code:** K1705839-005  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	190	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	91	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** CG122-60-BL-060617  
**Lab Code:** K1705839-006  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	290	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** CG122-75-BL-060617  
**Lab Code:** K1705839-007  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	160	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	95	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-D-BL-060617  
**Lab Code:** K1705839-008  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	230	D	4.0	1.6	10	06/13/17	06/15/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	95	64-120	06/15/17	Acceptable

**Comments:** \_\_\_\_\_



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** 06/06/2017  
**Date Received:** 06/08/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-FB-BL-060617  
**Lab Code:** K1705839-009  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	06/13/17	06/14/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	83	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1704847-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	06/13/17	06/14/17	KWG1704847	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	107	64-120	06/14/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
IMW-1-55-BL-060617	K1705839-001	93
IMW-2-57.5-BL-060617	K1705839-002	84
IP-5-58-BL-060617	K1705839-003	87
IP-6-58-BL-060617	K1705839-004	93
IP-7-58-BL-060617	K1705839-005	91
CG122-60-BL-060617	K1705839-006	93
CG122-75-BL-060617	K1705839-007	95
IP-D-BL-060617	K1705839-008	95
IP-FB-BL-060617	K1705839-009	83
Method Blank	KWG1704847-5	107
IP-FB-BL-060617MS	KWG1704847-1	89
IP-FB-BL-060617DMS	KWG1704847-2	84
Lab Control Sample	KWG1704847-3	98
Duplicate Lab Control Sample	KWG1704847-4	98

**Surrogate Recovery Control Limits (%)**

---

Sur1 = 1,4-Dioxane-d8 64-120

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/14/2017  
**Time Analyzed:** 06:29

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\061417\0614F002.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1704892-2  
**Analysis Lot:** KWG1704892

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	21,255	5.23
<b>Upper Limit ==&gt;</b>	42,510	5.73
<b>Lower Limit ==&gt;</b>	10,628	4.73
<b>ICAL Result ==&gt;</b>	15,677	5.23

*Associated Analyses*

Method Blank	KWG1704847-5	18,942	5.23
Lab Control Sample	KWG1704847-3	23,307	5.22
Duplicate Lab Control Sample	KWG1704847-4	20,916	5.23
IP-FB-BL-060617MS	KWG1704847-1	21,100	5.23
IP-FB-BL-060617DMS	KWG1704847-2	21,901	5.22
IP-FB-BL-060617	K1705839-009	20,364	5.23
IMW-1-55-BL-060617	K1705839-001	22,926	5.22
IMW-2-57.5-BL-060617	K1705839-002	21,684	5.23
IP-5-58-BL-060617	K1705839-003	18,807	5.22
IP-6-58-BL-060617	K1705839-004	20,862	5.23
IP-7-58-BL-060617	K1705839-005	19,812	5.23
CG122-60-BL-060617	K1705839-006	24,166	5.22
CG122-75-BL-060617	K1705839-007	19,849	5.23

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/15/2017  
**Time Analyzed:** 06:51

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\061517\0615F002.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705179-2  
**Analysis Lot:** KWG1705179

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	17,723	5.23
<b>Upper Limit ==&gt;</b>	35,446	5.73
<b>Lower Limit ==&gt;</b>	8,862	4.73
<b>ICAL Result ==&gt;</b>	15,677	5.23

*Associated Analyses*

Sample ID	Lab Code	Area	RT
IP-D-BL-060617	K1705839-008	21,052	5.23
IMW-1-55-BL-060617DL	K1705839-001	18,060	5.23
IMW-2-57.5-BL-060617DL	K1705839-002	15,193	5.23
IP-5-58-BL-060617DL	K1705839-003	16,271	5.23
IP-6-58-BL-060617DL	K1705839-004	16,039	5.23
IP-7-58-BL-060617DL	K1705839-005	17,958	5.23
CG122-60-BL-060617DL	K1705839-006	17,499	5.23
CG122-75-BL-060617DL	K1705839-007	18,236	5.23
IP-D-BL-060617DL	K1705839-008	18,015	5.23

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Extracted:** 06/13/2017  
**Date Analyzed:** 06/14/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** IP-FB-BL-060617  
**Lab Code:** K1705839-009  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1704847

Analyte Name	Sample Result	IP-FB-BL-060617MS KWG1704847-1 Matrix Spike			IP-FB-BL-060617DMS KWG1704847-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	ND	8.22	10.0	82	7.58	10.0	76	49-113	8	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Extracted:** 06/13/2017  
**Date Analyzed:** 06/14/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1704847

Analyte Name	Lab Control Sample KWG1704847-3 Lab Control Spike			Duplicate Lab Control Sample KWG1704847-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	8.97	10.0	90	8.94	10.0	89	59-111	0	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Extracted:** 06/13/2017  
**Date Analyzed:** 06/14/2017  
**Time Analyzed:** 14:18

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1704847-5 **File ID:** J:\MS26\DATA\061417\0614F021.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1704847

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1704847-3	J:\MS26\DATA\061417\0614F022.D	06/14/17	14:37
Duplicate Lab Control Sample	KWG1704847-4	J:\MS26\DATA\061417\0614F023.D	06/14/17	14:55
IP-FB-BL-060617MS	KWG1704847-1	J:\MS26\DATA\061417\0614F024.D	06/14/17	15:14
IP-FB-BL-060617DMS	KWG1704847-2	J:\MS26\DATA\061417\0614F025.D	06/14/17	15:32
IP-FB-BL-060617	K1705839-009	J:\MS26\DATA\061417\0614F026.D	06/14/17	15:51
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061417\0614F027.D	06/14/17	16:09
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061417\0614F028.D	06/14/17	16:27
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061417\0614F029.D	06/14/17	16:46
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061417\0614F030.D	06/14/17	17:04
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061417\0614F031.D	06/14/17	17:23
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061417\0614F032.D	06/14/17	17:41
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061417\0614F033.D	06/14/17	18:00
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F018.D	06/15/17	11:58
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061517\0615F019.D	06/15/17	12:17
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061517\0615F020.D	06/15/17	12:35
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061517\0615F021.D	06/15/17	12:54
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061517\0615F022.D	06/15/17	13:12
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061517\0615F023.D	06/15/17	13:31
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061517\0615F024.D	06/15/17	13:49
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061517\0615F025.D	06/15/17	14:08
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F026.D	06/15/17	14:26



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Extracted:** 06/13/2017  
**Date Analyzed:** 06/14/2017  
**Time Analyzed:** 14:37

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample **Instrument ID:** MS26  
**Lab Code:** KWG1704847-3 **File ID:** J:\MS26\DATA\061417\0614F022.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1704847

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1704847-5	J:\MS26\DATA\061417\0614F021.D	06/14/17	14:18
IP-FB-BL-060617MS	KWG1704847-1	J:\MS26\DATA\061417\0614F024.D	06/14/17	15:14
IP-FB-BL-060617DMS	KWG1704847-2	J:\MS26\DATA\061417\0614F025.D	06/14/17	15:32
IP-FB-BL-060617	K1705839-009	J:\MS26\DATA\061417\0614F026.D	06/14/17	15:51
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061417\0614F027.D	06/14/17	16:09
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061417\0614F028.D	06/14/17	16:27
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061417\0614F029.D	06/14/17	16:46
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061417\0614F030.D	06/14/17	17:04
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061417\0614F031.D	06/14/17	17:23
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061417\0614F032.D	06/14/17	17:41
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061417\0614F033.D	06/14/17	18:00
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F018.D	06/15/17	11:58
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061517\0615F019.D	06/15/17	12:17
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061517\0615F020.D	06/15/17	12:35
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061517\0615F021.D	06/15/17	12:54
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061517\0615F022.D	06/15/17	13:12
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061517\0615F023.D	06/15/17	13:31
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061517\0615F024.D	06/15/17	13:49
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061517\0615F025.D	06/15/17	14:08
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F026.D	06/15/17	14:26

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/14/2017  
**Time Analyzed:** 06:10

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\061417\0614F001.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1704892

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	13.4	307460	PASS
68	69	0	2	1.5	6339	PASS
69	198	0	100	17.8	410112	PASS
70	69	0	2	0.4	1844	PASS
127	198	10	80	34.2	786560	PASS
197	198	0	2	0.2	5197	PASS
198	442	30	100	42.3	2299221	PASS
199	198	5	9	6.6	151728	PASS
275	198	10	60	34.4	791978	PASS
365	442	1	50	2.1	112693	PASS
441	443	0	100	77.4	791018	PASS
442	442	100	100	100.0	5435562	PASS
443	442	15	24	18.8	1021930	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1704892-2	J:\MS26\DATA\061417\0614F002.D	06/14/2017	06:29	
Method Blank	KWG1704847-5	J:\MS26\DATA\061417\0614F021.D	06/14/2017	14:18	
Lab Control Sample	KWG1704847-3	J:\MS26\DATA\061417\0614F022.D	06/14/2017	14:37	
Duplicate Lab Control Sample	KWG1704847-4	J:\MS26\DATA\061417\0614F023.D	06/14/2017	14:55	
IP-FB-BL-060617MS	KWG1704847-1	J:\MS26\DATA\061417\0614F024.D	06/14/2017	15:14	
IP-FB-BL-060617DMS	KWG1704847-2	J:\MS26\DATA\061417\0614F025.D	06/14/2017	15:32	
IP-FB-BL-060617	K1705839-009	J:\MS26\DATA\061417\0614F026.D	06/14/2017	15:51	
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061417\0614F027.D	06/14/2017	16:09	
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061417\0614F028.D	06/14/2017	16:27	
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061417\0614F029.D	06/14/2017	16:46	
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061417\0614F030.D	06/14/2017	17:04	
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061417\0614F031.D	06/14/2017	17:23	
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061417\0614F032.D	06/14/2017	17:41	
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061417\0614F033.D	06/14/2017	18:00	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/15/2017  
**Time Analyzed:** 06:33

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\061517\0615F001.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705179

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	14.0	274178	PASS
68	69	0	2	1.4	5302	PASS
69	198	0	100	19.0	371382	PASS
70	69	0	2	0.4	1509	PASS
127	198	10	80	35.8	702072	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	45.6	1959082	PASS
199	198	5	9	6.7	130829	PASS
275	198	10	60	33.1	648938	PASS
365	442	1	50	2.0	87272	PASS
441	443	0	100	77.1	621290	PASS
442	442	100	100	100.0	4291925	PASS
443	442	15	24	18.8	806122	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705179-2	J:\MS26\DATA\061517\0615F002.D	06/15/2017	06:51	
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F018.D	06/15/2017	11:58	
IMW-1-55-BL-060617	K1705839-001	J:\MS26\DATA\061517\0615F019.D	06/15/2017	12:17	
IMW-2-57.5-BL-060617	K1705839-002	J:\MS26\DATA\061517\0615F020.D	06/15/2017	12:35	
IP-5-58-BL-060617	K1705839-003	J:\MS26\DATA\061517\0615F021.D	06/15/2017	12:54	
IP-6-58-BL-060617	K1705839-004	J:\MS26\DATA\061517\0615F022.D	06/15/2017	13:12	
IP-7-58-BL-060617	K1705839-005	J:\MS26\DATA\061517\0615F023.D	06/15/2017	13:31	
CG122-60-BL-060617	K1705839-006	J:\MS26\DATA\061517\0615F024.D	06/15/2017	13:49	
CG122-75-BL-060617	K1705839-007	J:\MS26\DATA\061517\0615F025.D	06/15/2017	14:08	
IP-D-BL-060617	K1705839-008	J:\MS26\DATA\061517\0615F026.D	06/15/2017	14:26	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Calibration Date:** 03/06/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15235  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\030617\0306F021.D	E	J:\MS26\DATA\030617\0306F025.D
B	J:\MS26\DATA\030617\0306F022.D	F	J:\MS26\DATA\030617\0306F026.D
C	J:\MS26\DATA\030617\0306F023.D	G	J:\MS26\DATA\030617\0306F027.D
D	J:\MS26\DATA\030617\0306F024.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.510	B	4.0	0.437	C	10	0.406	D	20	0.426	E	50	0.408
	F	100	0.380	G	200	0.397									
1,4-Dioxane-d8	A	2.0	0.441	B	4.0	0.401	C	10	0.403	D	20	0.414	E	50	0.408
	F	100	0.378	G	200	0.391									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Calibration Date:** 03/06/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15235  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	10.0		≤ 20	0.423		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	4.8		≤ 20	0.405		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Calibration Date:** 03/06/2017  
**Date Analyzed:** 03/06/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15235  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\030617\0306F028.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.423	0.427	1	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/14/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 03/06/2017  
**Calibration ID:** CAL15235  
**Analysis Lot:** KWG1704892  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\061417\0614F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	21	0.01	0.423	0.453	7	NA	± 20	AverageRF
1,4-Dioxane-d8	20	23	0.01	0.405	0.464	14	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839  
**Date Analyzed:** 06/15/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 03/06/2017  
**Calibration ID:** CAL15235  
**Analysis Lot:** KWG1705179  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\061517\0615F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	21	0.01	0.423	0.452	7	NA	± 20	AverageRF
1,4-Dioxane-d8	20	23	0.01	0.405	0.475	17	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1704892  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0614F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1704892-1	6/14/2017	06:10		6/14/2017	06:20
0614F002.D	Continuing Calibration Verification	KWG1704892-2	6/14/2017	06:29		6/14/2017	06:39
0614F004.D	ZZZZZZ	ZZZZZZ	6/14/2017	07:18		6/14/2017	07:28
0614F005.D	ZZZZZZ	ZZZZZZ	6/14/2017	09:23		6/14/2017	09:33
0614F006.D	ZZZZZZ	ZZZZZZ	6/14/2017	09:42		6/14/2017	09:52
0614F007.D	ZZZZZZ	ZZZZZZ	6/14/2017	10:00		6/14/2017	10:10
0614F008.D	ZZZZZZ	ZZZZZZ	6/14/2017	10:18		6/14/2017	10:28
0614F009.D	ZZZZZZ	ZZZZZZ	6/14/2017	10:37		6/14/2017	10:47
0614F010.D	ZZZZZZ	ZZZZZZ	6/14/2017	10:55		6/14/2017	11:05
0614F011.D	ZZZZZZ	ZZZZZZ	6/14/2017	11:14		6/14/2017	11:24
0614F012.D	ZZZZZZ	ZZZZZZ	6/14/2017	11:32		6/14/2017	11:42
0614F013.D	ZZZZZZ	ZZZZZZ	6/14/2017	11:51		6/14/2017	12:01
0614F014.D	ZZZZZZ	ZZZZZZ	6/14/2017	12:09		6/14/2017	12:19
0614F015.D	ZZZZZZ	ZZZZZZ	6/14/2017	12:28		6/14/2017	12:38
0614F016.D	ZZZZZZ	ZZZZZZ	6/14/2017	12:46		6/14/2017	12:56
0614F017.D	ZZZZZZ	ZZZZZZ	6/14/2017	13:04		6/14/2017	13:14
0614F018.D	ZZZZZZ	ZZZZZZ	6/14/2017	13:23		6/14/2017	13:33
0614F019.D	ZZZZZZ	ZZZZZZ	6/14/2017	13:41		6/14/2017	13:51
0614F020.D	ZZZZZZ	ZZZZZZ	6/14/2017	14:00		6/14/2017	14:10
0614F021.D	Method Blank	KWG1704847-5	6/14/2017	14:18		6/14/2017	14:28
0614F022.D	Lab Control Sample	KWG1704847-3	6/14/2017	14:37		6/14/2017	14:47
0614F023.D	Duplicate Lab Control Sample	KWG1704847-4	6/14/2017	14:55		6/14/2017	15:05
0614F024.D	IP-FB-BL-060617MS	KWG1704847-1	6/14/2017	15:14		6/14/2017	15:24
0614F025.D	IP-FB-BL-060617DMS	KWG1704847-2	6/14/2017	15:32		6/14/2017	15:42
0614F026.D	IP-FB-BL-060617	K1705839-009	6/14/2017	15:51		6/14/2017	16:01
0614F027.D	IMW-1-55-BL-060617	K1705839-001	6/14/2017	16:09		6/14/2017	16:19
0614F028.D	IMW-2-57.5-BL-060617	K1705839-002	6/14/2017	16:27		6/14/2017	16:37
0614F029.D	IP-5-58-BL-060617	K1705839-003	6/14/2017	16:46		6/14/2017	16:56
0614F030.D	IP-6-58-BL-060617	K1705839-004	6/14/2017	17:04		6/14/2017	17:14
0614F031.D	IP-7-58-BL-060617	K1705839-005	6/14/2017	17:23		6/14/2017	17:33
0614F032.D	CG122-60-BL-060617	K1705839-006	6/14/2017	17:41		6/14/2017	17:51
0614F033.D	CG122-75-BL-060617	K1705839-007	6/14/2017	18:00		6/14/2017	18:10

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001

**Service Request:** K1705839

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705179  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0615F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705179-1	6/15/2017	06:33		6/15/2017	06:43
0615F002.D	Continuing Calibration Verification	KWG1705179-2	6/15/2017	06:51		6/15/2017	07:01
0615F003.D	ZZZZZZ	ZZZZZZ	6/15/2017	07:21		6/15/2017	07:31
0615F004.D	ZZZZZZ	ZZZZZZ	6/15/2017	07:39		6/15/2017	07:49
0615F005.D	ZZZZZZ	ZZZZZZ	6/15/2017	07:58		6/15/2017	08:08
0615F006.D	ZZZZZZ	ZZZZZZ	6/15/2017	08:16		6/15/2017	08:26
0615F007.D	ZZZZZZ	ZZZZZZ	6/15/2017	08:35		6/15/2017	08:45
0615F008.D	ZZZZZZ	ZZZZZZ	6/15/2017	08:53		6/15/2017	09:03
0615F009.D	ZZZZZZ	ZZZZZZ	6/15/2017	09:12		6/15/2017	09:22
0615F010.D	ZZZZZZ	ZZZZZZ	6/15/2017	09:30		6/15/2017	09:40
0615F011.D	ZZZZZZ	ZZZZZZ	6/15/2017	09:49		6/15/2017	09:59
0615F012.D	ZZZZZZ	ZZZZZZ	6/15/2017	10:07		6/15/2017	10:17
0615F013.D	ZZZZZZ	ZZZZZZ	6/15/2017	10:26		6/15/2017	10:36
0615F014.D	ZZZZZZ	ZZZZZZ	6/15/2017	10:44		6/15/2017	10:54
0615F015.D	ZZZZZZ	ZZZZZZ	6/15/2017	11:03		6/15/2017	11:13
0615F016.D	ZZZZZZ	ZZZZZZ	6/15/2017	11:21		6/15/2017	11:31
0615F017.D	ZZZZZZ	ZZZZZZ	6/15/2017	11:40		6/15/2017	11:50
0615F018.D	IP-D-BL-060617	K1705839-008	6/15/2017	11:58		6/15/2017	12:08
0615F019.D	IMW-1-55-BL-060617	K1705839-001	6/15/2017	12:17		6/15/2017	12:27
0615F020.D	IMW-2-57.5-BL-060617	K1705839-002	6/15/2017	12:35		6/15/2017	12:45
0615F021.D	IP-5-58-BL-060617	K1705839-003	6/15/2017	12:54		6/15/2017	13:04
0615F022.D	IP-6-58-BL-060617	K1705839-004	6/15/2017	13:12		6/15/2017	13:22
0615F023.D	IP-7-58-BL-060617	K1705839-005	6/15/2017	13:31		6/15/2017	13:41
0615F024.D	CG122-60-BL-060617	K1705839-006	6/15/2017	13:49		6/15/2017	13:59
0615F025.D	CG122-75-BL-060617	K1705839-007	6/15/2017	14:08		6/15/2017	14:18
0615F026.D	IP-D-BL-060617	K1705839-008	6/15/2017	14:26		6/15/2017	14:36

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

## QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1705839  
**Date Extracted:** 06/13/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1704847  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
IMW-1-55-BL-060617	K1705839-001	06/06/17	06/08/17	10ml	2ml	NA	
IMW-1-55-BL-060617DL	K1705839-001	06/06/17	06/08/17	10ml	2ml	NA	
IMW-2-57.5-BL-060617DL	K1705839-002	06/06/17	06/08/17	10ml	2ml	NA	
IMW-2-57.5-BL-060617	K1705839-002	06/06/17	06/08/17	10ml	2ml	NA	
IP-5-58-BL-060617DL	K1705839-003	06/06/17	06/08/17	10ml	2ml	NA	
IP-5-58-BL-060617	K1705839-003	06/06/17	06/08/17	10ml	2ml	NA	
IP-6-58-BL-060617DL	K1705839-004	06/06/17	06/08/17	10ml	2ml	NA	
IP-6-58-BL-060617	K1705839-004	06/06/17	06/08/17	10ml	2ml	NA	
IP-7-58-BL-060617	K1705839-005	06/06/17	06/08/17	10ml	2ml	NA	
IP-7-58-BL-060617DL	K1705839-005	06/06/17	06/08/17	10ml	2ml	NA	
CG122-60-BL-060617	K1705839-006	06/06/17	06/08/17	10ml	2ml	NA	
CG122-60-BL-060617DL	K1705839-006	06/06/17	06/08/17	10ml	2ml	NA	
CG122-75-BL-060617DL	K1705839-007	06/06/17	06/08/17	10ml	2ml	NA	
CG122-75-BL-060617	K1705839-007	06/06/17	06/08/17	10ml	2ml	NA	
IP-D-BL-060617DL	K1705839-008	06/06/17	06/08/17	10ml	2ml	NA	
IP-D-BL-060617	K1705839-008	06/06/17	06/08/17	10ml	2ml	NA	
IP-FB-BL-060617	K1705839-009	06/06/17	06/08/17	10ml	2ml	NA	
Method Blank	KWG1704847-5	NA	NA	10ml	2ml	NA	
IP-FB-BL-060617MS	KWG1704847-1	06/06/17	06/08/17	10ml	2ml	NA	
IP-FB-BL-060617DMS	KWG1704847-2	06/06/17	06/08/17	10ml	2ml	NA	
Lab Control Sample	KWG1704847-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1704847-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



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July 13, 2017

**Analytical Report for Service Request No: K1706268**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: Georgetown ISB / STRCL-001**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory June 16, 2017  
For your reference, these analyses have been assigned our service request number **K1706268**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Kurt Clarkson  
Client Services  
Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site. Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.





## Case Narrative

**ALS Environmental—Kelso Laboratory**  
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## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request No.:** K1706268  
**Date Received:** 06/16/17

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Four water samples were received for analysis at ALS Environmental on 06/16/17. The samples were received in good condition and consistent with the accompanying chain of custody form, except where noted on the cooler receipt and preservation form included in this report. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Iron, Divalent (Ferrous Iron) by Method ApplEnvNic7-87-1536-1540:**

Samples were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

The upper control criterion was exceeded in Matrix Spike (MS) for sample CG-FB-061517. The analyte in question was not detected in the associated field sample. The error associated with elevated recovery indicated a high bias. The sample data was not significantly affected. No further corrective action was appropriate.

No other anomalies associated with the analysis of these samples were observed.


#### Total Metals

No other anomalies associated with the analysis of these samples were observed.

#### 1,4-Dioxane by EPA Method 8270

No other anomalies associated with the analysis of these samples were observed.

Approved by





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



CHAIN OF CUSTODY  
79991

003

SR# \_\_\_\_\_  
COC Set \_\_\_\_\_ of \_\_\_\_\_  
COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
www.alsglobal.com

K1706268 Page 1 of 1

Environmental

PROJECT: WILLOW TOWN 15B Project Number: STRCL-001  
 JER: TASTA GRAM  
 DOF  
 10827 N 2<sup>ND</sup> ST KIRKLAND, WA 98033  
 # 206-375-0211 email  
 Sampler Signature: [Signature] Sampler Printed Name: D COOPER

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	NUMBER OF CONTAINERS	7196A / Cr6	App/Env/Mic/2,87-1536-1540 /	8270D / 1,4-Dioxane	300.0 / SO4	3020A / Metals D	1 NITRATE / NITRITE	2 FERRIC / FEROUS	3 TOTAL Fe	4 1,4 DIOXANE	Remarks
1 CG-127-40-BL-DG-1517		4/15/17	1045	WASH	4						X	X	X	X	
2 CG-127-75-BL-DG-1517			0450		4						X	X	X	X	
3 CG-DU-DG-1517			0455		4						X	X	X	X	
4 CG-FB-DG-1517			1100		4						X	X	X	X	
5.															
6.															
7.															
8.															
9.															
10.															

- Report Requirements**
- I. Routine Report: Method Blank, Surrogate, as required
  - II. Report Dup., MS, MSD as required
  - III. CLP Like Summary (no raw data)
  - IV. Data Validation Report
  - V. EDD

**Invoice Information**  
 P.O.# \_\_\_\_\_  
 Bill To: STERICYCLE

**Turnaround Requirements**  
 24 hr.  48 hr.  
 5 Day Standard

Requested Report Date \_\_\_\_\_

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu  Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: FEROUS IRON FIELD FILTERED 0.45um

\*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other \_\_\_\_\_ (Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: <u>[Signature]</u>	Signature: <u>FEDER WASH</u>	Signature: _____	Signature: <u>[Signature]</u>	Signature: _____	Signature: _____
Printed Name: <u>D COOPER</u>	Printed Name: <u>CUSTODY SKR</u>	Printed Name: _____	Printed Name: <u>COODY GRAVES</u>	Printed Name: _____	Printed Name: _____
Firm: <u>DOF</u>	Firm: _____	Firm: _____	Firm: <u>ALS</u>	Firm: _____	Firm: _____
Date/Time: <u>4/15/17 1600</u>	Date/Time: _____	Date/Time: _____	Date/Time: <u>6/16/17 0950</u>	Date/Time: _____	Date/Time: _____



PC KC

### Cooler Receipt and Preservation Form

Client DOF Service Request K17 06268  
Received: 6/16/17 Opened: 6/16/17 By: CG Unloaded: 6/16/17 By: CG

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- Were custody seals on coolers? NA  Y  N If yes, how many and where? 1 Front  
If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	NA	Tracking Number	NA	Filed
5.2	5.3	/	/	10.1	308	79991		7868 9590 3136		

- Packing material: Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA  Y  N
- If applicable, tissue samples were received: Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N CG 6/16
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below. NA  Y  N
- Were VOA vials received without headspace? Indicate in the table below.  NA  Y  N
- Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:
<u>CG (40ml vial)</u>	<u>CG-FB-061517</u>	<u>Elimination / sample time</u>

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
**SHORT HOLD TIME**



# General Chemistry

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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Units:** mg/L  
**Basis:** NA

Nitrate+Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
CG127-40-BL-061517	K1706268-001	ND U	0.050	0.020	1	06/29/17 14:59	6/29/17	
CG127-75-BL-061517	K1706268-002	ND U	0.050	0.020	1	06/29/17 14:59	6/29/17	
CG-DU-061517	K1706268-003	ND U	0.050	0.020	1	06/29/17 14:59	6/29/17	
CG-FB-061517	K1706268-004	ND U	0.050	0.020	1	06/29/17 14:59	6/29/17	
Method Blank	K1706268-MB	ND U	0.050	0.020	1	06/29/17 14:59	6/29/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:**K1706268  
**Date Collected:**NA  
**Date Received:**NA

**Units:**mg/L  
**Basis:**NA

**Replicate Sample Summary**

**Nitrate+Nitrite as Nitrogen**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
Batch QC	K1706239-001DUP	0.050	0.020	ND U	ND U	NC	NC	20	06/29/17
Batch QC	K1706274-004DUP	0.050	0.020	ND U	ND U	NC	NC	20	06/29/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 06/29/17  
**Date Extracted:** 06/29/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706239-001  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1706239-001MS			Duplicate Matrix Spike K1706239-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	0.986	1.00	99	1.01	1.00	101	90-110	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 06/29/17  
**Date Extracted:** 06/29/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706274-004  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1706274-004MS			Duplicate Matrix Spike K1706274-004DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	0.929	1.00	93	1.07	1.00	107	90-110	14	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Analyzed:** 06/29/17  
**Date Extracted:** 06/29/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 552129

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1706268-LCS	9.90	10.9	91	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:**K1706268

**Continuing Calibration Blank (CCB) Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	552129	KQ1708896-11	06/29/17 14:59	0.050	0.020	ND	U
CCB2	552129	KQ1708896-12	06/29/17 14:59	0.050	0.020	ND	U
CCB3	552129	KQ1708896-13	06/29/17 14:59	0.050	0.020	ND	U
CCB4	552129	KQ1708896-14	06/29/17 14:59	0.050	0.020	ND	U
CCB5	552129	KQ1708896-15	06/29/17 14:59	0.050	0.020	ND	U
CCB6	552129	KQ1708896-16	06/29/17 14:59	0.050	0.020	ND	U
CCB7	552129	KQ1708896-17	06/29/17 14:59	0.050	0.020	ND	U
CCB8	552129	KQ1708896-18	06/29/17 14:59	0.050	0.020	ND	U
CCB9	552129	KQ1708896-19	06/29/17 14:59	0.050	0.020	0.029	J
CCB10	552129	KQ1708896-20	06/29/17 14:59	0.050	0.020	ND	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

### Continuing Calibration Verification (CCV) Summary

#### Nitrate+Nitrite as Nitrogen

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	552129	KQ1708896-01	06/29/17 14:59	3.00	3.02	101	90-110
CCV2	552129	KQ1708896-02	06/29/17 14:59	3.00	3.03	101	90-110
CCV3	552129	KQ1708896-03	06/29/17 14:59	3.00	2.98	99	90-110
CCV4	552129	KQ1708896-04	06/29/17 14:59	3.00	2.95	98	90-110
CCV5	552129	KQ1708896-05	06/29/17 14:59	3.00	2.96	99	90-110
CCV6	552129	KQ1708896-06	06/29/17 14:59	3.00	2.95	98	90-110
CCV7	552129	KQ1708896-07	06/29/17 14:59	3.00	2.97	99	90-110
CCV8	552129	KQ1708896-08	06/29/17 14:59	3.00	2.93	98	90-110
CCV9	552129	KQ1708896-09	06/29/17 14:59	3.00	3.00	100	90-110
CCV10	552129	KQ1708896-10	06/29/17 14:59	3.00	2.98	99	90-110

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG127-40-BL-061517	K1706268-001	9.59	0.20	0.05	1	06/16/17 17:30	*
CG127-75-BL-061517	K1706268-002	0.62	0.20	0.05	1	06/16/17 17:30	*
CG-DU-061517	K1706268-003	0.54	0.20	0.05	1	06/16/17 17:30	*
CG-FB-061517	K1706268-004	ND U	0.20	0.05	1	06/16/17 17:30	*
Method Blank	K1706268-MB	ND U	0.20	0.05	1	06/16/17 17:30	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Date Analyzed:** 06/16/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-FB-061517  
**Lab Code:** K1706268-004

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1706268-004DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Date Analyzed:** 06/16/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-FB-061517  
**Lab Code:** K1706268-004  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1706268-004MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	ND U	2.64	2.00	132 *	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:**K1706268

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	550069	KQ1707991-02	06/16/17 17:30	0.20	0.05	ND	U
CCB2	550069	KQ1707991-03	06/16/17 17:30	0.20	0.05	ND	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	<b>Analysis</b>		<b>Date</b>	<b>True</b>	<b>Measured</b>	<b>Percent</b>	<b>Acceptance Limits</b>
	<b>Lot</b>	<b>Lab Code</b>	<b>Analyzed</b>	<b>Value</b>	<b>Value</b>	<b>Recovery</b>	
CCV1	550069	KQ1707991-04	06/16/17 17:30	4.00	3.94	99	90-110
CCV2	550069	KQ1707991-05	06/16/17 17:30	4.00	3.94	99	90-110



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG127-40-BL-061517  
**Lab Code:** K1706268-001

**Service Request:** K1706268  
**Date Collected:** 06/15/17 10:45  
**Date Received:** 06/16/17 09:50  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	13500	ug/L	21	3	1	06/27/17 17:05	06/22/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG127-75-BL-061517  
**Lab Code:** K1706268-002

**Service Request:** K1706268  
**Date Collected:** 06/15/17 09:50  
**Date Received:** 06/16/17 09:50  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	4170	ug/L	21	3	1	06/27/17 17:20	06/22/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-DU-061517  
**Lab Code:** K1706268-003

**Service Request:** K1706268  
**Date Collected:** 06/15/17 09:55  
**Date Received:** 06/16/17 09:50  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	4190	ug/L	21	3	1	06/27/17 17:23	06/22/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-FB-061517  
**Lab Code:** K1706268-004

**Service Request:** K1706268  
**Date Collected:** 06/15/17 11:00  
**Date Received:** 06/16/17 09:50  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	18 J	ug/L	21	3	1	06/27/17 17:25	06/22/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1708247-02

**Service Request:** K1706268  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	ND U	ug/L	21	3	1	06/27/17 16:45	06/22/17	



ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Date Analyzed:** 06/27/17

Replicate Sample Summary

Total Metals

**Sample Name:** CG127-40-BL-061517  
**Lab Code:** K1706268-001

**Units:** ug/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1708247-03 Result			
Iron	6010C	21	3	13500	13500	13500	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/17  
**Date Received:** 06/16/17  
**Date Analyzed:** 06/27/17  
**Date Extracted:** 06/22/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** CG127-40-BL-061517  
**Lab Code:** K1706268-001  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ1708247-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	13500	14600	1000	104 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Analyzed:** 06/27/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ1708247-01

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6010C	2420	2500	97	80-120

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:**K1706268

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6010C

**Extraction Lot:**291113

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
CG127-40-BL-061517	K1706268-001	6/15/17	6/16/17	10 mL	10.5 mL	
CG127-75-BL-061517	K1706268-002	6/15/17	6/16/17	10 mL	10.5 mL	
CG-DU-061517	K1706268-003	6/15/17	6/16/17	10 mL	10.5 mL	
CG-FB-061517	K1706268-004	6/15/17	6/16/17	10 mL	10.5 mL	
Lab Control Sample	KQ1708247-01LCS	NA	NA	10 mL	10.7 mL	
Method Blank	KQ1708247-02MB	NA	NA	10 mL	10.5 mL	
Duplicate	KQ1708247-03DUP	6/15/17	6/16/17	10 mL	10.5 mL	
Matrix Spike	KQ1708247-04MS	6/15/17	6/16/17	10 mL	10.9 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	551434	2500	2510	100	10000	10000	100	10000	10100	101

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	551434				10000	10200	102	10000	10300	103

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	551434				10000	10200	102	10000	10300	103

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6010C	551434	3	U	3	U	3	U	3	U



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6010C	551434	3	U	3	U	3	U	3	U

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6010C	551434	16.0	20.0	79	70-130	06/27/17 13:50
LLCCV	Iron	6010C	551434	23.0	20.0	113	70-130	06/27/17 16:55
LLCCV	Iron	6010C	551434	17.0	20.0	87	70-130	06/27/17 17:35

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	551434	188000	-	-	-	06/27/17 14:14

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	551434	189000	-	-	-	06/27/17 14:17

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1706268-001SDL	Iron	6010C	551434	12900	13100	2	10	06/27/17 17:08

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Wavelength (nm)</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	2599	ug/L	20	3	6010C

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-AES-04

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 2599	360000	6010C

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-04

**Analytical BatchID:** 551434

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	06/27/17 13:31	
ZZZZZZ	1	06/27/17 13:33	
ZZZZZZ	1	06/27/17 13:36	
ZZZZZZ	1	06/27/17 13:38	
ICV	1	06/27/17 13:41	X
ZZZZZZ	1	06/27/17 13:43	
ICB	1	06/27/17 13:48	X
LLICV	1	06/27/17 13:50	X
ZZZZZZ	1	06/27/17 13:53	
ZZZZZZ	0.5	06/27/17 13:55	
CCVB1	1	06/27/17 13:59	X
ZZZZZZ	1	06/27/17 14:04	
CCB	1	06/27/17 14:12	X
ICSA	1	06/27/17 14:14	X
ICSAB	1	06/27/17 14:17	X
ZZZZZZ	1	06/27/17 14:22	
ZZZZZZ	1	06/27/17 14:47	
ZZZZZZ	1	06/27/17 14:49	
ZZZZZZ	1	06/27/17 14:52	
ZZZZZZ	1	06/27/17 14:54	
ZZZZZZ	1	06/27/17 14:56	
ZZZZZZ	1	06/27/17 14:59	
ZZZZZZ	1	06/27/17 15:01	
ZZZZZZ	1	06/27/17 15:04	
ZZZZZZ	1	06/27/17 15:06	
ZZZZZZ	1	06/27/17 15:09	
CCVB	1	06/27/17 15:11	X
ZZZZZZ	1	06/27/17 15:14	
CCB	1	06/27/17 15:16	X
ZZZZZZ	5	06/27/17 15:19	
ZZZZZZ	1	06/27/17 15:21	
ZZZZZZ	1	06/27/17 15:24	
ZZZZZZ	1	06/27/17 15:26	
ZZZZZZ	1	06/27/17 15:28	
ZZZZZZ	1	06/27/17 15:31	
ZZZZZZ	1	06/27/17 15:33	
ZZZZZZ	1	06/27/17 15:36	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-04

**Analytical BatchID:** 551434

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	06/27/17 15:38	
ZZZZZZ	1	06/27/17 15:41	
CCVB	1	06/27/17 15:43	X
ZZZZZZ	1	06/27/17 15:46	
CCB	1	06/27/17 15:48	X
ZZZZZZ	1	06/27/17 15:51	
ZZZZZZ	1	06/27/17 15:53	
ZZZZZZ	1	06/27/17 15:56	
ZZZZZZ	1	06/27/17 15:58	
ZZZZZZ	5	06/27/17 16:01	
ZZZZZZ	1	06/27/17 16:03	
ZZZZZZ	1	06/27/17 16:06	
ZZZZZZ	1	06/27/17 16:08	
ZZZZZZ	1	06/27/17 16:10	
ZZZZZZ	1	06/27/17 16:13	
CCVB	1	06/27/17 16:15	X
ZZZZZZ	1	06/27/17 16:18	
CCB	1	06/27/17 16:20	X
ZZZZZZ	1	06/27/17 16:23	
ZZZZZZ	1	06/27/17 16:25	
ZZZZZZ	1	06/27/17 16:28	
ZZZZZZ	1	06/27/17 16:30	
ZZZZZZ	1	06/27/17 16:33	
ZZZZZZ	1	06/27/17 16:35	
ZZZZZZ	1	06/27/17 16:38	
ZZZZZZ	1	06/27/17 16:40	
ZZZZZZ	1	06/27/17 16:43	
KQ1708247-02MB	1	06/27/17 16:45	X
CCVB	1	06/27/17 16:48	X
ZZZZZZ	1	06/27/17 16:50	
CCB	1	06/27/17 16:53	X
LLCCV	1	06/27/17 16:55	X
ZZZZZZ	1	06/27/17 16:58	
ZZZZZZ	0.5	06/27/17 17:00	
KQ1708247-01LCS	1	06/27/17 17:03	X
K1706268-001	1	06/27/17 17:05	X
K1706268-001SDL	5	06/27/17 17:08	X

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-04

**Analytical BatchID:** 551434

Sample	Dilution Factor	Date/Time	F e
K1706268-001DUP	1	06/27/17 17:10	X
K1706268-001MS	1	06/27/17 17:13	X
ZZZZZZ	1	06/27/17 17:15	
ZZZZZZ	1	06/27/17 17:18	
K1706268-002	1	06/27/17 17:20	X
K1706268-003	1	06/27/17 17:23	X
K1706268-004	1	06/27/17 17:25	X
CCVB	1	06/27/17 17:28	X
ZZZZZZ	1	06/27/17 17:30	
CCB	1	06/27/17 17:32	X
LLCCV	1	06/27/17 17:35	X
ZZZZZZ	0.5	06/27/17 17:38	
ZZZZZZ	1	06/27/17 17:41	
ZZZZZZ	1	06/27/17 17:43	
ZZZZZZ	1	06/27/17 17:46	
ZZZZZZ	1	06/27/17 17:48	
ZZZZZZ	1	06/27/17 17:51	
ZZZZZZ	1	06/27/17 17:53	
ZZZZZZ	1	06/27/17 17:56	
ZZZZZZ	1	06/27/17 17:58	
ZZZZZZ	1	06/27/17 18:01	
ZZZZZZ	5	06/27/17 18:03	
ZZZZZZ	1	06/27/17 18:06	
ZZZZZZ	1	06/27/17 18:08	
ZZZZZZ	1	06/27/17 18:11	
ZZZZZZ	1	06/27/17 18:13	
ZZZZZZ	1	06/27/17 18:16	
ZZZZZZ	1	06/27/17 18:18	
ZZZZZZ	1	06/27/17 18:21	
ZZZZZZ	1	06/27/17 18:23	
ZZZZZZ	1	06/27/17 18:26	
ZZZZZZ	1	06/27/17 18:28	
ZZZZZZ	1	06/27/17 18:31	
ZZZZZZ	1	06/27/17 18:33	
ZZZZZZ	1	06/27/17 18:36	
ZZZZZZ	1	06/27/17 18:38	
ZZZZZZ	1	06/27/17 18:41	

## ICP-04

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Al 167.079 (502)	<input checked="" type="checkbox"/>	6	Cd	-0.000673	0.000000	No
			Co	-0.000511	0.000000	No
			Cu	-0.000251	0.000000	No
			Fe	0.001472	0.000000	No
			Mo	-0.000447	0.000000	No
			Ni	-0.000516	0.000000	No
Al 394.401 ( 85)	<input checked="" type="checkbox"/>	4	Ca	0.000069	0.000000	No
			Ni	0.000556	0.000000	No
			V	0.000304	0.000000	No
			Fe	0.000036	0.000000	No
Sb 206.833 (463)	<input checked="" type="checkbox"/>	2	Cr	0.015072	0.000000	No
			Ti	0.000755	0.000000	No
Sb 217.581 (455)	<input checked="" type="checkbox"/>	2	Pb	-0.000725	0.000000	No
			V	0.002284	0.000000	No
As 189.042 (478)	<input checked="" type="checkbox"/>	5	Cr	0.000649	0.000000	No
			Mn	-0.000306	0.000000	No
			Mo	0.000939	0.000000	No
			V	0.000245	0.000000	No
			Fe	-0.000082	0.000000	No
Ba 455.403 ( 74)	<input checked="" type="checkbox"/>	None				
Be 234.861 (144)	<input checked="" type="checkbox"/>	3	Fe	0.000019	0.000000	No
			Mn	-0.000049	0.000000	No
			Mo	-0.000388	0.000000	No
B 249.678 (135)	<input checked="" type="checkbox"/>	5	Cr	0.000244	0.000000	No
			Co	0.002316	0.000000	No
			Fe	-0.000450	0.000000	No
			Mo	-0.000475	0.000000	No
			V	-0.000251	0.000000	No
Cd 214.438 (457)	<input checked="" type="checkbox"/>	2	Al	-0.000004	0.000000	No
			Fe	0.000024	0.000000	No
Cd 226.502 (449)	<input checked="" type="checkbox"/>	3	Fe	0.000133	0.000000	No
			Mo	-0.000048	0.000000	No
			Ti	0.000044	0.000000	No
Ca 315.887 (107)	<input checked="" type="checkbox"/>	4	Co	0.000649	0.000000	No
			Mo	-0.000681	0.000000	No
			V	-0.000628	0.000000	No
			Fe	0.000013	0.000000	No
Ca 393.366 ( 86)	<input checked="" type="checkbox"/>	1	Fe	0.000024	0.000000	No
			Cr 267.716 (126)	<input checked="" type="checkbox"/>	3	Cd
Co 228.616 (447)	<input checked="" type="checkbox"/>	5	V	-0.000104	0.000000	No
			Fe	0.000026	0.000000	No
			Cr	-0.000170	0.000000	No
			Fe	0.000013	0.000000	No
			Mo	-0.000104	0.000000	No
Co 230.786 (446)	<input checked="" type="checkbox"/>	5	Ni	0.000167	0.000000	No
			Ti	0.002048	0.000000	No
			Al	-0.000007	0.000000	No
			Cr	-0.000046	0.000000	No
			Fe	0.000033	0.000000	No
Cu 224.700 (450)	<input checked="" type="checkbox"/>	5	Mo	0.000989	0.000000	No
			Ni	-0.001619	0.000000	No
			Fe	0.000574	0.000000	No
			Pb	0.000586	0.000000	No
			Mo	0.000990	0.000000	No
			Ni	-0.002581	0.000000	No
			Ti	0.000271	0.000000	No

## ICP-04

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Cu 327.396 {103}	<input checked="" type="checkbox"/>	4	Ca	0.000010	0.000000	No
			Co	0.000315	0.000000	No
			Fe	-0.000009	0.000000	No
			Ti	0.000106	0.000000	No
Fe 259.940 {130}	<input checked="" type="checkbox"/>	1	Mo	-0.000793	0.000000	No
Pb 220.353 {453}	<input checked="" type="checkbox"/>	4	Al	-0.000059	0.000000	No
			Cu	0.001403	0.000000	No
			Mo	-0.000393	0.000000	No
			Si	0.001005	0.000000	No
Li 670.784 { 50}	<input checked="" type="checkbox"/>	None				
Mg 279.079 {121}	<input checked="" type="checkbox"/>	None				
Mg 279.553 {121}	<input checked="" type="checkbox"/>	1	Fe	0.000022	0.000000	No
Mg 285.213 {118}	<input checked="" type="checkbox"/>	2	V	-0.000221	0.000000	No
			Fe	0.000028	0.000000	No
Mn 257.610 {131}	<input checked="" type="checkbox"/>	1	Fe	0.000014	0.000000	No
Mn 260.569 {129}	<input checked="" type="checkbox"/>	None				
Mo 202.030 {467}	<input checked="" type="checkbox"/>	None				
Ni 221.647 {452}	<input checked="" type="checkbox"/>	6	Cr	-0.000805	0.000000	No
			Co	-0.000344	0.000000	No
			Cu	-0.000054	0.000000	No
			Si	0.000297	0.000000	No
			Ti	-0.000358	0.000000	No
			Fe	0.000039	0.000000	No
Ni 231.604 {446}	<input checked="" type="checkbox"/>	1	Fe	0.000044	0.000000	No
P 178.284 {489}	<input checked="" type="checkbox"/>	None				
P 214.914 {457}	<input checked="" type="checkbox"/>	6	Al	-0.000840	0.000000	No
			Cu	0.002461	0.000000	No
			Fe	0.000923	0.000000	No
			Mn	-0.000859	0.000000	No
			Mo	0.009166	0.000000	No
			V	-0.002986	0.000000	No
K 766.490 { 44}	<input checked="" type="checkbox"/>	None				
Se 196.090 {472}	<input checked="" type="checkbox"/>	3	Al	-0.000055	0.000000	No
			Co	-0.000472	0.000000	No
			Fe	-0.000335	0.000000	No
Si 251.611 {134}	<input checked="" type="checkbox"/>	1	Mo	0.007431	0.000000	No
Ag 328.068 {103}	<input checked="" type="checkbox"/>	None				
Na 589.592 { 57}	<input checked="" type="checkbox"/>	None				
Sr 407.771 { 83}	<input checked="" type="checkbox"/>	None				
Tl 190.856 {477}	<input checked="" type="checkbox"/>	4	Al	-0.000023	0.000000	No
			Co	0.000657	0.000000	No
			Mn	-0.000364	0.000000	No
			Ti	-0.000691	0.000000	No
Sn 189.989 {477}	<input checked="" type="checkbox"/>	None				
Ti 336.121 {100}	<input checked="" type="checkbox"/>	1	Ni	0.000091	0.000000	No
V 292.402 {115}	<input checked="" type="checkbox"/>	4	Cr	-0.003236	0.000000	No
			Cu	-0.000060	0.000000	No
			Mn	-0.000194	0.000000	No
			Ti	0.000613	0.000000	No
Zn 206.200 {463}	<input checked="" type="checkbox"/>	3	Cr	-0.000138	0.000000	No
			Fe	-0.000019	0.000000	No
			Mo	0.000270	0.000000	No
Zn 213.856 {458}	<input checked="" type="checkbox"/>	4	Cu	0.001387	0.000000	No
			Fe	0.000142	0.000000	No
			Ni	0.005684	0.000000	No
			Ti	-0.000115	0.000000	No

ICP-04

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Y 224.306 {450}*	<input checked="" type="checkbox"/>	None				
Y 360.073 { 94}*	<input checked="" type="checkbox"/>	None				
Y 360.073 { 94}2*	<input checked="" type="checkbox"/>	None				
Bi 223.061 {451}	<input checked="" type="checkbox"/>	5	Cr	0.000625	0.000000	No
			Co	-0.004443	0.000000	No
			Cu	-0.003084	0.000000	No
			V	-0.000813	0.000000	No
			Fe	0.000115	0.000000	No
S 182.034 {485}	<input checked="" type="checkbox"/>	2	Mn	0.003199	0.000000	No
			Mo	0.001127	0.000000	No



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
CG127-40-BL-061517	K1706268-001	06/15/2017	06/16/2017
CG127-75-BL-061517	K1706268-002	06/15/2017	06/16/2017
CG-DU-061517	K1706268-003	06/15/2017	06/16/2017
CG-FB-061517	K1706268-004	06/15/2017	06/16/2017
CG-FB-061517MS	KWG1705098-1	06/15/2017	06/16/2017
CG-FB-061517DMS	KWG1705098-2	06/15/2017	06/16/2017

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/2017  
**Date Received:** 06/16/2017

1,4-Dioxane by GCMS

**Sample Name:** CG127-40-BL-061517  
**Lab Code:** K1706268-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	330	D	4.0	1.6	10	06/21/17	07/10/17	KWG1705098	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	86	64-120	07/10/17	Acceptable

**Comments:** \_\_\_\_\_



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/2017  
**Date Received:** 06/16/2017

1,4-Dioxane by GCMS

**Sample Name:** CG127-75-BL-061517  
**Lab Code:** K1706268-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	760	D	8.0	3.2	20	06/21/17	07/10/17	KWG1705098	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	07/10/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/2017  
**Date Received:** 06/16/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-DU-061517  
**Lab Code:** K1706268-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	730	D	8.0	3.2	20	06/21/17	07/10/17	KWG1705098	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	87	64-120	07/10/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** 06/15/2017  
**Date Received:** 06/16/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-FB-061517  
**Lab Code:** K1706268-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	06/21/17	07/10/17	KWG1705098	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	86	64-120	07/10/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1705098-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	06/21/17	07/10/17	KWG1705098	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	81	64-120	07/10/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
CG127-40-BL-061517	K1706268-001	86
CG127-75-BL-061517	K1706268-002	92 D
CG-DU-061517	K1706268-003	87
CG-FB-061517	K1706268-004	86
Method Blank	KWG1705098-5	81
CG-FB-061517MS	KWG1705098-1	91
CG-FB-061517DMS	KWG1705098-2	84
Lab Control Sample	KWG1705098-3	86
Duplicate Lab Control Sample	KWG1705098-4	90

**Surrogate Recovery Control Limits (%)**

---

Sur1 = 1,4-Dioxane-d8 64-120

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Date Analyzed:** 07/10/2017  
**Time Analyzed:** 19:45

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071017A\0710F023.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705811-2  
**Analysis Lot:** KWG1705711

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	56,062	5.22
<b>Upper Limit ==&gt;</b>	112,124	5.72
<b>Lower Limit ==&gt;</b>	28,031	4.72
<b>ICAL Result ==&gt;</b>	39,344	5.21

*Associated Analyses*

Method Blank	KWG1705098-5	43,587	5.21
Lab Control Sample	KWG1705098-3	49,632	5.21
Duplicate Lab Control Sample	KWG1705098-4	53,127	5.22
CG-FB-061517MS	KWG1705098-1	51,856	5.21
CG-FB-061517DMS	KWG1705098-2	44,416	5.21
CG127-40-BL-061517	K1706268-001	53,269	5.21
CG127-75-BL-061517	K1706268-002	41,048	5.21
CG-DU-061517	K1706268-003	45,485	5.21
CG-FB-061517	K1706268-004	44,700	5.21
CG127-40-BL-061517DL	K1706268-001	39,326	5.21
CG127-75-BL-061517DL	K1706268-002	38,305	5.21
CG-DU-061517DL	K1706268-003	44,640	5.21

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Extracted:** 06/21/2017  
**Date Analyzed:** 07/10/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** CG-FB-061517  
**Lab Code:** K1706268-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705098

Analyte Name	Sample Result	CG-FB-061517MS KWG1705098-1 Matrix Spike			CG-FB-061517DMS KWG1705098-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	ND	8.45	10.0	84	8.61	10.0	86	49-113	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Extracted:** 06/21/2017  
**Date Analyzed:** 07/10/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705098

Analyte Name	Lab Control Sample KWG1705098-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705098-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	8.28	10.0	83	8.47	10.0	85	59-111	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Extracted:** 06/21/2017  
**Date Analyzed:** 07/10/2017  
**Time Analyzed:** 20:04

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1705098-5 **File ID:** J:\MS26\DATA\071017A\0710F024.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1705098

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1705098-3	J:\MS26\DATA\071017A\0710F025.D	07/10/17	20:22
Duplicate Lab Control Sample	KWG1705098-4	J:\MS26\DATA\071017A\0710F026.D	07/10/17	20:41
CG-FB-061517MS	KWG1705098-1	J:\MS26\DATA\071017A\0710F027.D	07/10/17	20:59
CG-FB-061517DMS	KWG1705098-2	J:\MS26\DATA\071017A\0710F028.D	07/10/17	21:18
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F029.D	07/10/17	21:36
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F030.D	07/10/17	21:55
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F031.D	07/10/17	22:13
CG-FB-061517	K1706268-004	J:\MS26\DATA\071017A\0710F032.D	07/10/17	22:32
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F033.D	07/10/17	22:50
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F034.D	07/10/17	23:09
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F035.D	07/10/17	23:28

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Extracted:** 06/21/2017  
**Date Analyzed:** 07/10/2017  
**Time Analyzed:** 20:22

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample  
**Lab Code:** KWG1705098-3  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Instrument ID:** MS26  
**File ID:** J:\MS26\DATA\071017A\0710F025.D  
**Level:** Low  
**Extraction Lot:** KWG1705098

This Lab Control Sample applies to the following analyses:

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>
Method Blank	KWG1705098-5	J:\MS26\DATA\071017A\0710F024.D	07/10/17	20:04
CG-FB-061517MS	KWG1705098-1	J:\MS26\DATA\071017A\0710F027.D	07/10/17	20:59
CG-FB-061517DMS	KWG1705098-2	J:\MS26\DATA\071017A\0710F028.D	07/10/17	21:18
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F029.D	07/10/17	21:36
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F030.D	07/10/17	21:55
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F031.D	07/10/17	22:13
CG-FB-061517	K1706268-004	J:\MS26\DATA\071017A\0710F032.D	07/10/17	22:32
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F033.D	07/10/17	22:50
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F034.D	07/10/17	23:09
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F035.D	07/10/17	23:28

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Date Analyzed:** 07/10/2017  
**Time Analyzed:** 16:59

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071017A\0710F014.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705711

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	14.0	370124	PASS
68	69	0	2	1.5	7154	PASS
69	198	0	100	18.3	481460	PASS
70	69	0	2	0.5	2211	PASS
127	198	10	80	34.9	921149	PASS
197	198	0	2	0.4	9686	PASS
198	442	30	100	57.9	2636288	PASS
199	198	5	9	6.6	173386	PASS
275	198	10	60	32.1	847445	PASS
365	442	1	50	2.4	107901	PASS
441	443	0	100	77.2	676053	PASS
442	442	100	100	100.0	4550314	PASS
443	442	15	24	19.2	875840	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705811-2	J:\MS26\DATA\071017A\0710F023.D	07/10/2017	19:45	
Method Blank	KWG1705098-5	J:\MS26\DATA\071017A\0710F024.D	07/10/2017	20:04	
Lab Control Sample	KWG1705098-3	J:\MS26\DATA\071017A\0710F025.D	07/10/2017	20:22	
Duplicate Lab Control Sample	KWG1705098-4	J:\MS26\DATA\071017A\0710F026.D	07/10/2017	20:41	
CG-FB-061517MS	KWG1705098-1	J:\MS26\DATA\071017A\0710F027.D	07/10/2017	20:59	
CG-FB-061517DMS	KWG1705098-2	J:\MS26\DATA\071017A\0710F028.D	07/10/2017	21:18	
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F029.D	07/10/2017	21:36	
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F030.D	07/10/2017	21:55	
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F031.D	07/10/2017	22:13	
CG-FB-061517	K1706268-004	J:\MS26\DATA\071017A\0710F032.D	07/10/2017	22:32	
CG127-40-BL-061517	K1706268-001	J:\MS26\DATA\071017A\0710F033.D	07/10/2017	22:50	
CG127-75-BL-061517	K1706268-002	J:\MS26\DATA\071017A\0710F034.D	07/10/2017	23:09	
CG-DU-061517	K1706268-003	J:\MS26\DATA\071017A\0710F035.D	07/10/2017	23:28	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\071017\0710F016.D	E	J:\MS26\DATA\071017\0710F020.D
B	J:\MS26\DATA\071017\0710F017.D	F	J:\MS26\DATA\071017\0710F021.D
C	J:\MS26\DATA\071017\0710F018.D	G	J:\MS26\DATA\071017\0710F022.D
D	J:\MS26\DATA\071017\0710F019.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.457	B	4.0	0.378	C	10	0.409	D	20	0.413	E	50	0.419
	F	100	0.422	G	200	0.401									
1,4-Dioxane-d8	A	2.0	0.428	B	4.0	0.395	C	10	0.394	D	20	0.420	E	50	0.418
	F	100	0.418	G	200	0.403									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	5.8		≤ 20	0.414		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	3.2		≤ 20	0.411		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Calibration Date:** 07/10/2017  
**Date Analyzed:** 07/10/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15465  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071017\0710F023.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.414	0.406	-2	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268  
**Date Analyzed:** 07/10/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/10/2017  
**Calibration ID:** CAL15465  
**Analysis Lot:** KWG1705711  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071017A\0710F023.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.01	0.414	0.406	-2	NA	± 20	AverageRF
1,4-Dioxane-d8	20	20	0.01	0.411	0.419	2	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706268

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705711  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0710F014.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705811-1	7/10/2017	16:59		7/10/2017	17:09
0710F023.D	Continuing Calibration Verification	KWG1705811-2	7/10/2017	19:45		7/10/2017	19:55
0710F024.D	Method Blank	KWG1705098-5	7/10/2017	20:04		7/10/2017	20:14
0710F025.D	Lab Control Sample	KWG1705098-3	7/10/2017	20:22		7/10/2017	20:32
0710F026.D	Duplicate Lab Control Sample	KWG1705098-4	7/10/2017	20:41		7/10/2017	20:51
0710F027.D	CG-FB-061517MS	KWG1705098-1	7/10/2017	20:59		7/10/2017	21:09
0710F028.D	CG-FB-061517DMS	KWG1705098-2	7/10/2017	21:18		7/10/2017	21:28
0710F029.D	CG127-40-BL-061517	K1706268-001	7/10/2017	21:36		7/10/2017	21:46
0710F030.D	CG127-75-BL-061517	K1706268-002	7/10/2017	21:55		7/10/2017	22:05
0710F031.D	CG-DU-061517	K1706268-003	7/10/2017	22:13		7/10/2017	22:23
0710F032.D	CG-FB-061517	K1706268-004	7/10/2017	22:32		7/10/2017	22:42
0710F033.D	CG127-40-BL-061517	K1706268-001	7/10/2017	22:50		7/10/2017	23:00
0710F034.D	CG127-75-BL-061517	K1706268-002	7/10/2017	23:09		7/10/2017	23:19
0710F035.D	CG-DU-061517	K1706268-003	7/10/2017	23:28		7/10/2017	23:38
0710F036.D	ZZZZZZ	ZZZZZZ	7/10/2017	23:46		7/10/2017	23:56
0710F037.D	ZZZZZZ	ZZZZZZ	7/11/2017	00:05		7/11/2017	00:15
0710F038.D	ZZZZZZ	ZZZZZZ	7/11/2017	00:23		7/11/2017	00:33
0710F039.D	ZZZZZZ	ZZZZZZ	7/11/2017	00:42		7/11/2017	00:52
0710F040.D	ZZZZZZ	ZZZZZZ	7/11/2017	01:00		7/11/2017	01:10
0710F041.D	ZZZZZZ	ZZZZZZ	7/11/2017	01:19		7/11/2017	01:29
0710F042.D	ZZZZZZ	ZZZZZZ	7/11/2017	01:37		7/11/2017	01:47
0710F043.D	ZZZZZZ	ZZZZZZ	7/11/2017	01:56		7/11/2017	02:06
0710F044.D	ZZZZZZ	ZZZZZZ	7/11/2017	02:14		7/11/2017	02:24
0710F045.D	ZZZZZZ	ZZZZZZ	7/11/2017	02:33		7/11/2017	02:43
0710F046.D	ZZZZZZ	ZZZZZZ	7/11/2017	02:51		7/11/2017	03:01
0710F047.D	ZZZZZZ	ZZZZZZ	7/11/2017	03:10		7/11/2017	03:20
0710F048.D	ZZZZZZ	ZZZZZZ	7/11/2017	03:28		7/11/2017	03:38
0710F049.D	ZZZZZZ	ZZZZZZ	7/11/2017	03:47		7/11/2017	03:57
0710F050.D	ZZZZZZ	ZZZZZZ	7/11/2017	04:06		7/11/2017	04:16
0710F051.D	ZZZZZZ	ZZZZZZ	7/11/2017	04:24		7/11/2017	04:34
0710F052.D	ZZZZZZ	ZZZZZZ	7/11/2017	04:43		7/11/2017	04:53

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706268  
**Date Extracted:** 06/21/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1705098  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
CG127-40-BL-061517	K1706268-001	06/15/17	06/16/17	10ml	2ml	NA	
CG127-40-BL-061517DL	K1706268-001	06/15/17	06/16/17	10ml	2ml	NA	
CG127-75-BL-061517	K1706268-002	06/15/17	06/16/17	10ml	2ml	NA	
CG127-75-BL-061517DL	K1706268-002	06/15/17	06/16/17	10ml	2ml	NA	
CG-DU-061517	K1706268-003	06/15/17	06/16/17	10ml	2ml	NA	
CG-DU-061517DL	K1706268-003	06/15/17	06/16/17	10ml	2ml	NA	
CG-FB-061517	K1706268-004	06/15/17	06/16/17	10ml	2ml	NA	
Method Blank	KWG1705098-5	NA	NA	10ml	2ml	NA	
CG-FB-061517MS	KWG1705098-1	06/15/17	06/16/17	10ml	2ml	NA	
CG-FB-061517DMS	KWG1705098-2	06/15/17	06/16/17	10ml	2ml	NA	
Lab Control Sample	KWG1705098-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1705098-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



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July 18, 2017

**Analytical Report for Service Request No: K1706565**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: Georgetown ISB / STRCL-001**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory June 23, 2017  
For your reference, these analyses have been assigned our service request number **K1706565**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Kurt Clarkson  
Client Services  
Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown IJB/STRCL-001  
**Sample Matrix:** Water

**Service Request No.:** K1706565  
**Date Received:** 06/23/17

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Three water samples were received for analysis at ALS Environmental on 06/23/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

All samples were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.


#### Total Metals

No other anomalies associated with the analysis of these samples were observed.

#### 1,4-Dioxane by EPA Method 8270

No other anomalies associated with the analysis of these samples were observed.

Approved by







# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
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# CHAIN OF CUSTODY

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

SR#

K1706565

PAGE

OF

COC#

<b>PROJECT NAME</b> <u>Greystone IJB</u> <b>PROJECT NUMBER</b> <u>STRCL-001</u> <b>PROJECT MANAGER</b> <u>JASPA GITY</u> <b>COMPANY NAME</b> <u>DOF</u> <b>ADDRESS</b> <u>10827 NE 68th</u> <b>CITY/STATE/ZIP</b> <u>Kirkland WA 98023</u> <b>E-MAIL ADDRESS</b> <u>LKERVER@DOFNW.com</u> <b>PHONE #</b> <u>206-316-7223</u> <small>FAX #</small> <b>SAMPLER'S SIGNATURE</b>				<b>NUMBER OF CONTAINERS</b>	Semivolatile Organics by GC/MS 625 <input type="checkbox"/> 8270 <input type="checkbox"/> 8270LL <input type="checkbox"/> SIM PAH <input type="checkbox"/> Volatile Organics 624 <input type="checkbox"/> 8260 <input type="checkbox"/> 8021 <input type="checkbox"/> BTEX <input type="checkbox"/> Gas <input type="checkbox"/> Diesel <input type="checkbox"/> Oil <input type="checkbox"/> Oil & Grease/TRPH 1664 HEM <input type="checkbox"/> 1664 SGT <input type="checkbox"/> PCBs Aroclors <input type="checkbox"/> Congeners <input type="checkbox"/> Pesticides/Herbicides 608 <input type="checkbox"/> 808 <input type="checkbox"/> 814 <input type="checkbox"/> 8151 <input type="checkbox"/> Chlorophenolics - 8151M <input type="checkbox"/> Tri <input type="checkbox"/> Tetra <input type="checkbox"/> PCP <input type="checkbox"/> Metals: Total <input type="checkbox"/> or Dissolved <input type="checkbox"/> (See List Below) Cyanide <input type="checkbox"/> Hex-Chrom <input type="checkbox"/> (circle) pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS, Turb. (circle) NH3-N, COD, TKN, TOC, DOC, NO2+NO3, F-Phos TOX 9020 <input type="checkbox"/> AOX 1650 <input type="checkbox"/> 506 <input type="checkbox"/> Alkalinity <input type="checkbox"/> CO3 <input type="checkbox"/> HCO3 <input type="checkbox"/> Dioxins/Furans 1613 <input type="checkbox"/> 8290 <input type="checkbox"/> Dissolved Gases CO2 <input type="checkbox"/> Ethane <input type="checkbox"/> RSK 175 <input type="checkbox"/> Methane <input type="checkbox"/> I,4-DXANE PERFORM/FERAC 1R2W	<b>REMARKS</b>																																																																																									
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:15%;">SAMPLE I.D.</th> <th style="width:10%;">DATE</th> <th style="width:10%;">TIME</th> <th style="width:10%;">LAB I.D.</th> <th style="width:10%;">MATRIX</th> </tr> </thead> <tbody> <tr> <td>CG-127-40-062217</td> <td>06/24/17</td> <td>11:15</td> <td></td> <td>water</td> </tr> <tr> <td>CG-9-127-40-062217</td> <td>06/24/17</td> <td>11:20</td> <td></td> <td>water</td> </tr> <tr> <td>CG-127-75-061217</td> <td>06/20/17</td> <td>12:05</td> <td></td> <td>water</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	SAMPLE I.D.	DATE	TIME				LAB I.D.	MATRIX	CG-127-40-062217	06/24/17	11:15		water	CG-9-127-40-062217	06/24/17	11:20		water	CG-127-75-061217	06/20/17	12:05		water																																																																								
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<b>REPORT REQUIREMENTS</b> ___ I. Routine Report: Method Blank, Surrogate, as required ___ II. Report Dup., MS, MSD as required ___ III. CLP Like Summary (no raw data) ___ IV. Data Validation Report ___ V. EDD		<b>INVOICE INFORMATION</b> P.O. # _____ Bill To: <u>STERICYCLE</u> _____ _____ <b>TURNAROUND REQUIREMENTS</b> ___ 24 hr. ___ 48 hr. ___ 5 day <input checked="" type="checkbox"/> Standard (15 working days) ___ Provide FAX Results Requested Report Date _____		<b>CIRCLE WHICH METALS ARE TO BE ANALYZED:</b> Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <u>Fe</u> Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg <b>*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)</b> <b>SPECIAL INSTRUCTIONS/COMMENTS:</b> ___ Sample Shipment contains USDA regulated soil samples (check box if applicable)																																																																																											
<b>RELINQUISHED BY:</b> <u>06/22/17 1545</u> Signature <u>Lucas Kerne</u> Date/Time <u>DOF</u> Printed Name Firm		<b>RECEIVED BY:</b> <u>FEDEX UNDER</u> Signature <u>Curby Seal</u> Date/Time _____ Printed Name Firm		<b>RELINQUISHED BY:</b> Signature _____ Date/Time _____ Printed Name Firm		<b>RECEIVED BY:</b> <u>6/23/17 0920</u> Signature <u>SWIFT</u> Date/Time <u>FECS</u> Printed Name Firm																																																																																									



PC KC

### Cooler Receipt and Preservation Form

Client DOF Service Request K17 065605  
Received: 6/23/17 Opened: 6/23/17 By: [Signature] Unloaded: 6/23/17 By: [Signature]

- 1. Samples were received via? **USPS** Fed Ex **UPS** **DHL** **PDX** **Courier** **Hand Delivered**
- 2. Samples were received in: (circle) Cooler **Box** **Envelope** **Other** NA
- 3. Were custody seals on coolers? **NA** Y **N** If yes, how many and where? see front  
If present, were custody seals intact? Y **N** If present, were they signed and dated? Y **N**

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.9	2.1	6.1	6.3	+0.2	349		7869 6812 3000		

- 4. Packing material: **Inserts** **Baggies** Bubble Wrap **Gel Packs** Wet Ice **Dry Ice** **Sleeves**
- 5. Were custody papers properly filled out (ink, signed, etc.)? **NA** Y **N**
- 6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* **NA** Y **N**  
If applicable, tissue samples were received: **Frozen** **Partially Thawed** **Thawed**
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? **NA** Y **N**
- 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* **NA** Y **N**
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? **NA** Y **N**
- 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* **NA** Y **N**
- 11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y **N**
- 12. Was C12/Res negative? NA Y **N**

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
<u>ALL</u>	<u>250ml</u>					<u>X</u>	<u>PHB3</u>	<u>0.5ml</u>	<u>RE/1-45E</u>	<u>[Signature]</u>	<u>1100</u>

Notes, Discrepancies, & Resolutions: SHORT HOLD TIME



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1706565  
**Date Collected:** 06/22/17  
**Date Received:** 06/23/17  
**Units:** mg/L  
**Basis:** NA

Nitrate+Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
CG-127-40-062217	K1706565-001	ND U	0.050	1	07/11/17 10:33	7/7/17	
CG-9-127-40-062217	K1706565-002	ND U	0.050	1	07/11/17 10:33	7/7/17	
CG-127-75-0612217	K1706565-003	ND U	0.050	1	07/08/17 08:08	7/7/17	
Method Blank	K1706565-MB1	ND U	0.050	1	07/08/17 08:08	7/7/17	
Method Blank	K1706565-MB2	ND U	0.050	1	07/11/17 10:33	7/7/17	

**ALS Group USA, Corp.**  
**dba ALS Environmental**

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1706565  
**Date Collected:** NA  
**Date Received:** NA

**Units:** mg/L  
**Basis:** NA

**Replicate Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
Batch QC	K1706370-006DUP	0.10	2.28	2.26	2.27	1	20	07/11/17
Batch QC	K1706500-008DUP	0.050	1.91	1.91	1.91	<1	20	07/11/17
Batch QC	K1706571-002DUP	0.050	ND U	ND U	NC	NC	20	07/08/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/11/17  
**Date Extracted:** 07/7/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706370-006  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1706370-006MS			Duplicate Matrix Spike K1706370-006DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	2.28	7.45	5.00	103	7.58	5.00	106	90-110	3	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/11/17  
**Date Extracted:** 07/7/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706500-008  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1706500-008MS			Duplicate Matrix Spike K1706500-008DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	1.91	7.18	5.00	105	7.15	5.00	105	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/8/17  
**Date Extracted:** 07/7/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706571-002  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1706571-002MS			Duplicate Matrix Spike K1706571-002DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	0.981	1.00	98	0.999	1.00	100	90-110	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Analyzed:** 07/08/17  
**Date Extracted:** 07/07/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 552784

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1706565-LCS1	9.93	10.9	91	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Analyzed:** 07/11/17  
**Date Extracted:** 07/07/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 552748

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1706565-LCS2	10.1	10.9	92	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Continuing Calibration Verification (CCV) Summary**

**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	552748	KQ1709213-07	07/11/17 10:33	1.00	1.05	105	90-110
CCV2	552748	KQ1709213-08	07/11/17 10:33	1.00	1.06	106	90-110
CCV3	552748	KQ1709213-09	07/11/17 10:33	1.00	1.07	107	90-110
CCV4	552748	KQ1709213-10	07/11/17 10:33	1.00	0.917	92	90-110
CCV5	552748	KQ1709213-11	07/11/17 10:33	1.00	1.07	107	90-110
CCV6	552748	KQ1709213-12	07/11/17 10:33	1.00	1.05	105	90-110
CCV7	552748	KQ1709213-18	07/11/17 10:33	1.00	1.08	108	90-110
CCV8	552748	KQ1709213-19	07/11/17 10:33	1.00	1.08	108	90-110
CCV9	552748	KQ1709213-20	07/11/17 10:33	1.00	1.10	110	90-110
CCV10	552748	KQ1709213-21	07/11/17 10:33	1.00	1.10	110	90-110
CCV11	552748	KQ1709213-22	07/11/17 10:33	1.00	1.10	110	90-110
CCV12	552784	KQ1709224-08	07/08/17 08:08	10.0	1.02	10	90-110
CCV13	552784	KQ1709224-09	07/08/17 08:08	10.0	1.01	10	90-110
CCV14	552784	KQ1709224-10	07/08/17 08:08	10.0	1.01	10	90-110
CCV15	552784	KQ1709224-11	07/08/17 08:08	10.0	1.00	10	90-110
CCV16	552784	KQ1709224-12	07/08/17 08:08	10.0	1.00	10	90-110
CCV17	552784	KQ1709224-13	07/08/17 08:08	10.0	1.00	10	90-110
CCV18	552784	KQ1709224-14	07/08/17 08:08	10.0	0.974	10	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Continuing Calibration Blank (CCB) Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>Result</b>	<b>Q</b>
CCB1	552748	KQ1709213-01	07/11/17 10:33	0.050	ND	U
CCB2	552748	KQ1709213-02	07/11/17 10:33	0.050	ND	U
CCB3	552748	KQ1709213-03	07/11/17 10:33	0.050	ND	U
CCB4	552748	KQ1709213-04	07/11/17 10:33	0.050	ND	U
CCB5	552748	KQ1709213-05	07/11/17 10:33	0.050	ND	U
CCB6	552748	KQ1709213-06	07/11/17 10:33	0.050	ND	U
CCB7	552748	KQ1709213-13	07/11/17 10:33	0.050	ND	U
CCB8	552748	KQ1709213-14	07/11/17 10:33	0.050	ND	U
CCB9	552748	KQ1709213-15	07/11/17 10:33	0.050	ND	U
CCB10	552748	KQ1709213-16	07/11/17 10:33	0.050	ND	U
CCB11	552748	KQ1709213-17	07/11/17 10:33	0.050	ND	U
CCB12	552784	KQ1709224-01	07/08/17 08:08	0.050	ND	U
CCB13	552784	KQ1709224-02	07/08/17 08:08	0.050	ND	U
CCB14	552784	KQ1709224-03	07/08/17 08:08	0.050	ND	U
CCB15	552784	KQ1709224-04	07/08/17 08:08	0.050	ND	U
CCB16	552784	KQ1709224-05	07/08/17 08:08	0.050	ND	U
CCB17	552784	KQ1709224-06	07/08/17 08:08	0.050	ND	U
CCB18	552784	KQ1709224-07	07/08/17 08:08	0.050	ND	U

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1706565  
**Date Collected:** 06/22/17  
**Date Received:** 06/23/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-062217	K1706565-001	<b>11.0</b>	1.0	0.3	5	06/23/17 12:15	*
CG-9-127-40-062217	K1706565-002	<b>12.6</b>	1.0	0.3	5	06/23/17 12:15	*
CG-127-75-0612217	K1706565-003	<b>0.78</b>	0.20	0.05	1	06/23/17 12:15	*
Method Blank	K1706565-MB1	ND U	0.20	0.05	1	06/22/17 13:20	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: Georgetown ISB/STRCL-001  
Sample Matrix: Water

Service Request: K1706565  
Date Collected: NA  
Date Received: NA  
Date Analyzed: 06/22/17

Replicate Sample Summary  
General Chemistry Parameters

Sample Name: Batch QC  
Lab Code: K1706507-001

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1706507-001DUP Result	Average	RPD	RPD Limit
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 06/22/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** Batch QC  
**Lab Code:** K1706507-001  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1706507-001MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	ND U	2.47	2.00	124	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	550965	KQ1708355-07	06/22/17 13:20	4.00	4.15	104	90-110
CCV2	550965	KQ1708355-08	06/22/17 13:20	4.00	4.16	104	90-110
CCV3	550965	KQ1708355-09	06/22/17 13:20	4.00	4.15	104	90-110
CCV4	550965	KQ1708355-10	06/23/17 12:15	4.00	3.91	98	90-110
CCV5	550965	KQ1708355-11	06/23/17 12:15	4.00	3.90	98	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:**K1706565

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	550965	KQ1708355-02	06/22/17 13:20	0.20	0.05	ND	U
CCB2	550965	KQ1708355-03	06/22/17 13:20	0.20	0.05	ND	U
CCB3	550965	KQ1708355-04	06/22/17 13:20	0.20	0.05	ND	U
CCB4	550965	KQ1708355-05	06/23/17 12:15	0.20	0.05	ND	U
CCB5	550965	KQ1708355-06	06/23/17 12:15	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-062217  
**Lab Code:** K1706565-001

**Service Request:** K1706565  
**Date Collected:** 06/22/17 11:15  
**Date Received:** 06/23/17 09:20  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6010C	13700	ug/L	21	3	1	07/10/17 14:31	07/05/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-9-127-40-062217  
**Lab Code:** K1706565-002

**Service Request:** K1706565  
**Date Collected:** 06/22/17 11:20  
**Date Received:** 06/23/17 09:20  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6010C	13600	ug/L	21	3	1	07/10/17 15:58	07/05/17	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-0612217  
**Lab Code:** K1706565-003

**Service Request:** K1706565  
**Date Collected:** 06/22/17 12:05  
**Date Received:** 06/23/17 09:20  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6010C	9310	ug/L	21	3	1	07/10/17 16:01	07/05/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1708649-02

**Service Request:** K1706565  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	ND U	ug/L	21	3	1	07/10/17 14:14	07/05/17	

ALS Group USA, Corp.

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: Georgetown ISB/STRCL-001  
Sample Matrix: Water

Service Request: K1706565  
Date Collected: NA  
Date Received: NA  
Date Analyzed: 07/10/17

Replicate Sample Summary  
Dissolved Metals

Sample Name: Batch QC  
Lab Code: K1706692-002

Units: ug/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1708649-07 Result			
Iron	6010C	21	3	4460	4490	4470	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: Georgetown ISB/STRCL-001  
Sample Matrix: Water

Service Request: K1706565  
Date Collected: 06/22/17  
Date Received: 06/23/17  
Date Analyzed: 07/10/17

Replicate Sample Summary

Total Metals

Sample Name: CG-127-40-062217  
Lab Code: K1706565-001

Units: ug/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1708649-03 Result			
Iron	6010C	21	3	13700	13700	13700	<1	20

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: Georgetown ISB/STRCL-001  
Sample Matrix: Water

Service Request: K1706565  
Date Collected: NA  
Date Received: NA  
Date Analyzed: 07/10/17

Replicate Sample Summary

Total Metals

Sample Name: Batch QC  
Lab Code: K1706692-002

Units: ug/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1708649-05 Result			
Iron	6010C	21	3	4760	4900	4830	3	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/10/17  
**Date Extracted:** 07/5/17

**Matrix Spike Summary**  
**Dissolved Metals**

**Sample Name:** Batch QC  
**Lab Code:** K1706692-002  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ1708649-08

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	4460	5410	1000	95 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** 06/22/17  
**Date Received:** 06/23/17  
**Date Analyzed:** 07/10/17  
**Date Extracted:** 07/5/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** CG-127-40-062217  
**Lab Code:** K1706565-001  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ1708649-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	13700	14600	1000	85 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/10/17  
**Date Extracted:** 07/5/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** Batch QC  
**Lab Code:** K1706692-002  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ1708649-06

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	4760	5740	1000	98 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Analyzed:** 07/10/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ1708649-01

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6010C	977	1000	98	80-120

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Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:**K1706565

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6010C

**Extraction Lot:**291693

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
Batch QC	KQ1708649-07DUP	NA	NA	10 mL	10.5 mL	
Batch QC	KQ1708649-08MS	NA	NA	10 mL	10.9 mL	
CG-127-40-062217	K1706565-001	6/22/17	6/23/17	10 mL	10.5 mL	
CG-9-127-40-062217	K1706565-002	6/22/17	6/23/17	10 mL	10.5 mL	
CG-127-75-0612217	K1706565-003	6/22/17	6/23/17	10 mL	10.5 mL	
Lab Control Sample	KQ1708649-01LCS	NA	NA	10 mL	10.7 mL	
Method Blank	KQ1708649-02MB	NA	NA	10 mL	10.5 mL	
Duplicate	KQ1708649-03DUP	6/22/17	6/23/17	10 mL	10.5 mL	
Matrix Spike	KQ1708649-04MS	6/22/17	6/23/17	10 mL	10.9 mL	
Batch QC	KQ1708649-05DUP	NA	NA	10 mL	10.5 mL	
Batch QC	KQ1708649-06MS	NA	NA	10 mL	10.9 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	552902	2500	2540	102	10000	10300	103	10000	10300	103



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	552902				10000	10300	103	10000	10300	103

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	552902				10000	10300	103	10000	9990	100

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	552902				10000	10100	101	10000	10100	101

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	552902				10000	9960	100	10000	9920	99

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6010C	552902	3	J	6	J	3	U	4	J

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6010C	552902	11	J	3	U	3	U	3	U

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	552902			-4.00	J	6	J	3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6010C	552902			3	U				



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
LLICV	Iron	6010C	552902	24.0	20.0	120	70-130	07/10/17 10:53
LLCCV	Iron	6010C	552902	20.0	20.0	100	70-130	07/10/17 12:35
LLCCV	Iron	6010C	552902	22.0	20.0	111	70-130	07/10/17 14:00
LLCCV	Iron	6010C	552902	22.0	20.0	111	70-130	07/10/17 16:23
LLCCV	Iron	6010C	552902	24.0	20.0	120	70-130	07/10/17 18:04

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	552902	186000	-	-	-	07/10/17 11:28

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	552902	185000	-	-	-	07/10/17 11:31

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1706565-001A	Iron	6010C	552902	13100	15100	2500	80	80-120	07/10/17 15:56
K1706692-002A	Iron	6010C	552902	4530	7000	2500	99	80-120	07/10/17 16:50

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1706565-001SDL	Iron	6010C	552902	13100	13400	2	10	07/10/17 14:39

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Wavelength (nm)</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	2599	ug/L	20	3	6010C

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-AES-03

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 2599	360000	6010C

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 552902

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/10/17 10:32	
ZZZZZZ	1	07/10/17 10:35	
ZZZZZZ	1	07/10/17 10:37	
ZZZZZZ	1	07/10/17 10:42	
ICV	1	07/10/17 10:45	X
ZZZZZZ	1	07/10/17 10:48	
ICB	1	07/10/17 10:51	X
LLICV	1	07/10/17 10:53	X
ZZZZZZ	1	07/10/17 10:58	
ZZZZZZ	0.5	07/10/17 11:01	
CCVB1	1	07/10/17 11:06	X
ZZZZZZ	1	07/10/17 11:11	
ZZZZZZ	1	07/10/17 11:19	
CCB	1	07/10/17 11:24	X
ICSA	1	07/10/17 11:28	X
ICSAB	1	07/10/17 11:31	X
ZZZZZZ	1	07/10/17 11:35	
ZZZZZZ	2	07/10/17 12:00	
ZZZZZZ	2	07/10/17 12:03	
ZZZZZZ	2	07/10/17 12:05	
ZZZZZZ	2	07/10/17 12:08	
ZZZZZZ	2	07/10/17 12:10	
ZZZZZZ	2	07/10/17 12:13	
ZZZZZZ	2	07/10/17 12:15	
ZZZZZZ	2	07/10/17 12:18	
ZZZZZZ	2	07/10/17 12:21	
CCVB	1	07/10/17 12:26	X
ZZZZZZ	1	07/10/17 12:29	
CCB	1	07/10/17 12:32	X
LLCCV	1	07/10/17 12:35	X
ZZZZZZ	1	07/10/17 12:39	
ZZZZZZ	1	07/10/17 12:43	
ZZZZZZ	1	07/10/17 12:45	
ZZZZZZ	1	07/10/17 12:48	
ZZZZZZ	1	07/10/17 12:51	
ZZZZZZ	1	07/10/17 12:54	
ZZZZZZ	1	07/10/17 12:56	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 552902

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/10/17 12:59	
ZZZZZZ	1	07/10/17 13:01	
ZZZZZZ	1	07/10/17 13:04	
ZZZZZZ	1	07/10/17 13:07	
CCVB	1	07/10/17 13:10	X
ZZZZZZ	1	07/10/17 13:17	
ZZZZZZ	1	07/10/17 13:21	
CCB	1	07/10/17 13:23	X
ZZZZZZ	1	07/10/17 13:26	
ZZZZZZ	1	07/10/17 13:29	
ZZZZZZ	1	07/10/17 13:32	
ZZZZZZ	1	07/10/17 13:34	
ZZZZZZ	1	07/10/17 13:37	
ZZZZZZ	1	07/10/17 13:40	
ZZZZZZ	1	07/10/17 13:43	
ZZZZZZ	1	07/10/17 13:46	
CCVB	1	07/10/17 13:49	X
ZZZZZZ	1	07/10/17 13:52	
CCB	1	07/10/17 13:54	X
ZZZZZZ	1	07/10/17 13:57	
LLCCV	1	07/10/17 14:00	X
ZZZZZZ	1	07/10/17 14:05	
ZZZZZZ	0.5	07/10/17 14:08	
KQ1708649-02MB	1	07/10/17 14:14	X
KQ1708649-01LCS	1	07/10/17 14:16	X
ZZZZZZ	1	07/10/17 14:19	
ZZZZZZ	1	07/10/17 14:21	
ZZZZZZ	1	07/10/17 14:24	
ZZZZZZ	1	07/10/17 14:27	
K1706565-001	1	07/10/17 14:31	X
K1706565-001SDL	5	07/10/17 14:39	X
K1706565-001DUP	1	07/10/17 14:41	X
K1706565-001MS	1	07/10/17 14:44	X
CCVB	1	07/10/17 14:47	X
ZZZZZZ	1	07/10/17 14:50	
CCB	1	07/10/17 14:52	X
ZZZZZZ	1	07/10/17 14:57	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 552902

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/10/17 15:00	
ZZZZZZ	1	07/10/17 15:03	
ZZZZZZ	5	07/10/17 15:06	
ZZZZZZ	1	07/10/17 15:08	
ZZZZZZ	1	07/10/17 15:11	
ZZZZZZ	1	07/10/17 15:14	
ZZZZZZ	1	07/10/17 15:16	
ZZZZZZ	1	07/10/17 15:19	
ZZZZZZ	1	07/10/17 15:22	
CCVB	1	07/10/17 15:25	X
ZZZZZZ	1	07/10/17 15:28	
CCB	1	07/10/17 15:30	X
ZZZZZZ	1	07/10/17 15:33	
ZZZZZZ	1	07/10/17 15:35	
ZZZZZZ	1	07/10/17 15:38	
ZZZZZZ	1	07/10/17 15:41	
ZZZZZZ	1.111	07/10/17 15:44	
ZZZZZZ	1.111	07/10/17 15:47	
K1706565-001PS	1	07/10/17 15:56	X
K1706565-002	1	07/10/17 15:58	X
K1706565-003	1	07/10/17 16:01	X
ZZZZZZ	1	07/10/17 16:04	
CCVB	1	07/10/17 16:09	X
ZZZZZZ	1	07/10/17 16:12	
CCB	1	07/10/17 16:14	X
ZZZZZZ	1	07/10/17 16:17	
LLCCV	1	07/10/17 16:23	X
ZZZZZZ	0.5	07/10/17 16:26	
ZZZZZZ	1	07/10/17 16:30	
ZZZZZZ	1	07/10/17 16:33	
ZZZZZZ	1	07/10/17 16:35	
ZZZZZZ	1	07/10/17 16:39	
ZZZZZZ	1	07/10/17 16:42	
K1706692-002DUP	1	07/10/17 16:44	X
K1706692-002MS	1	07/10/17 16:47	X
K1706692-002PS	1	07/10/17 16:50	X
ZZZZZZ	1	07/10/17 16:53	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 552902

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/10/17 16:56	
CCVB	1	07/10/17 17:00	X
ZZZZZZ	1	07/10/17 17:03	
CCB	1	07/10/17 17:06	X
ZZZZZZ	1	07/10/17 17:09	
K1706692-002DUP	1	07/10/17 17:12	X
K1706692-002MS	1	07/10/17 17:14	X
K1706692-002PS	1	07/10/17 17:17	X
ZZZZZZ	1	07/10/17 17:20	
ZZZZZZ	5	07/10/17 17:23	
ZZZZZZ	20	07/10/17 17:26	
ZZZZZZ	5	07/10/17 17:28	
ZZZZZZ	20	07/10/17 17:31	
ZZZZZZ	5	07/10/17 17:34	
CCVB	1	07/10/17 17:37	X
ZZZZZZ	1	07/10/17 17:40	
CCB	1	07/10/17 17:42	X
ZZZZZZ	5	07/10/17 17:45	
ZZZZZZ	5	07/10/17 17:48	
ZZZZZZ	5	07/10/17 17:51	
CCVB	1	07/10/17 17:53	X
ZZZZZZ	1	07/10/17 17:56	
CCB	1	07/10/17 17:59	X
ZZZZZZ	1	07/10/17 18:02	
LLCCV	1	07/10/17 18:04	X
ZZZZZZ	1	07/10/17 18:07	
ZZZZZZ	0.5	07/10/17 18:10	

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Al 167.079 (502)	<input checked="" type="checkbox"/>	1	Fe	0.000833	0.000000	No
Al 394.401 (85)	<input checked="" type="checkbox"/>	None				
Sb 206.833 (463)	<input checked="" type="checkbox"/>	4	Cr	0.016054	0.000000	No
			Fe	-0.000037	0.000000	No
			Mo	0.000488	0.000000	No
			Ti	0.000603	0.000000	No
Sb 217.581 (455)	<input checked="" type="checkbox"/>	4	Cu	-0.000990	0.000000	No
			Fe	-0.000951	0.000000	No
			Mn	-0.000745	0.000000	No
			V	0.002186	0.000000	No
As 189.042 (478)	<input checked="" type="checkbox"/>	5	Al	0.000041	0.000000	No
			Cr	0.000477	0.000000	No
			Mn	-0.000266	0.000000	No
			Mo	0.001196	0.000000	No
			Fe	-0.000029	0.000000	No
Ba 455.403 (74)	<input checked="" type="checkbox"/>	None				
Be 234.861 (144)	<input checked="" type="checkbox"/>	3	Fe	0.000008	0.000000	No
			Mn	-0.000058	0.000000	No
			Mo	-0.000392	0.000000	No
B 249.678 (135)	<input checked="" type="checkbox"/>	4	Co	0.002863	0.000000	No
			Fe	-0.000682	0.000000	No
			Mo	-0.001636	0.000000	No
			V	-0.000450	0.000000	No
Cd 214.438 (457)	<input checked="" type="checkbox"/>	2	Al	-0.000005	0.000000	No
			Fe	0.000028	0.000000	No
Cd 226.502 (449)	<input checked="" type="checkbox"/>	2	Fe	0.000133	0.000000	No
			Ti	0.000128	0.000000	No
Ca 315.887 (107)	<input checked="" type="checkbox"/>	None				
Ca 393.366 (86)	<input checked="" type="checkbox"/>	1	Fe	0.000130	0.000000	No
Cr 267.716 (126)	<input checked="" type="checkbox"/>	3	Cd	-0.000118	0.000000	No
			Mn	0.000260	0.000000	No
			Fe	0.000026	0.000000	No
Co 228.616 (447)	<input checked="" type="checkbox"/>	4	Ba	-0.000098	0.000000	No
			Mo	-0.001099	0.000000	No
			Ni	0.000115	0.000000	No
			Ti	0.002559	0.000000	No
Co 230.786 (446)	<input checked="" type="checkbox"/>	5	Al	-0.000006	0.000000	No
			Cr	-0.000188	0.000000	No
			Fe	0.000031	0.000000	No
			Mo	0.000224	0.000000	No
			Ni	0.000132	0.000000	No
Cu 224.700 (450)	<input checked="" type="checkbox"/>	6	Co	0.000140	0.000000	No
			Fe	0.000305	0.000000	No
			Pb	0.001810	0.000000	No
			Mo	0.001663	0.000000	No
			Ni	-0.004632	0.000000	No
			Ti	0.000391	0.000000	No
Cu 327.396 (103)	<input checked="" type="checkbox"/>	5	Ca	0.000016	0.000000	No
			Co	0.000273	0.000000	No
			Mo	-0.000211	0.000000	No
			Ti	0.000145	0.000000	No
			Fe	0.000025	0.000000	No
Fe 259.940 (130)	<input checked="" type="checkbox"/>	None				
Pb 220.353 (453)	<input checked="" type="checkbox"/>	6	Al	-0.000083	0.000000	No
			Cu	0.000295	0.000000	No
			Mo	-0.000599	0.000000	No
			Ni	0.000228	0.000000	No
			Si	0.000124	0.000000	No

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
			Fe	0.000051	0.000000	No
Li 670.784 ( 50)	☒	None				
Mg 279.079 (121)	☒	None				
Mg 279.553 (121)	☒	1	Fe	0.000137	0.000000	No
Mg 285.213 (118)	☒	None				
Mn 257.610 (131)	☒	1	Fe	0.000014	0.000000	No
Mn 260.569 (129)	☒	None				
Mo 202.030 (467)	☒	1	Fe	-0.000021	0.000000	No
Ni 221.647 (452)	☒	6	Cr	-0.000539	0.000000	No
			Co	-0.000167	0.000000	No
			Cu	-0.000056	0.000000	No
			Si	0.000558	0.000000	No
			Ti	-0.000654	0.000000	No
			Fe	0.000034	0.000000	No
Ni 231.604 (446)	☒	1	Co	-0.000186	0.000000	No
P 178.284 (489)	☒	None				
P 214.914 (457)	☒	6	Al	-0.000826	0.000000	No
			Cd	-0.001386	0.000000	No
			Cu	0.005306	0.000000	No
			Fe	0.000669	0.000000	No
			Mo	0.009817	0.000000	No
			V	-0.001756	0.000000	No
K 766.490 ( 44)	☒	None				
Se 196.090 (472)	☒	1	Fe	-0.000090	0.000000	No
Si 251.611 (134)	☒	1	Mo	0.008004	0.000000	No
Ag 328.068 (103)	☒	2	Mn	0.000146	0.000000	No
			Fe	-0.000001	0.000000	No
Na 589.592 ( 57)	☒	None				
Sr 407.771 ( 83)	☒	None				
Tl 190.856 (477)	☒	5	Cr	0.000283	0.000000	No
			Co	0.003057	0.000000	No
			Mn	0.000688	0.000000	No
			Ti	-0.000474	0.000000	No
			V	0.000383	0.000000	No
Sn 189.989 (477)	☒	None				
Ti 336.121 (100)	☒	2	Ni	0.000108	0.000000	No
			Si	0.000021	0.000000	No
V 292.402 (115)	☒	6	Cr	-0.005445	0.000000	No
			Cu	-0.000055	0.000000	No
			Mn	-0.001374	0.000000	No
			Mo	-0.000084	0.000000	No
			Ti	0.000398	0.000000	No
			Fe	-0.000013	0.000000	No
Zn 206.200 (463)	☒	3	Cr	-0.000124	0.000000	No
			Fe	0.000001	0.000000	No
			Mo	0.000326	0.000000	No
Zn 213.856 (458)	☒	3	Cu	0.001201	0.000000	No
			Fe	0.000114	0.000000	No
			Ni	0.005255	0.000000	No
Y 224.306 (450)*	☒	None				
Y 360.073 ( 94)*	☒	None				
Y 360.073 ( 94)2*	☒	None				
In 230.606 (446)	☒	None				
Bi 223.061 (451)	☒	4	Cr	0.001080	0.000000	No
			Co	-0.009626	0.000000	No
			Cu	-0.002768	0.000000	No
			V	-0.000476	0.000000	No
S 182.034 (485)	☒	2	Mn	0.003127	0.000000	No

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
			Mo	0.000981	0.000000	No



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
CG-127-40-062217	K1706565-001	06/22/2017	06/23/2017
CG-9-127-40-062217	K1706565-002	06/22/2017	06/23/2017
CG-127-75-0612217	K1706565-003	06/22/2017	06/23/2017



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** 06/22/2017  
**Date Received:** 06/23/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-062217  
**Lab Code:** K1706565-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	350	D	4.0	1.6	10	06/29/17	07/13/17	KWG1705306	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	82	64-120	07/11/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** 06/22/2017  
**Date Received:** 06/23/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-9-127-40-062217  
**Lab Code:** K1706565-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	380	D	4.0	1.6	10	06/29/17	07/13/17	KWG1705306	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	91	64-120	07/11/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** 06/22/2017  
**Date Received:** 06/23/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-0612217  
**Lab Code:** K1706565-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	780	D	8.0	3.2	20	06/29/17	07/13/17	KWG1705306	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1705306-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	06/29/17	07/11/17	KWG1705306	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	07/11/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
Batch QC	K1706496-032	71
CG-127-40-062217	K1706565-001	82
CG-9-127-40-062217	K1706565-002	91
CG-127-75-0612217	K1706565-003	92
Method Blank	KWG1705306-5	92
Batch QCMS	KWG1705306-1	90
Batch QCDMS	KWG1705306-2	94
Lab Control Sample	KWG1705306-3	97
Duplicate Lab Control Sample	KWG1705306-4	92

**Surrogate Recovery Control Limits (%)**

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Sur1 = 1,4-Dioxane-d8 64-120

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/11/2017  
**Time Analyzed:** 17:23

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071117\0711F004.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705854-2  
**Analysis Lot:** KWG1705854

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	52,760	5.21
<b>Upper Limit ==&gt;</b>	105,520	5.71
<b>Lower Limit ==&gt;</b>	26,380	4.71
<b>ICAL Result ==&gt;</b>	39,344	5.21

*Associated Analyses*

Method Blank	KWG1705306-5	50,258	5.21
Lab Control Sample	KWG1705306-3	47,686	5.21
Duplicate Lab Control Sample	KWG1705306-4	49,639	5.21
Batch QCMS	KWG1705306-1	51,329	5.21
Batch QCDMS	KWG1705306-2	49,572	5.21
Batch QC	K1706496-032	53,844	5.21
CG-127-40-062217	K1706565-001	51,287	5.21
CG-9-127-40-062217	K1706565-002	51,605	5.21
CG-127-75-0612217	K1706565-003	50,333	5.21

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 21:30

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F037.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705951-2  
**Analysis Lot:** KWG1705951

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	40,099	5.22
<b>Upper Limit ==&gt;</b>	80,198	5.72
<b>Lower Limit ==&gt;</b>	20,050	4.72
<b>ICAL Result ==&gt;</b>	39,344	5.21

*Associated Analyses*

CG-127-40-062217DL	K1706565-001	41,155	5.21
CG-9-127-40-062217DL	K1706565-002	47,822	5.22
CG-127-75-0612217DL	K1706565-003	47,445	5.21

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Extracted:** 06/29/2017  
**Date Analyzed:** 07/11/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Batch QC  
**Lab Code:** K1706496-032  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705306

Analyte Name	Sample Result	Batch QCMS KWG1705306-1 Matrix Spike			Batch QCDMS KWG1705306-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	1.3	9.52	10.0	83	10.2	10.0	89	49-113	6	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Extracted:** 06/29/2017  
**Date Analyzed:** 07/11/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705306

Analyte Name	Lab Control Sample KWG1705306-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705306-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	9.02	10.0	90	8.63	10.0	86	59-111	4	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Extracted:** 06/29/2017  
**Date Analyzed:** 07/11/2017  
**Time Analyzed:** 17:56

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1705306-5 **File ID:** J:\MS26\DATA\071117\0711F005.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1705306

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1705306-3	J:\MS26\DATA\071117\0711F006.D	07/11/17	18:14
Duplicate Lab Control Sample	KWG1705306-4	J:\MS26\DATA\071117\0711F007.D	07/11/17	18:33
Batch QCMS	KWG1705306-1	J:\MS26\DATA\071117\0711F008.D	07/11/17	18:51
Batch QCDMS	KWG1705306-2	J:\MS26\DATA\071117\0711F009.D	07/11/17	19:10
Batch QC	K1706496-032	J:\MS26\DATA\071117\0711F022.D	07/11/17	23:10
CG-127-40-062217	K1706565-001	J:\MS26\DATA\071117\0711F023.D	07/11/17	23:29
CG-9-127-40-062217	K1706565-002	J:\MS26\DATA\071117\0711F024.D	07/11/17	23:48
CG-127-75-0612217	K1706565-003	J:\MS26\DATA\071117\0711F025.D	07/12/17	00:06
CG-127-40-062217	K1706565-001	J:\MS26\DATA\071217\0712F053.D	07/13/17	02:26
CG-9-127-40-062217	K1706565-002	J:\MS26\DATA\071217\0712F054.D	07/13/17	02:45
CG-127-75-0612217	K1706565-003	J:\MS26\DATA\071217\0712F055.D	07/13/17	03:03



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/11/2017  
**Time Analyzed:** 16:03

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071117\0711F003.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705854

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
197	198	0	2	0.2	4367	PASS
198	442	30	100	60.6	2661888	PASS
199	198	5	9	6.7	177986	PASS
275	198	10	60	32.6	868949	PASS
365	442	1	50	2.6	112029	PASS
441	443	0	100	76.9	647914	PASS
442	442	100	100	100.0	4391850	PASS
443	442	15	24	19.2	842432	PASS
51	198	10	80	16.1	427794	PASS
68	69	0	2	1.5	8154	PASS
69	198	0	100	20.1	535469	PASS
70	69	0	2	0.5	2556	PASS
127	198	10	80	35.1	933376	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705854-2	J:\MS26\DATA\071117\0711F004.D	07/11/2017	17:23	
Method Blank	KWG1705306-5	J:\MS26\DATA\071117\0711F005.D	07/11/2017	17:56	
Lab Control Sample	KWG1705306-3	J:\MS26\DATA\071117\0711F006.D	07/11/2017	18:14	
Duplicate Lab Control Sample	KWG1705306-4	J:\MS26\DATA\071117\0711F007.D	07/11/2017	18:33	
Batch QCMS	KWG1705306-1	J:\MS26\DATA\071117\0711F008.D	07/11/2017	18:51	
Batch QCDMS	KWG1705306-2	J:\MS26\DATA\071117\0711F009.D	07/11/2017	19:10	
Batch QC	K1706496-032	J:\MS26\DATA\071117\0711F022.D	07/11/2017	23:10	
CG-127-40-062217	K1706565-001	J:\MS26\DATA\071117\0711F023.D	07/11/2017	23:29	
CG-9-127-40-062217	K1706565-002	J:\MS26\DATA\071117\0711F024.D	07/11/2017	23:48	
CG-127-75-0612217	K1706565-003	J:\MS26\DATA\071117\0711F025.D	07/12/2017	00:06	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 21:12

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F036.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705951

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	15.5	441292	PASS
68	69	0	2	1.4	7875	PASS
69	198	0	100	20.0	571020	PASS
70	69	0	2	0.4	2482	PASS
127	198	10	80	36.7	1046801	PASS
197	198	0	2	0.2	5071	PASS
198	442	30	100	74.2	2848597	PASS
199	198	5	9	6.6	187349	PASS
275	198	10	60	30.6	870656	PASS
365	442	1	50	2.6	99282	PASS
441	443	0	100	76.7	573952	PASS
442	442	100	100	100.0	3837098	PASS
443	442	15	24	19.5	748266	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705951-2	J:\MS26\DATA\071217\0712F037.D	07/12/2017	21:30	
CG-127-40-062217	K1706565-001	J:\MS26\DATA\071217\0712F053.D	07/13/2017	02:26	
CG-9-127-40-062217	K1706565-002	J:\MS26\DATA\071217\0712F054.D	07/13/2017	02:45	
CG-127-75-0612217	K1706565-003	J:\MS26\DATA\071217\0712F055.D	07/13/2017	03:03	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\071017\0710F016.D	E	J:\MS26\DATA\071017\0710F020.D
B	J:\MS26\DATA\071017\0710F017.D	F	J:\MS26\DATA\071017\0710F021.D
C	J:\MS26\DATA\071017\0710F018.D	G	J:\MS26\DATA\071017\0710F022.D
D	J:\MS26\DATA\071017\0710F019.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.457	B	4.0	0.378	C	10	0.409	D	20	0.413	E	50	0.419
	F	100	0.422	G	200	0.401									
1,4-Dioxane-d8	A	2.0	0.428	B	4.0	0.395	C	10	0.394	D	20	0.420	E	50	0.418
	F	100	0.418	G	200	0.403									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	5.8		≤ 20	0.414		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	3.2		≤ 20	0.411		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Calibration Date:** 07/10/2017  
**Date Analyzed:** 07/10/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15465  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071017\0710F023.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.414	0.406	-2	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/11/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/10/2017  
**Calibration ID:** CAL15465  
**Analysis Lot:** KWG1705854  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071117\0711F004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.01	0.414	0.413	0	NA	± 20	AverageRF
1,4-Dioxane-d8	20	21	0.01	0.411	0.424	3	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565  
**Date Analyzed:** 07/12/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/10/2017  
**Calibration ID:** CAL15465  
**Analysis Lot:** KWG1705951  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071217\0712F037.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	21	0.01	0.414	0.438	6	NA	± 20	AverageRF
1,4-Dioxane-d8	20	22	0.01	0.411	0.442	8	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705854  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0711F003.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705854-1	7/11/2017	16:03		7/11/2017	16:13
0711F004.D	Continuing Calibration Verification	KWG1705854-2	7/11/2017	17:23		7/11/2017	17:33
0711F005.D	Method Blank	KWG1705306-5	7/11/2017	17:56		7/11/2017	18:06
0711F006.D	Lab Control Sample	KWG1705306-3	7/11/2017	18:14		7/11/2017	18:24
0711F007.D	Duplicate Lab Control Sample	KWG1705306-4	7/11/2017	18:33		7/11/2017	18:43
0711F008.D	Batch QCMS	KWG1705306-1	7/11/2017	18:51		7/11/2017	19:01
0711F009.D	Batch QCDMS	KWG1705306-2	7/11/2017	19:10		7/11/2017	19:20
0711F010.D	ZZZZZZ	ZZZZZZ	7/11/2017	19:28		7/11/2017	19:38
0711F011.D	ZZZZZZ	ZZZZZZ	7/11/2017	19:47		7/11/2017	19:57
0711F012.D	ZZZZZZ	ZZZZZZ	7/11/2017	20:05		7/11/2017	20:15
0711F013.D	ZZZZZZ	ZZZZZZ	7/11/2017	20:24		7/11/2017	20:34
0711F014.D	ZZZZZZ	ZZZZZZ	7/11/2017	20:42		7/11/2017	20:52
0711F015.D	ZZZZZZ	ZZZZZZ	7/11/2017	21:01		7/11/2017	21:11
0711F016.D	ZZZZZZ	ZZZZZZ	7/11/2017	21:19		7/11/2017	21:29
0711F017.D	ZZZZZZ	ZZZZZZ	7/11/2017	21:38		7/11/2017	21:48
0711F018.D	ZZZZZZ	ZZZZZZ	7/11/2017	21:56		7/11/2017	22:06
0711F019.D	ZZZZZZ	ZZZZZZ	7/11/2017	22:15		7/11/2017	22:25
0711F020.D	ZZZZZZ	ZZZZZZ	7/11/2017	22:33		7/11/2017	22:43
0711F021.D	ZZZZZZ	ZZZZZZ	7/11/2017	22:52		7/11/2017	23:02
0711F022.D	Batch QC	K1706496-032	7/11/2017	23:10		7/11/2017	23:20
0711F023.D	CG-127-40-062217	K1706565-001	7/11/2017	23:29		7/11/2017	23:39
0711F024.D	CG-9-127-40-062217	K1706565-002	7/11/2017	23:48		7/11/2017	23:58
0711F025.D	CG-127-75-0612217	K1706565-003	7/12/2017	00:06		7/12/2017	00:16

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001

**Service Request:** K1706565

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705951  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0712F036.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705951-1	7/12/2017	21:12		7/12/2017	21:22
0712F037.D	Continuing Calibration Verification	KWG1705951-2	7/12/2017	21:30		7/12/2017	21:40
0712F038.D	ZZZZZZ	ZZZZZZ	7/12/2017	21:49		7/12/2017	21:59
0712F039.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:07		7/12/2017	22:17
0712F040.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:26		7/12/2017	22:36
0712F041.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:44		7/12/2017	22:54
0712F042.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:03		7/12/2017	23:13
0712F043.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:21		7/12/2017	23:31
0712F044.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:40		7/12/2017	23:50
0712F045.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:58		7/13/2017	00:08
0712F046.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:17		7/13/2017	00:27
0712F047.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:35		7/13/2017	00:45
0712F048.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:54		7/13/2017	01:04
0712F049.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:12		7/13/2017	01:22
0712F050.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:31		7/13/2017	01:41
0712F051.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:49		7/13/2017	01:59
0712F052.D	ZZZZZZ	ZZZZZZ	7/13/2017	02:08		7/13/2017	02:18
0712F053.D	CG-127-40-062217	K1706565-001	7/13/2017	02:26		7/13/2017	02:36
0712F054.D	CG-9-127-40-062217	K1706565-002	7/13/2017	02:45		7/13/2017	02:55
0712F055.D	CG-127-75-0612217	K1706565-003	7/13/2017	03:03		7/13/2017	03:13
0712F056.D	ZZZZZZ	ZZZZZZ	7/13/2017	03:22		7/13/2017	03:32
0712F057.D	ZZZZZZ	ZZZZZZ	7/13/2017	03:40		7/13/2017	03:50
0712F058.D	ZZZZZZ	ZZZZZZ	7/13/2017	03:59		7/13/2017	04:09

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown ISB/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1706565  
**Date Extracted:** 06/29/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1705306  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
CG-127-40-062217	K1706565-001	06/22/17	06/23/17	10ml	2ml	NA	
CG-127-40-062217DL	K1706565-001	06/22/17	06/23/17	10ml	2ml	NA	
CG-9-127-40-062217	K1706565-002	06/22/17	06/23/17	10ml	2ml	NA	
CG-9-127-40-062217DL	K1706565-002	06/22/17	06/23/17	10ml	2ml	NA	
CG-127-75-0612217	K1706565-003	06/22/17	06/23/17	10ml	2ml	NA	
CG-127-75-0612217DL	K1706565-003	06/22/17	06/23/17	10ml	2ml	NA	
Method Blank	KWG1705306-5	NA	NA	10ml	2ml	NA	
Batch QC	K1706496-032	NA	NA	10ml	2ml	NA	
Batch QCMS	KWG1705306-1	NA	NA	10ml	2ml	NA	
Batch QCDMS	KWG1705306-2	NA	NA	10ml	2ml	NA	
Lab Control Sample	KWG1705306-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1705306-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



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July 26, 2017

**Analytical Report for Service Request No: K1706876**

Tasya Gray  
Dalton Olmsted & Fuglevand  
10827 NE 68th St., Suite B  
Kirkland, WA 98033

**RE: Georgetown 1,4-Dioxane ISB / STRCL-001 375.08**

Dear Tasya,

Enclosed are the results of the sample(s) submitted to our laboratory June 30, 2017  
For your reference, these analyses have been assigned our service request number **K1706876**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

for Kurt Clarkson  
Client Services  
Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.



### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
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## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1706876  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08      **Date Received:** 06/30/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Four water samples were received for analysis at ALS Environmental on 06/30/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Ferrous Iron (Divalent Iron) by ApplEnvMic7-87-1536-1540:**

All samples were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

#### Total Metals

No anomalies associated with the analysis of these samples were observed.

#### 1,4-Dioxane by EPA Method 8270

##### **Matrix Spike Recovery Exceptions:**

The control criteria for replicate Matrix Spikes (MS/DMS) KWG1705607-1 and KWG1705607-2 recoveries of 1,4-Dioxane for sample CG-127-40-062917 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recoveries.

No other anomalies associated with the analysis of these samples were observed.

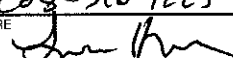
Approved by \_\_\_\_\_

*Noel D. O'Neil*



# Chain of Custody

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[www.alsglobal.com](http://www.alsglobal.com)

PROJECT NAME: Georgetown 1,4-Dioxane ISB  
PROJECT NUMBER: JTRCI-001 37508  
PROJECT MANAGER: TASYA GRAY  
COMPANY NAME: DOF  
ADDRESS: 10827 NE 68th St  
CITY/STATE/ZIP: Kirkland, WA 98023  
E-MAIL ADDRESS: LUKERNER@DOFNU.COM  
PHONE #: 202-316-7223 FAX # \_\_\_\_\_  
SAMPLER'S SIGNATURE: 

NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 <input type="checkbox"/> 8270 <input type="checkbox"/> 8270LL <input type="checkbox"/> SIM PAH <input type="checkbox"/>
	Volatile Organics 624 <input type="checkbox"/> 8260 <input type="checkbox"/> 8021 <input type="checkbox"/> BTEX <input type="checkbox"/>
	Hydrocarbons (see below) Gas <input type="checkbox"/> Diesel <input type="checkbox"/> Oil <input type="checkbox"/>
	Oil & Grease/TRPH 1664 HEM <input type="checkbox"/> 1664 SGT <input type="checkbox"/>
	PCBs Aroclors <input type="checkbox"/> Congeners <input type="checkbox"/>
	Pesticides/Herbicides 608 <input type="checkbox"/> 8081 <input type="checkbox"/> 8141 <input type="checkbox"/>
	Chlorophenolics Tri <input type="checkbox"/> Tetra <input type="checkbox"/> 8151 <input type="checkbox"/>
	Metals (Total) or Dissolved (See List below) PCP <input type="checkbox"/>
	Cyanide <input type="checkbox"/> Hex-Chrom <input type="checkbox"/>
	(circle) pH, Cond., Cl, SO <sub>4</sub> , PO <sub>4</sub> , F, NO <sub>2</sub> , NO <sub>3</sub> , BOD, TSS, TDS, Turb.

DOC  NH<sub>4</sub>-N, COD, TKN, TOC,  
NO<sub>2</sub>+NO<sub>3</sub>-N, I-Phos  
TOX 9020  AOX 1650  506   
Alkalinity  CO<sub>3</sub>  HCO<sub>3</sub>   
Dioxins/Furans  
1613  8290   
Dissolved Gases  
RSK 175  Methane  Ethene   
1,4-Dioxane  
Ferrous/Ferric Iron

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	CONTAINERS	Semivolatile Organics by GC/MS	Volatile Organics	Hydrocarbons	Oil & Grease/TRPH	PCBs	Aroclors	Pesticides/Herbicides	Chlorophenolics	Metals (Total) or Dissolved	Cyanide	(circle) pH, Cond., Cl, SO <sub>4</sub> , PO <sub>4</sub> , F, NO <sub>2</sub> , NO <sub>3</sub> , BOD, TSS, TDS, Turb.	DOC	NH <sub>4</sub> -N, COD, TKN, TOC, NO <sub>2</sub> +NO <sub>3</sub> -N, I-Phos	TOX 9020	AOX 1650	506	Dioxins/Furans	1613	8290	Dissolved Gases	RSK 175	Methane	Ethene	REMARKS	
CG-127-40-062917	06/29/17	11:55		Water	4									X		X									X	X				
CG-127-40-062917	06/29/17	12:00		Water	4									X		X									X	X				
CG-127-75-062917	06/29/17	11:08		Water	4									X		X									X	X				
Field Blank	06/29/17	11:30		Water	1																									

**REPORT REQUIREMENTS**

I. Routine Report: Method Blank, Surrogate, as required

II. Report Dup., MS, MSD as required

III. CLP Like Summary (no raw data)

IV. Data Validation Report

V. EDD

**INVOICE INFORMATION**

P.O. # \_\_\_\_\_  
Bill To: STERCYCLE  
Bill Beck

**TURNAROUND REQUIREMENTS**

24 hr. \_\_\_\_\_ 48 hr. \_\_\_\_\_  
5 day \_\_\_\_\_  
 Standard (15 working days)  
Provide FAX Results \_\_\_\_\_  
Requested Report Date \_\_\_\_\_

Circle which metals are to be analyzed:

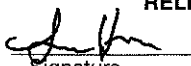
Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

\*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: \_\_\_\_\_ (CIRCLE ONE)

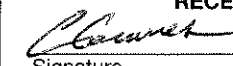
SPECIAL INSTRUCTIONS/COMMENTS:

Sample Shipment contains USDA regulated soil samples (check box if applicable)

**RELINQUISHED BY:**  
  
Signature \_\_\_\_\_  
Date/Time 06/29/17 1240  
Printed Name Tasya Gray  
Firm DOF

**RECEIVED BY:**  
Fedex under custody seal  
Signature \_\_\_\_\_  
Date/Time \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Firm \_\_\_\_\_

**RELINQUISHED BY:**  
Signature \_\_\_\_\_  
Date/Time \_\_\_\_\_  
Printed Name \_\_\_\_\_  
Firm \_\_\_\_\_

**RECEIVED BY:**  
  
Signature \_\_\_\_\_  
Date/Time 6/30/17 0930  
Printed Name CHAD GRAVES  
Firm ALS



PC KC

### Cooler Receipt and Preservation Form

Client Stericycle/DOF Service Request K17 66876  
Received: 6/30/17 Opened: 6/30/17 By: CG Unloaded: 6/30/17 By: CG

- 1. Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other NA
- 3. Were custody seals on coolers? NA  Y  N If yes, how many and where? 1 Front  
If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.7	0.5	/	/	-0.2	374	NA	7870 4101 1579		

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- 5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- 6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- 11. Were VOA vials received without headspace? *Indicate in the table below.* NA  Y  N
- 12. Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

# SHORT HOLD TIME



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1706876  
**Date Collected:** 06/29/17  
**Date Received:** 06/30/17  
**Units:** mg/L  
**Basis:** NA

Nitrate+Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
CG-127-40-062917	K1706876-001	ND U	0.050	0.020	1	07/15/17 08:44	7/15/17	
CG-9-127-40-062917	K1706876-002	ND U	0.050	0.020	1	07/15/17 08:44	7/15/17	
CG-127-75-062917	K1706876-003	ND U	0.050	0.020	1	07/20/17 12:28	7/20/17	
Method Blank	K1706876-MB1	ND U	0.050	0.020	1	07/15/17 08:44	7/15/17	
Method Blank	K1706876-MB2	ND U	0.050	0.020	1	07/20/17 12:28	7/20/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:**K1706876  
**Date Collected:**NA  
**Date Received:**NA

**Units:**mg/L  
**Basis:**NA

**Replicate Sample Summary**

**Nitrate+Nitrite as Nitrogen**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
Batch QC	K1706698-006DUP	0.050	0.020	0.340	0.338	0.339	<1	20	07/15/17
Batch QC	K1706910-001DUP	0.050	0.020	ND U	ND U	NC	NC	20	07/15/17
Batch QC	K1707226-001DUP	0.050	0.020	0.467	0.465	0.466	<1	20	07/20/17
Batch QC	K1707326-001DUP	0.050	0.020	0.950	0.971	0.961	2	20	07/20/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/15/17  
**Date Extracted:** 07/15/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1706698-006  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Matrix Spike K1706698-006MS				Duplicate Matrix Spike K1706698-006DMS			% Rec Limits	RPD	RPD Limit
	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	0.340	1.50	1.00	116 *	1.44	1.00	110	90-110	5	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/15/17  
**Date Extracted:** 07/15/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1706910-001 **Basis:** NA  
**Analysis Method:** 353.2  
**Prep Method:** Method

Analyte Name	Sample Result	Matrix Spike K1706910-001MS			Duplicate Matrix Spike K1706910-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	1.10	1.00	110	1.10	1.00	110	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/20/17  
**Date Extracted:** 07/20/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1707226-001  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1707226-001MS			Duplicate Matrix Spike K1707226-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	0.467	1.49	1.00	102	1.49	1.00	103	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/20/17  
**Date Extracted:** 07/20/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1707326-001  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1707326-001MS			Duplicate Matrix Spike K1707326-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	0.950	6.31	5.00	107	6.37	5.00	108	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Analyzed:** 07/15/17  
**Date Extracted:** 07/15/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 553669

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1706876-LCS1	9.88	10.9	91	90-110

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Analyzed:** 07/20/17  
**Date Extracted:** 07/20/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 554397

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1706876-LCS2	10.1	10.9	93	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

### Continuing Calibration Verification (CCV) Summary

#### Nitrate+Nitrite as Nitrogen

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	553669	KQ1709619-09	07/15/17 08:44	1.00	1.07	107	90-110
CCV2	553669	KQ1709619-10	07/15/17 08:44	1.00	1.07	107	90-110
CCV3	553669	KQ1709619-11	07/15/17 08:44	1.00	1.03	103	90-110
CCV4	553669	KQ1709619-12	07/15/17 08:44	1.00	1.05	105	90-110
CCV5	553669	KQ1709619-13	07/15/17 08:44	1.00	1.06	106	90-110
CCV6	553669	KQ1709619-14	07/15/17 08:44	1.00	1.06	106	90-110
CCV7	553669	KQ1709619-15	07/15/17 08:44	1.00	1.08	108	90-110
CCV8	553669	KQ1709619-16	07/15/17 08:44	1.00	1.09	109	90-110
CCV9	554397	KQ1709942-01	07/20/17 12:28	1.00	1.05	105	90-110
CCV10	554397	KQ1709942-02	07/20/17 12:28	1.00	1.04	104	90-110
CCV11	554397	KQ1709942-03	07/20/17 12:28	1.00	1.04	104	90-110
CCV12	554397	KQ1709942-04	07/20/17 12:28	1.00	1.04	104	90-110
CCV13	554397	KQ1709942-05	07/20/17 12:28	1.00	1.04	104	90-110

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:**K1706876

**Continuing Calibration Blank (CCB) Summary**  
Nitrate+Nitrite as Nitrogen

**Analysis Method:** 353.2

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	553669	KQ1709619-01	07/15/17 08:44	0.050	0.020	ND	U
CCB2	553669	KQ1709619-02	07/15/17 08:44	0.050	0.020	ND	U
CCB3	553669	KQ1709619-03	07/15/17 08:44	0.050	0.020	ND	U
CCB4	553669	KQ1709619-04	07/15/17 08:44	0.050	0.020	ND	U
CCB5	553669	KQ1709619-05	07/15/17 08:44	0.050	0.020	ND	U
CCB6	553669	KQ1709619-06	07/15/17 08:44	0.050	0.020	ND	U
CCB7	553669	KQ1709619-07	07/15/17 08:44	0.050	0.020	ND	U
CCB8	553669	KQ1709619-08	07/15/17 08:44	0.050	0.020	ND	U
CCB9	554397	KQ1709942-06	07/20/17 12:28	0.050	0.020	ND	U
CCB10	554397	KQ1709942-07	07/20/17 12:28	0.050	0.020	ND	U
CCB11	554397	KQ1709942-08	07/20/17 12:28	0.050	0.020	ND	U
CCB12	554397	KQ1709942-09	07/20/17 12:28	0.050	0.020	ND	U
CCB13	554397	KQ1709942-10	07/20/17 12:28	0.050	0.020	ND	U

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1706876  
**Date Collected:** 06/29/17  
**Date Received:** 06/30/17

**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-062917	K1706876-001	<b>7.95</b>	0.40	0.10	2	06/30/17 14:00	*
CG-9-127-40-062917	K1706876-002	<b>12.4</b>	1.0	0.3	5	06/30/17 14:00	*
CG-127-75-062917	K1706876-003	<b>0.59</b>	0.20	0.05	1	06/30/17 14:00	*
Method Blank	K1706876-MB1	ND U	0.20	0.05	1	06/30/17 14:00	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/17  
**Date Received:** 06/30/17  
**Date Analyzed:** 06/30/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-127-75-062917  
**Lab Code:** K1706876-003

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1706876-003DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	0.59	0.58	0.585	2	20

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/17  
**Date Received:** 06/30/17  
**Date Analyzed:** 06/30/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-127-75-062917  
**Lab Code:** K1706876-003  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1706876-003MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	0.59	2.87	2.00	114	75-125

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	552103	KQ1708865-04	06/30/17 14:00	4.00	4.03	101	90-110
CCV2	552103	KQ1708865-05	06/30/17 14:00	4.00	4.02	101	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:**K1706876

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	552103	KQ1708865-02	06/30/17 14:00	0.20	0.05	ND	U
CCB2	552103	KQ1708865-03	06/30/17 14:00	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-062917  
**Lab Code:** K1706876-001

**Service Request:** K1706876  
**Date Collected:** 06/29/17 11:55  
**Date Received:** 06/30/17 09:30  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	12900	ug/L	21	3	1	07/20/17 17:52	07/12/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-127-40-062917  
**Lab Code:** K1706876-002

**Service Request:** K1706876  
**Date Collected:** 06/29/17 12:00  
**Date Received:** 06/30/17 09:30  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6010C	13000	ug/L	21	3	1	07/20/17 17:55	07/12/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-062917  
**Lab Code:** K1706876-003

**Service Request:** K1706876  
**Date Collected:** 06/29/17 11:08  
**Date Received:** 06/30/17 09:30  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	4150	ug/L	21	3	1	07/20/17 17:58	07/12/17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1709261-02

**Service Request:** K1706876  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	ND U	ug/L	21	3	1	07/20/17 15:03	07/12/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** NA  
**Date Received:** NA  
**Date Analyzed:** 07/20/17

Replicate Sample Summary

Total Metals

**Sample Name:** Batch QC  
**Lab Code:** K1706824-002

**Units:** ug/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate	Average	RPD	RPD Limit
					Sample KQ1709261-03 Result			
Iron	6010C	21	3	7570	7500	7530	<1	20

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 07/20/17  
**Date Extracted:** 07/12/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** Batch QC  
**Lab Code:** K1706824-002  
**Analysis Method:** 6010C  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** ug/L  
**Basis:** NA

**Matrix Spike**  
KQ1709261-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	7570	8450	1000	88 #	75-125

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Analyzed:** 07/20/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**ug/L  
**Basis:**NA

**Lab Control Sample**  
KQ1709261-01

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6010C	2490	2500	99	80-120

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Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:**K1706876

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6010C

**Extraction Lot:**292473

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
CG-127-40-062917	K1706876-001	6/29/17	6/30/17	10 mL	10.5 mL	
CG-9-127-40-062917	K1706876-002	6/29/17	6/30/17	10 mL	10.5 mL	
CG-127-75-062917	K1706876-003	6/29/17	6/30/17	10 mL	10.5 mL	
Lab Control Sample	KQ1709261-01LCS	NA	NA	10 mL	10.8 mL	
Method Blank	KQ1709261-02MB	NA	NA	10 mL	10.5 mL	
Batch QC	KQ1709261-03DUP	NA	NA	10 mL	10.5 mL	
Batch QC	KQ1709261-04MS	NA	NA	10 mL	11 mL	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289	2500	2500	100	10000	10000	100	10000	10200	102

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10000	100	10000	10000	100

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10100	101	10000	10100	101

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10100	101	10000	10100	101

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10200	102	10000	10200	102

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10300	103	10000	10300	103

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10300	103	10000	10400	104

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10300	103	10000	10300	103



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6010C	554289				10000	10300	103			

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	J	3	U	3	U	3	U

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	U	3	U	3	U	3	U

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	U	3	U	3	U	3	U

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	U	-5.20	J	3	U		

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QA/QC Report

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**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	U	3	U	3	U	3	U

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6010C	554289	3	U	3	U	3	U		

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**dba ALS Environmental**

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6010C	554289	18.0	20.0	90	70-130	07/20/17 09:32
LLCCV	Iron	6010C	554289	19.0	20.0	97	70-130	07/20/17 11:39
LLCCV	Iron	6010C	554289	21.0	20.0	107	70-130	07/20/17 12:53
LLCCV	Iron	6010C	554289	18.0	20.0	92	70-130	07/20/17 15:31
LLCCV	Iron	6010C	554289	19.0	20.0	93	70-130	07/20/17 17:25
LLCCV	Iron	6010C	554289	24.0	20.0	122	70-130	07/20/17 20:53



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	554289	184000	-	-	-	07/20/17 09:56

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6010C	554289	185000	-	-	-	07/20/17 09:58

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1706824-002A	Iron	6010C	554289	7210	9360	2500	86	80-120	07/20/17 16:00

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1706824-002SDL	Iron	6010C	554289	7210	7380	2	10	07/20/17 15:11

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QA/QC Report

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**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Wavelength (nm)</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	2599	ug/L	20	3	6010C

**ALS Group USA, Corp.**  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-AES-03

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 2599	360000	6010C

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/20/17 09:09	
ZZZZZZ	1	07/20/17 09:12	
ZZZZZZ	1	07/20/17 09:14	
ZZZZZZ	1	07/20/17 09:17	
ZZZZZZ	1	07/20/17 09:19	
ICV	1	07/20/17 09:22	X
ZZZZZZ	1	07/20/17 09:24	
ICB	1	07/20/17 09:30	X
LLICV	1	07/20/17 09:32	X
ZZZZZZ	1	07/20/17 09:35	
ZZZZZZ	0.5	07/20/17 09:37	
CCVB1	1	07/20/17 09:41	X
ZZZZZZ	1	07/20/17 09:46	
CCB	1	07/20/17 09:53	X
ICSA	1	07/20/17 09:56	X
ICSAB	1	07/20/17 09:58	X
ZZZZZZ	1	07/20/17 10:03	
ZZZZZZ	1	07/20/17 10:32	
ZZZZZZ	1	07/20/17 10:34	
ZZZZZZ	1	07/20/17 10:37	
ZZZZZZ	5	07/20/17 10:39	
ZZZZZZ	1	07/20/17 10:42	
ZZZZZZ	1	07/20/17 10:44	
ZZZZZZ	1	07/20/17 10:47	
ZZZZZZ	1	07/20/17 10:49	
ZZZZZZ	1	07/20/17 10:52	
ZZZZZZ	1	07/20/17 10:54	
CCVB	1	07/20/17 10:57	X
ZZZZZZ	1	07/20/17 11:00	
CCB	1	07/20/17 11:02	X
ZZZZZZ	1	07/20/17 11:05	
ZZZZZZ	5	07/20/17 11:07	
ZZZZZZ	1	07/20/17 11:10	
ZZZZZZ	1	07/20/17 11:12	
ZZZZZZ	1	07/20/17 11:14	
ZZZZZZ	1	07/20/17 11:17	
ZZZZZZ	1	07/20/17 11:19	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/20/17 11:22	
ZZZZZZ	1	07/20/17 11:24	
ZZZZZZ	5	07/20/17 11:27	
CCVB	1	07/20/17 11:30	X
ZZZZZZ	1	07/20/17 11:33	
CCB	1	07/20/17 11:35	X
LLCCV	1	07/20/17 11:39	X
ZZZZZZ	1	07/20/17 11:42	
ZZZZZZ	1	07/20/17 11:47	
ZZZZZZ	1	07/20/17 11:50	
ZZZZZZ	1	07/20/17 11:52	
ZZZZZZ	1	07/20/17 11:54	
ZZZZZZ	1	07/20/17 11:57	
ZZZZZZ	1	07/20/17 11:59	
ZZZZZZ	1	07/20/17 12:02	
ZZZZZZ	1	07/20/17 12:05	
ZZZZZZ	1	07/20/17 12:07	
CCVB	1	07/20/17 12:10	X
ZZZZZZ	1	07/20/17 12:13	
CCB	1	07/20/17 12:15	X
ZZZZZZ	1	07/20/17 12:18	
ZZZZZZ	1	07/20/17 12:20	
ZZZZZZ	1	07/20/17 12:23	
ZZZZZZ	1	07/20/17 12:26	
ZZZZZZ	1	07/20/17 12:28	
ZZZZZZ	1	07/20/17 12:31	
ZZZZZZ	1	07/20/17 12:33	
ZZZZZZ	1	07/20/17 12:36	
ZZZZZZ	5	07/20/17 12:38	
ZZZZZZ	1	07/20/17 12:41	
CCVB	1	07/20/17 12:44	X
ZZZZZZ	1	07/20/17 12:47	
CCB	1	07/20/17 12:49	X
LLCCV	1	07/20/17 12:53	X
ZZZZZZ	1	07/20/17 13:00	
ZZZZZZ	1	07/20/17 13:05	
ZZZZZZ	1	07/20/17 13:07	



**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

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**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	10	07/20/17 13:10	
ZZZZZZ	50	07/20/17 13:13	
ZZZZZZ	10	07/20/17 13:16	
ZZZZZZ	10	07/20/17 13:18	
ZZZZZZ	1	07/20/17 13:21	
ZZZZZZ	1	07/20/17 13:24	
ZZZZZZ	1	07/20/17 13:27	
ZZZZZZ	10	07/20/17 13:31	
CCVB	1	07/20/17 13:34	X
ZZZZZZ	1	07/20/17 13:37	
CCB	1	07/20/17 13:39	X
ZZZZZZ	10	07/20/17 13:42	
ZZZZZZ	1.111	07/20/17 13:44	
ZZZZZZ	1.111	07/20/17 13:47	
ZZZZZZ	1.111	07/20/17 13:49	
ZZZZZZ	1	07/20/17 13:52	
ZZZZZZ	1	07/20/17 13:54	
ZZZZZZ	1	07/20/17 13:57	
ZZZZZZ	1	07/20/17 13:59	
ZZZZZZ	1	07/20/17 14:02	
ZZZZZZ	1	07/20/17 14:05	
CCVB	1	07/20/17 14:07	X
ZZZZZZ	1	07/20/17 14:10	
CCB	1	07/20/17 14:12	X
ZZZZZZ	1	07/20/17 14:15	
ZZZZZZ	1	07/20/17 14:17	
ZZZZZZ	1	07/20/17 14:20	
ZZZZZZ	1	07/20/17 14:23	
ZZZZZZ	1	07/20/17 14:25	
ZZZZZZ	1	07/20/17 14:28	
ZZZZZZ	1	07/20/17 14:31	
ZZZZZZ	1	07/20/17 14:33	
ZZZZZZ	1	07/20/17 14:36	
ZZZZZZ	1	07/20/17 14:39	
CCVB	1	07/20/17 14:41	X
ZZZZZZ	1	07/20/17 14:44	
CCB	1	07/20/17 14:47	X

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dba ALS Environmental

QA/QC Report

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**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/20/17 14:49	
ZZZZZZ	1	07/20/17 14:52	
ZZZZZZ	1	07/20/17 14:55	
ZZZZZZ	1	07/20/17 14:57	
ZZZZZZ	1	07/20/17 15:00	
KQ1709261-02MB	1	07/20/17 15:03	X
KQ1709261-01LCS	1	07/20/17 15:05	X
ZZZZZZ	1	07/20/17 15:08	
K1706824-002SDL	5	07/20/17 15:11	X
K1706824-002DUP	1	07/20/17 15:13	X
CCVB	1	07/20/17 15:16	X
ZZZZZZ	1	07/20/17 15:19	
CCB	1	07/20/17 15:21	X
LLCCV	1	07/20/17 15:31	X
ZZZZZZ	1	07/20/17 15:37	
ZZZZZZ	0.5	07/20/17 15:54	
K1706824-002MS	1	07/20/17 15:57	X
K1706824-002PS	1	07/20/17 16:00	X
ZZZZZZ	1	07/20/17 16:03	
ZZZZZZ	1	07/20/17 16:05	
ZZZZZZ	1	07/20/17 16:08	
ZZZZZZ	1	07/20/17 16:11	
ZZZZZZ	1	07/20/17 16:14	
ZZZZZZ	10	07/20/17 16:20	
ZZZZZZ	10	07/20/17 16:22	
ZZZZZZ	1	07/20/17 16:25	
CCVB	1	07/20/17 16:27	X
ZZZZZZ	1	07/20/17 16:30	
CCB	1	07/20/17 16:33	X
ZZZZZZ	1	07/20/17 16:35	
ZZZZZZ	1	07/20/17 16:38	
ZZZZZZ	1	07/20/17 16:40	
ZZZZZZ	1	07/20/17 16:43	
ZZZZZZ	1	07/20/17 16:46	
ZZZZZZ	1	07/20/17 16:49	
ZZZZZZ	1	07/20/17 16:52	
ZZZZZZ	1	07/20/17 16:54	

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**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/20/17 16:57	
ZZZZZZ	1	07/20/17 17:00	
CCVB	1	07/20/17 17:03	X
ZZZZZZ	1	07/20/17 17:05	
ZZZZZZ	1	07/20/17 17:08	
CCB	1	07/20/17 17:19	X
LLCCV	1	07/20/17 17:25	X
ZZZZZZ	0.5	07/20/17 17:35	
ZZZZZZ	0.5	07/20/17 17:49	
K1706876-001	1	07/20/17 17:52	X
K1706876-002	1	07/20/17 17:55	X
K1706876-003	1	07/20/17 17:58	X
ZZZZZZ	2	07/20/17 18:00	
ZZZZZZ	2	07/20/17 18:03	
ZZZZZZ	2	07/20/17 18:05	
ZZZZZZ	2	07/20/17 18:08	
ZZZZZZ	2	07/20/17 18:11	
ZZZZZZ	2	07/20/17 18:13	
ZZZZZZ	2	07/20/17 18:16	
CCVB	1	07/20/17 18:19	X
ZZZZZZ	1	07/20/17 18:22	
CCB	1	07/20/17 18:24	X
ZZZZZZ	2	07/20/17 18:27	
ZZZZZZ	2	07/20/17 18:29	
ZZZZZZ	2	07/20/17 18:32	
ZZZZZZ	1	07/20/17 18:34	
ZZZZZZ	1	07/20/17 18:37	
ZZZZZZ	1	07/20/17 18:39	
ZZZZZZ	1	07/20/17 18:42	
ZZZZZZ	1	07/20/17 18:45	
ZZZZZZ	1	07/20/17 18:47	
ZZZZZZ	1	07/20/17 18:50	
CCVB	1	07/20/17 18:53	X
ZZZZZZ	1	07/20/17 18:55	
CCB	1	07/20/17 18:58	X
ZZZZZZ	1	07/20/17 19:00	
ZZZZZZ	1	07/20/17 19:03	

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dba ALS Environmental

QA/QC Report

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**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/20/17 19:06	
ZZZZZZ	1	07/20/17 19:08	
ZZZZZZ	1	07/20/17 19:11	
ZZZZZZ	1	07/20/17 19:14	
ZZZZZZ	1	07/20/17 19:16	
ZZZZZZ	1	07/20/17 19:19	
ZZZZZZ	1	07/20/17 19:21	
ZZZZZZ	1	07/20/17 19:24	
CCVB	1	07/20/17 19:26	X
ZZZZZZ	1	07/20/17 19:29	
CCB	1	07/20/17 19:32	X
ZZZZZZ	1	07/20/17 19:34	
ZZZZZZ	1	07/20/17 19:37	
ZZZZZZ	1	07/20/17 19:39	
ZZZZZZ	1	07/20/17 19:42	
ZZZZZZ	1	07/20/17 19:44	
ZZZZZZ	1	07/20/17 19:47	
ZZZZZZ	1	07/20/17 19:50	
ZZZZZZ	1	07/20/17 19:52	
ZZZZZZ	1	07/20/17 19:55	
ZZZZZZ	1	07/20/17 19:58	
CCVB	1	07/20/17 20:00	X
ZZZZZZ	1	07/20/17 20:03	
CCB	1	07/20/17 20:05	X
ZZZZZZ	1	07/20/17 20:08	
ZZZZZZ	1	07/20/17 20:11	
ZZZZZZ	1	07/20/17 20:13	
ZZZZZZ	1	07/20/17 20:16	
ZZZZZZ	1	07/20/17 20:19	
ZZZZZZ	1	07/20/17 20:21	
ZZZZZZ	1	07/20/17 20:24	
ZZZZZZ	1	07/20/17 20:27	
ZZZZZZ	1	07/20/17 20:29	
ZZZZZZ	1	07/20/17 20:32	
CCVB	1	07/20/17 20:34	X
ZZZZZZ	1	07/20/17 20:37	
CCB	1	07/20/17 20:40	X

ALS Group USA, Corp.  
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QA/QC Report

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**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**

**Instrument ID:** K-ICP-AES-03

**Analytical BatchID:** 554289

<b>Sample</b>	<b>Dilution Factor</b>	<b>Date/Time</b>	<b>F e</b>
CCVB	1	07/20/17 20:42	X
ZZZZZZ	1	07/20/17 20:45	
CCB	1	07/20/17 20:47	X
ZZZZZZ	1	07/20/17 20:50	
LLCCV	1	07/20/17 20:53	X
ZZZZZZ	1	07/20/17 20:55	
ZZZZZZ	0.5	07/20/17 20:58	

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Al 167.079 (502)	<input checked="" type="checkbox"/>	1	Fe	0.000833	0.000000	No
Al 394.401 (85)	<input checked="" type="checkbox"/>	None				
Sb 206.833 (463)	<input checked="" type="checkbox"/>	4	Cr	0.016054	0.000000	No
			Fe	-0.000037	0.000000	No
			Mo	0.000488	0.000000	No
			Ti	0.000603	0.000000	No
Sb 217.581 (455)	<input checked="" type="checkbox"/>	4	Cu	-0.000990	0.000000	No
			Fe	-0.000951	0.000000	No
			Mn	-0.000745	0.000000	No
			V	0.002186	0.000000	No
As 189.042 (478)	<input checked="" type="checkbox"/>	5	Al	0.000041	0.000000	No
			Cr	0.000477	0.000000	No
			Mn	-0.000266	0.000000	No
			Mo	0.001196	0.000000	No
			Fe	-0.000029	0.000000	No
Ba 455.403 (74)	<input checked="" type="checkbox"/>	None				
Be 234.861 (144)	<input checked="" type="checkbox"/>	3	Fe	0.000008	0.000000	No
			Mn	-0.000058	0.000000	No
			Mo	-0.000392	0.000000	No
B 249.678 (135)	<input checked="" type="checkbox"/>	4	Co	0.002863	0.000000	No
			Fe	-0.000682	0.000000	No
			Mo	-0.001636	0.000000	No
			V	-0.000450	0.000000	No
Cd 214.438 (457)	<input checked="" type="checkbox"/>	2	Al	-0.000005	0.000000	No
			Fe	0.000028	0.000000	No
Cd 226.502 (449)	<input checked="" type="checkbox"/>	2	Fe	0.000133	0.000000	No
			Ti	0.000128	0.000000	No
Ca 315.887 (107)	<input checked="" type="checkbox"/>	None				
Ca 393.366 (86)	<input checked="" type="checkbox"/>	1	Fe	0.000130	0.000000	No
Cr 267.716 (126)	<input checked="" type="checkbox"/>	3	Cd	-0.000118	0.000000	No
			Mn	0.000260	0.000000	No
			Fe	0.000026	0.000000	No
Co 228.616 (447)	<input checked="" type="checkbox"/>	4	Ba	-0.000098	0.000000	No
			Mo	-0.001099	0.000000	No
			Ni	0.000115	0.000000	No
			Ti	0.002559	0.000000	No
Co 230.786 (446)	<input checked="" type="checkbox"/>	5	Al	-0.000006	0.000000	No
			Cr	-0.000188	0.000000	No
			Fe	0.000031	0.000000	No
			Mo	0.000224	0.000000	No
			Ni	0.000132	0.000000	No
Cu 224.700 (450)	<input checked="" type="checkbox"/>	6	Co	0.000140	0.000000	No
			Fe	0.000305	0.000000	No
			Pb	0.001810	0.000000	No
			Mo	0.001663	0.000000	No
			Ni	-0.004632	0.000000	No
			Ti	0.000391	0.000000	No
Cu 327.396 (103)	<input checked="" type="checkbox"/>	5	Ca	0.000016	0.000000	No
			Co	0.000273	0.000000	No
			Mo	-0.000211	0.000000	No
			Ti	0.000145	0.000000	No
			Fe	0.000025	0.000000	No
Fe 259.940 (130)	<input checked="" type="checkbox"/>	None				
Pb 220.353 (453)	<input checked="" type="checkbox"/>	6	Al	-0.000083	0.000000	No
			Cu	0.000295	0.000000	No
			Mo	-0.000599	0.000000	No
			Ni	0.000228	0.000000	No
			Si	0.000124	0.000000	No

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
			Fe	0.000051	0.000000	No
Li 670.784 ( 50)	☒	None				
Mg 279.079 (121)	☒	None				
Mg 279.553 (121)	☒	1	Fe	0.000137	0.000000	No
Mg 285.213 (118)	☒	None				
Mn 257.610 (131)	☒	1	Fe	0.000014	0.000000	No
Mn 260.569 (129)	☒	None				
Mo 202.030 (467)	☒	1	Fe	-0.000021	0.000000	No
Ni 221.647 (452)	☒	6	Cr	-0.000539	0.000000	No
			Co	-0.000167	0.000000	No
			Cu	-0.000056	0.000000	No
			Si	0.000558	0.000000	No
			Ti	-0.000654	0.000000	No
			Fe	0.000034	0.000000	No
Ni 231.604 (446)	☒	1	Co	-0.000186	0.000000	No
P 178.284 (489)	☒	None				
P 214.914 (457)	☒	6	Al	-0.000826	0.000000	No
			Cd	-0.001386	0.000000	No
			Cu	0.005306	0.000000	No
			Fe	0.000669	0.000000	No
			Mo	0.009817	0.000000	No
			V	-0.001756	0.000000	No
K 766.490 ( 44)	☒	None				
Se 196.090 (472)	☒	1	Fe	-0.000090	0.000000	No
Si 251.611 (134)	☒	1	Mo	0.008004	0.000000	No
Ag 328.068 (103)	☒	2	Mn	0.000146	0.000000	No
			Fe	-0.000001	0.000000	No
Na 589.592 ( 57)	☒	None				
Sr 407.771 ( 83)	☒	None				
Tl 190.856 (477)	☒	5	Cr	0.000283	0.000000	No
			Co	0.003057	0.000000	No
			Mn	0.000688	0.000000	No
			Ti	-0.000474	0.000000	No
			V	0.000383	0.000000	No
Sn 189.989 (477)	☒	None				
Ti 336.121 (100)	☒	2	Ni	0.000108	0.000000	No
			Si	0.000021	0.000000	No
V 292.402 (115)	☒	6	Cr	-0.005445	0.000000	No
			Cu	-0.000055	0.000000	No
			Mn	-0.001374	0.000000	No
			Mo	-0.000084	0.000000	No
			Ti	0.000398	0.000000	No
			Fe	-0.000013	0.000000	No
Zn 206.200 (463)	☒	3	Cr	-0.000124	0.000000	No
			Fe	0.000001	0.000000	No
			Mo	0.000326	0.000000	No
Zn 213.856 (458)	☒	3	Cu	0.001201	0.000000	No
			Fe	0.000114	0.000000	No
			Ni	0.005255	0.000000	No
Y 224.306 (450)*	☒	None				
Y 360.073 ( 94)*	☒	None				
Y 360.073 ( 94)2*	☒	None				
In 230.606 (446)	☒	None				
Bi 223.061 (451)	☒	4	Cr	0.001080	0.000000	No
			Co	-0.009626	0.000000	No
			Cu	-0.002768	0.000000	No
			V	-0.000476	0.000000	No
S 182.034 (485)	☒	2	Mn	0.003127	0.000000	No

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
			Mo	0.000981	0.000000	No





## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
CG-127-40-062917	K1706876-001	06/29/2017	06/30/2017
CG-9-127-40-062917	K1706876-002	06/29/2017	06/30/2017
CG-127-75-062917	K1706876-003	06/29/2017	06/30/2017
Field Blank	K1706876-004	06/29/2017	06/30/2017
CG-127-40-062917MS	KWG1705607-1	06/29/2017	06/30/2017
CG-127-40-062917DMS	KWG1705607-2	06/29/2017	06/30/2017

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/2017  
**Date Received:** 06/30/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-062917  
**Lab Code:** K1706876-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	310	D	4.0	1.6	10	07/05/17	07/13/17	KWG1705607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	86	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/2017  
**Date Received:** 06/30/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-9-127-40-062917  
**Lab Code:** K1706876-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	340	D	4.0	1.6	10	07/05/17	07/13/17	KWG1705607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	85	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/2017  
**Date Received:** 06/30/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-062917  
**Lab Code:** K1706876-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	780	D	8.0	3.2	20	07/05/17	07/13/17	KWG1705607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	83	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** 06/29/2017  
**Date Received:** 06/30/2017

1,4-Dioxane by GCMS

**Sample Name:** Field Blank  
**Lab Code:** K1706876-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	07/05/17	07/12/17	KWG1705607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	82	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1705607-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	07/05/17	07/12/17	KWG1705607	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	84	64-120	07/12/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
CG-127-40-062917	K1706876-001	86
CG-9-127-40-062917	K1706876-002	85
CG-127-75-062917	K1706876-003	83
Field Blank	K1706876-004	82
Method Blank	KWG1705607-5	84
CG-127-40-062917MS	KWG1705607-1	79
CG-127-40-062917DMS	KWG1705607-2	81
Lab Control Sample	KWG1705607-3	84
Duplicate Lab Control Sample	KWG1705607-4	85

**Surrogate Recovery Control Limits (%)**

---

Sur1 = 1,4-Dioxane-d8 64-120

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 11:28

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F005.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705944-2  
**Analysis Lot:** KWG1705944

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	48,789	5.21
<b>Upper Limit ==&gt;</b>	97,578	5.71
<b>Lower Limit ==&gt;</b>	24,395	4.71
<b>ICAL Result ==&gt;</b>	39,344	5.21

*Associated Analyses*

Method Blank	KWG1705607-5	51,495	5.21
Lab Control Sample	KWG1705607-3	49,768	5.21
Duplicate Lab Control Sample	KWG1705607-4	50,924	5.21
CG-127-40-062917MS	KWG1705607-1	51,320	5.21
CG-127-40-062917DMS	KWG1705607-2	50,725	5.21
CG-127-40-062917	K1706876-001	50,325	5.21
CG-9-127-40-062917	K1706876-002	51,964	5.21
CG-127-75-062917	K1706876-003	49,221	5.21
Field Blank	K1706876-004	52,334	5.21

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 21:30

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F037.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1705951-2  
**Analysis Lot:** KWG1705951

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	40,099	5.22
<b>Upper Limit ==&gt;</b>	80,198	5.72
<b>Lower Limit ==&gt;</b>	20,050	4.72
<b>ICAL Result ==&gt;</b>	39,344	5.21

*Associated Analyses*

CG-127-40-062917DL	K1706876-001	48,540	5.22
CG-9-127-40-062917DL	K1706876-002	38,856	5.22
CG-127-75-062917DL	K1706876-003	36,952	5.22

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Extracted:** 07/05/2017  
**Date Analyzed:** 07/12/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** CG-127-40-062917  
**Lab Code:** K1706876-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705607

Analyte Name	Sample Result	CG-127-40-062917MS KWG1705607-1 Matrix Spike			CG-127-40-062917DMS KWG1705607-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	310	283E	10.0	-268 #	293E	10.0	-169 #	49-113	3	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Extracted:** 07/05/2017  
**Date Analyzed:** 07/12/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705607

Analyte Name	Lab Control Sample KWG1705607-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705607-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	8.03	10.0	80	8.22	10.0	82	59-111	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Extracted:** 07/05/2017  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 11:57

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1705607-5 **File ID:** J:\MS26\DATA\071217\0712F006.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1705607

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1705607-3	J:\MS26\DATA\071217\0712F008.D	07/12/17	12:34
Duplicate Lab Control Sample	KWG1705607-4	J:\MS26\DATA\071217\0712F009.D	07/12/17	12:52
CG-127-40-062917MS	KWG1705607-1	J:\MS26\DATA\071217\0712F010.D	07/12/17	13:11
CG-127-40-062917DMS	KWG1705607-2	J:\MS26\DATA\071217\0712F011.D	07/12/17	13:29
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F013.D	07/12/17	14:06
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F015.D	07/12/17	14:43
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F016.D	07/12/17	15:02
Field Blank	K1706876-004	J:\MS26\DATA\071217\0712F017.D	07/12/17	15:20
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F056.D	07/13/17	03:22
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F057.D	07/13/17	03:40
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F058.D	07/13/17	03:59

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Extracted:** 07/05/2017  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 12:34

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample **Instrument ID:** MS26  
**Lab Code:** KWG1705607-3 **File ID:** J:\MS26\DATA\071217\0712F008.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1705607

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1705607-5	J:\MS26\DATA\071217\0712F006.D	07/12/17	11:57
CG-127-40-062917MS	KWG1705607-1	J:\MS26\DATA\071217\0712F010.D	07/12/17	13:11
CG-127-40-062917DMS	KWG1705607-2	J:\MS26\DATA\071217\0712F011.D	07/12/17	13:29
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F013.D	07/12/17	14:06
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F015.D	07/12/17	14:43
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F016.D	07/12/17	15:02
Field Blank	K1706876-004	J:\MS26\DATA\071217\0712F017.D	07/12/17	15:20
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F056.D	07/13/17	03:22
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F057.D	07/13/17	03:40
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F058.D	07/13/17	03:59

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 11:05

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F004.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705944

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
198	442	30	100	57.4	2423040	PASS
199	198	5	9	6.5	157989	PASS
275	198	10	60	31.9	773162	PASS
365	442	1	50	2.3	97917	PASS
441	443	0	100	77.7	624917	PASS
442	442	100	100	100.0	4223488	PASS
443	442	15	24	19.0	804544	PASS
51	198	10	80	14.2	343508	PASS
68	69	0	2	1.6	6981	PASS
69	198	0	100	18.5	447508	PASS
70	69	0	2	0.4	1976	PASS
127	198	10	80	35.0	847278	PASS
197	198	0	2	0.0	0	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705944-2	J:\MS26\DATA\071217\0712F005.D	07/12/2017	11:28	
Method Blank	KWG1705607-5	J:\MS26\DATA\071217\0712F006.D	07/12/2017	11:57	
Lab Control Sample	KWG1705607-3	J:\MS26\DATA\071217\0712F008.D	07/12/2017	12:34	
Duplicate Lab Control Sample	KWG1705607-4	J:\MS26\DATA\071217\0712F009.D	07/12/2017	12:52	
CG-127-40-062917MS	KWG1705607-1	J:\MS26\DATA\071217\0712F010.D	07/12/2017	13:11	
CG-127-40-062917DMS	KWG1705607-2	J:\MS26\DATA\071217\0712F011.D	07/12/2017	13:29	
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F013.D	07/12/2017	14:06	
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F015.D	07/12/2017	14:43	
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F016.D	07/12/2017	15:02	
Field Blank	K1706876-004	J:\MS26\DATA\071217\0712F017.D	07/12/2017	15:20	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017  
**Time Analyzed:** 21:12

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071217\0712F036.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1705951

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	15.5	441292	PASS
68	69	0	2	1.4	7875	PASS
69	198	0	100	20.0	571020	PASS
70	69	0	2	0.4	2482	PASS
127	198	10	80	36.7	1046801	PASS
197	198	0	2	0.2	5071	PASS
198	442	30	100	74.2	2848597	PASS
199	198	5	9	6.6	187349	PASS
275	198	10	60	30.6	870656	PASS
365	442	1	50	2.6	99282	PASS
441	443	0	100	76.7	573952	PASS
442	442	100	100	100.0	3837098	PASS
443	442	15	24	19.5	748266	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1705951-2	J:\MS26\DATA\071217\0712F037.D	07/12/2017	21:30	
CG-127-40-062917	K1706876-001	J:\MS26\DATA\071217\0712F056.D	07/13/2017	03:22	
CG-9-127-40-062917	K1706876-002	J:\MS26\DATA\071217\0712F057.D	07/13/2017	03:40	
CG-127-75-062917	K1706876-003	J:\MS26\DATA\071217\0712F058.D	07/13/2017	03:59	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

<b>Level ID</b>	<b>File ID</b>	<b>Level ID</b>	<b>File ID</b>
A	J:\MS26\DATA\071017\0710F016.D	E	J:\MS26\DATA\071017\0710F020.D
B	J:\MS26\DATA\071017\0710F017.D	F	J:\MS26\DATA\071017\0710F021.D
C	J:\MS26\DATA\071017\0710F018.D	G	J:\MS26\DATA\071017\0710F022.D
D	J:\MS26\DATA\071017\0710F019.D		

Analyte Name	Level			Level			Level			Level					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.457	B	4.0	0.378	C	10	0.409	D	20	0.413	E	50	0.419
	F	100	0.422	G	200	0.401									
1,4-Dioxane-d8	A	2.0	0.428	B	4.0	0.395	C	10	0.394	D	20	0.420	E	50	0.418
	F	100	0.418	G	200	0.403									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Calibration Date:** 07/10/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15465  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	5.8		≤ 20	0.414		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	3.2		≤ 20	0.411		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Calibration Date:** 07/10/2017  
**Date Analyzed:** 07/10/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15465  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071017\0710F023.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.414	0.406	-2	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/10/2017  
**Calibration ID:** CAL15465  
**Analysis Lot:** KWG1705944  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071217\0712F005.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.414	0.386	-7	NA	± 20	AverageRF
1,4-Dioxane-d8	20	18	0.01	0.411	0.363	-12	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876  
**Date Analyzed:** 07/12/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/10/2017  
**Calibration ID:** CAL15465  
**Analysis Lot:** KWG1705951  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071217\0712F037.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	21	0.01	0.414	0.438	6	NA	± 20	AverageRF
1,4-Dioxane-d8	20	22	0.01	0.411	0.442	8	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705944  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0712F004.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705944-1	7/12/2017	11:05		7/12/2017	11:15
0712F005.D	Continuing Calibration Verification	KWG1705944-2	7/12/2017	11:28		7/12/2017	11:38
0712F006.D	Method Blank	KWG1705607-5	7/12/2017	11:57		7/12/2017	12:07
0712F007.D	ZZZZZZ	ZZZZZZ	7/12/2017	12:15		7/12/2017	12:25
0712F008.D	Lab Control Sample	KWG1705607-3	7/12/2017	12:34		7/12/2017	12:44
0712F009.D	Duplicate Lab Control Sample	KWG1705607-4	7/12/2017	12:52		7/12/2017	13:02
0712F010.D	CG-127-40-062917MS	KWG1705607-1	7/12/2017	13:11		7/12/2017	13:21
0712F011.D	CG-127-40-062917DMS	KWG1705607-2	7/12/2017	13:29		7/12/2017	13:39
0712F012.D	ZZZZZZ	ZZZZZZ	7/12/2017	13:48		7/12/2017	13:58
0712F013.D	CG-127-40-062917	K1706876-001	7/12/2017	14:06		7/12/2017	14:16
0712F015.D	CG-9-127-40-062917	K1706876-002	7/12/2017	14:43		7/12/2017	14:53
0712F016.D	CG-127-75-062917	K1706876-003	7/12/2017	15:02		7/12/2017	15:12
0712F017.D	Field Blank	K1706876-004	7/12/2017	15:20		7/12/2017	15:30
0712F018.D	ZZZZZZ	ZZZZZZ	7/12/2017	15:38		7/12/2017	15:48
0712F019.D	ZZZZZZ	ZZZZZZ	7/12/2017	15:57		7/12/2017	16:07
0712F020.D	ZZZZZZ	ZZZZZZ	7/12/2017	16:15		7/12/2017	16:25
0712F021.D	ZZZZZZ	ZZZZZZ	7/12/2017	16:34		7/12/2017	16:44
0712F022.D	ZZZZZZ	ZZZZZZ	7/12/2017	16:52		7/12/2017	17:02
0712F023.D	ZZZZZZ	ZZZZZZ	7/12/2017	17:11		7/12/2017	17:21
0712F024.D	ZZZZZZ	ZZZZZZ	7/12/2017	17:29		7/12/2017	17:39
0712F025.D	ZZZZZZ	ZZZZZZ	7/12/2017	17:48		7/12/2017	17:58
0712F026.D	ZZZZZZ	ZZZZZZ	7/12/2017	18:06		7/12/2017	18:16
0712F027.D	ZZZZZZ	ZZZZZZ	7/12/2017	18:25		7/12/2017	18:35
0712F028.D	ZZZZZZ	ZZZZZZ	7/12/2017	18:43		7/12/2017	18:53
0712F029.D	ZZZZZZ	ZZZZZZ	7/12/2017	19:02		7/12/2017	19:12
0712F030.D	ZZZZZZ	ZZZZZZ	7/12/2017	19:20		7/12/2017	19:30
0712F031.D	ZZZZZZ	ZZZZZZ	7/12/2017	19:39		7/12/2017	19:49
0712F032.D	ZZZZZZ	ZZZZZZ	7/12/2017	19:57		7/12/2017	20:07
0712F033.D	ZZZZZZ	ZZZZZZ	7/12/2017	20:16		7/12/2017	20:26
0712F034.D	ZZZZZZ	ZZZZZZ	7/12/2017	20:34		7/12/2017	20:44
0712F035.D	ZZZZZZ	ZZZZZZ	7/12/2017	20:53		7/12/2017	21:03

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

**Service Request:** K1706876

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1705951  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0712F036.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1705951-1	7/12/2017	21:12		7/12/2017	21:22
0712F037.D	Continuing Calibration Verification	KWG1705951-2	7/12/2017	21:30		7/12/2017	21:40
0712F038.D	ZZZZZZ	ZZZZZZ	7/12/2017	21:49		7/12/2017	21:59
0712F039.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:07		7/12/2017	22:17
0712F040.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:26		7/12/2017	22:36
0712F041.D	ZZZZZZ	ZZZZZZ	7/12/2017	22:44		7/12/2017	22:54
0712F042.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:03		7/12/2017	23:13
0712F043.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:21		7/12/2017	23:31
0712F044.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:40		7/12/2017	23:50
0712F045.D	ZZZZZZ	ZZZZZZ	7/12/2017	23:58		7/13/2017	00:08
0712F046.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:17		7/13/2017	00:27
0712F047.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:35		7/13/2017	00:45
0712F048.D	ZZZZZZ	ZZZZZZ	7/13/2017	00:54		7/13/2017	01:04
0712F049.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:12		7/13/2017	01:22
0712F050.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:31		7/13/2017	01:41
0712F051.D	ZZZZZZ	ZZZZZZ	7/13/2017	01:49		7/13/2017	01:59
0712F052.D	ZZZZZZ	ZZZZZZ	7/13/2017	02:08		7/13/2017	02:18
0712F053.D	ZZZZZZ	ZZZZZZ	7/13/2017	02:26		7/13/2017	02:36
0712F054.D	ZZZZZZ	ZZZZZZ	7/13/2017	02:45		7/13/2017	02:55
0712F055.D	ZZZZZZ	ZZZZZZ	7/13/2017	03:03		7/13/2017	03:13
0712F056.D	CG-127-40-062917	K1706876-001	7/13/2017	03:22		7/13/2017	03:32
0712F057.D	CG-9-127-40-062917	K1706876-002	7/13/2017	03:40		7/13/2017	03:50
0712F058.D	CG-127-75-062917	K1706876-003	7/13/2017	03:59		7/13/2017	04:09

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Georgetown 1,4-Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1706876  
**Date Extracted:** 07/05/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1705607  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
CG-127-40-062917	K1706876-001	06/29/17	06/30/17	10ml	2ml	NA	
CG-127-40-062917DL	K1706876-001	06/29/17	06/30/17	10ml	2ml	NA	
CG-9-127-40-062917	K1706876-002	06/29/17	06/30/17	10ml	2ml	NA	
CG-9-127-40-062917DL	K1706876-002	06/29/17	06/30/17	10ml	2ml	NA	
CG-127-75-062917	K1706876-003	06/29/17	06/30/17	10ml	2ml	NA	
CG-127-75-062917DL	K1706876-003	06/29/17	06/30/17	10ml	2ml	NA	
Field Blank	K1706876-004	06/29/17	06/30/17	10ml	2ml	NA	
Method Blank	KWG1705607-5	NA	NA	10ml	2ml	NA	
CG-127-40-062917MS	KWG1705607-1	06/29/17	06/30/17	10ml	2ml	NA	
CG-127-40-062917DMS	KWG1705607-2	06/29/17	06/30/17	10ml	2ml	NA	
Lab Control Sample	KWG1705607-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1705607-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis





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August 02, 2017

**Analytical Report for Service Request No: K1707384**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: 1,4 Dioxane ISB / STRCL-001 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory July 14, 2017  
For your reference, these analyses have been assigned our service request number **K1707384**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

for Kurt Clarkson  
Client Services  
Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1707384  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08      **Date Received:** 07/14/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

### Sample Receipt

Six water samples were received for analysis at ALS Environmental on 07/14/17. The samples were received in good condition and consistent with the accompanying chain of custody form, except where noted on the cooler receipt and preservation form included in this report. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

### General Chemistry Parameters

#### **Nitrate + Nitrite as Nitrogen by EPA Method 353.2:**

The duplicate matrix spike recovery for sample CG-127-40-1G-07132017 was outside control criteria because of suspected matrix interference. As a result of the interference, the results for this analyte contained a potential high bias. No further corrective action was taken.

#### **Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

Samples CG-127-40-1G-07132017 and CG-127-40-07132017 were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

The matrix spike recovery for sample CG-127-75-9-07132017 was outside control criteria because of suspected matrix interference. As a result of the interference, the results for this analyte contained a potential high bias. No further corrective action was taken.

No other anomalies associated with the analysis of these samples were observed.

### Total Metals

No anomalies associated with the analysis of these samples were observed.

### 1,4-Dioxane by EPA Method 8270

#### **Matrix Spike Recovery Exceptions:**

The control criteria for replicate Matrix Spikes (MS/DMS) KWG1705961-1 and KWG1705961-2 recoveries of 1,4-Dioxane for sample CG-127-40-1G-07132017 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recoveries.

No other anomalies associated with the analysis of these samples were observed.

Approved by       *Nae D. Dean*



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
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CHAIN OF CUSTODY

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SR# K107384  
 COC Set 1 of 1  
 COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
 www.alsglobal.com

Project Name <u>1,4-Dioxane ISB</u>		Project Number <u>STRCL-001 37548</u>		NUMBER OF CONTAINERS	24H	7D	28D	180D						Remarks
Project Manager <u>Tasya Gray</u>					ApplEnvMtic7-87-1536-1540 /									
Company <u>DOF</u>					8270D / 1,4-Dioxane									
Address <u>10827 NE 68th B</u>					353.2 / NO2 NO3 T									
Phone # <u>208-310 7223</u>		email <u>lkerne@dofnw.com</u>			6020A / Metals T									
Sampler Signature <u>Lucas Kerne</u>		Sampler Printed Name <u>Lucas Kerne</u>												
CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix										
1. <u>CG-127-40-1G-07132017</u>		<u>07/13/2017</u>	<u>12:55</u>	<u>water</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Y</u>					
2. <u>CG-127-40-07132017</u>			<u>13:20</u>		<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>Y</u>					
3. <u>CG-127-75-1G-07132017</u>			<u>13:40</u>		<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					
4. <u>CG-127-75-07132017</u>			<u>14:00</u>		<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					
5. <u>CG-127-75-9-07132017</u>			<u>14:05</u>		<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					
6. <u>Field Blank 07132017</u>			<u>14:15</u>		<u>1</u>	<u>X</u>								
7.														
8.														
9.														
10.														

<b>Report Requirements</b> <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD	<b>Invoice Information</b> P.O.# _____ Bill To: <u>STERCYCLE</u> Bill Back _____	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <u>Fe</u> Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg			
	<b>Turnaround Requirements</b> <input type="checkbox"/> 24 hr. _____ 48 hr. <input checked="" type="checkbox"/> 5 Day <input type="checkbox"/> Standard	Special Instructions/Comments: <u>sample event 3</u> *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)			
	Requested Report Date _____				
<b>Relinquished By:</b> <u>Lucas Kerne</u> Signature <u>DOF</u> Firm <u>15:05 7/13/2017</u> Date/Time	<b>Received By:</b> <u>FEDEX UNDER CUSTODY JEE!</u> Signature <u>JEE!</u> Printed Name Firm <u>7/14/17 0940</u> Date/Time	<b>Relinquished By:</b> Signature Printed Name Firm Date/Time	<b>Received By:</b> <u>[Signature]</u> Signature <u>[Signature]</u> Printed Name Firm <u>7/14/17 0940</u> Date/Time	<b>Relinquished By:</b> Signature Printed Name Firm Date/Time	<b>Received By:</b> Signature Printed Name Firm Date/Time



PC Kunt

### Cooler Receipt and Preservation Form

DOF

Client DOF Service Request K17 07384  
Received: 7/14/17 Opened: 7/14/17 By: [Signature] Unloaded: 7/14/17 By: [Signature]

- 1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- 2. Samples were received in: (circle) Cooler Box Envelope Other NA
- 3. Were custody seals on coolers? NA Y N If yes, how many and where? one, front
- If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.5	1.0	3.9	4.0	40.1	308	81273	7871 8523 7727		

- 4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N CG 7/14
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N
- 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
- 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:
<u>CG-127-40-07132017</u>	<u>CG-127-75-07132017</u>	<u>Sampling time / elimination</u>
<u>CG-127-40-9-07132017</u>	<u>CG-127-75-9-07132017</u>	

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

**SHORT HOLD TIME**



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17

**Units:** mg/L  
**Basis:** NA

Nitrate+Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
CG-127-40-1G-07132017	K1707384-001	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	
CG-127-40-07132017	K1707384-002	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	
CG-127-75-1G-07132017	K1707384-003	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	
CG-127-75-07132017	K1707384-004	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	
CG-127-75-9-07132017	K1707384-005	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	
Method Blank	K1707384-MB	ND U	0.050	0.020	1	07/27/17 11:46	7/27/17	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17

**Units:** mg/L  
**Basis:** NA

**Replicate Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
CG-127-40-1G-07132017	K1707384-001DUP	0.050	0.020	ND U	ND U	NC	NC	20	07/27/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Date Analyzed:** 07/27/17  
**Date Extracted:** 07/27/17

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001  
**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1707384-001MS			Duplicate Matrix Spike K1707384-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	1.08	1.00	108	1.14	1.00	114 *	90-110	5	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

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ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Analyzed:** 07/27/17  
**Date Extracted:** 07/27/17

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 555331

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1707384-LCS	9.86	10.9	90	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

### Continuing Calibration Verification (CCV) Summary

#### Nitrate+Nitrite as Nitrogen

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	555331	KQ1710372-08	07/27/17 11:46	1.00	1.03	103	90-110
CCV2	555331	KQ1710372-09	07/27/17 11:46	1.00	1.04	104	90-110
CCV3	555331	KQ1710372-10	07/27/17 11:46	1.00	1.08	108	90-110
CCV4	555331	KQ1710372-11	07/27/17 11:46	1.00	1.07	107	90-110
CCV5	555331	KQ1710372-12	07/27/17 11:46	1.00	1.07	107	90-110
CCV6	555331	KQ1710372-13	07/27/17 11:46	1.00	1.06	106	90-110
CCV7	555331	KQ1710372-14	07/27/17 11:46	1.00	1.04	104	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:**K1707384

**Continuing Calibration Blank (CCB) Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	555331	KQ1710372-01	07/27/17 11:46	0.050	0.020	ND	U
CCB2	555331	KQ1710372-02	07/27/17 11:46	0.050	0.020	ND	U
CCB3	555331	KQ1710372-03	07/27/17 11:46	0.050	0.020	ND	U
CCB4	555331	KQ1710372-04	07/27/17 11:46	0.050	0.020	ND	U
CCB5	555331	KQ1710372-05	07/27/17 11:46	0.050	0.020	ND	U
CCB6	555331	KQ1710372-06	07/27/17 11:46	0.050	0.020	ND	U
CCB7	555331	KQ1710372-07	07/27/17 11:46	0.050	0.020	ND	U

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-1G-07132017	K1707384-001	<b>10.5</b>	0.40	0.10	2	07/14/17 13:30	*
CG-127-40-07132017	K1707384-002	<b>3.90</b>	0.20	0.05	1	07/14/17 13:30	*
CG-127-75-1G-07132017	K1707384-003	ND U	0.20	0.05	1	07/14/17 13:30	
CG-127-75-07132017	K1707384-004	<b>0.23</b>	0.20	0.05	1	07/14/17 13:30	
CG-127-75-9-07132017	K1707384-005	ND U	0.20	0.05	1	07/14/17 13:30	
Method Blank	K1707384-MB	ND U	0.20	0.05	1	07/14/17 13:30	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Date Analyzed:** 07/14/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-127-75-9-07132017  
**Lab Code:** K1707384-005

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1707384-005DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

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Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Date Analyzed:** 07/14/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-127-75-9-07132017  
**Lab Code:** K1707384-005  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1707384-005MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	ND U	2.62	2.00	131 *	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	553913	KQ1709722-04	07/14/17 13:30	4.00	4.33	108	90-110
CCV2	553913	KQ1709722-05	07/14/17 13:30	4.00	4.33	108	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:**K1707384

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	553913	KQ1709722-02	07/14/17 13:30	0.20	0.05	ND	U
CCB2	553913	KQ1709722-03	07/14/17 13:30	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001

**Service Request:** K1707384  
**Date Collected:** 07/13/17 12:55  
**Date Received:** 07/14/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	12.9	mg/L	0.0020	0.0003	1	07/24/17 18:51	07/18/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-07132017  
**Lab Code:** K1707384-002

**Service Request:** K1707384  
**Date Collected:** 07/13/17 13:20  
**Date Received:** 07/14/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	12.7	mg/L	0.0020	0.0003	1	07/24/17 19:21	07/18/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-1G-07132017  
**Lab Code:** K1707384-003

**Service Request:** K1707384  
**Date Collected:** 07/13/17 13:40  
**Date Received:** 07/14/17 09:40

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	4.15	mg/L	0.0020	0.0003	1	07/24/17 19:25	07/18/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-07132017  
**Lab Code:** K1707384-004

**Service Request:** K1707384  
**Date Collected:** 07/13/17 14:00  
**Date Received:** 07/14/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	4.02	mg/L	0.0020	0.0003	1	07/24/17 19:29	07/18/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-9-07132017  
**Lab Code:** K1707384-005

**Service Request:** K1707384  
**Date Collected:** 07/13/17 14:05  
**Date Received:** 07/14/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>4.04</b>	mg/L	0.0020	0.0003	1	07/24/17 19:33	07/18/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1709657-01

**Service Request:** K1707384  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	ND U	mg/L	0.0020	0.0003	1	07/24/17 18:36	07/18/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Date Analyzed:** 07/24/17

Replicate Sample Summary

Total Metals

**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate	Average	RPD	RPD Limit
					Sample KQ1709657-03 Result			
Iron	6020A	0.0020	0.0003	12.9	12.9	12.9	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/17  
**Date Received:** 07/14/17  
**Date Analyzed:** 07/24/17  
**Date Extracted:** 07/18/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1709657-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	12.9	12.9	0.0500	126 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Analyzed:** 07/24/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1709657-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0500	0.0500	100	80-120



ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:**K1707384

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**292990

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
CG-127-40-1G-07132017	K1707384-001	7/13/17	7/14/17	10 mL	10 mL	
CG-127-40-07132017	K1707384-002	7/13/17	7/14/17	10 mL	10 mL	
CG-127-75-1G-07132017	K1707384-003	7/13/17	7/14/17	10 mL	10 mL	
CG-127-75-07132017	K1707384-004	7/13/17	7/14/17	10 mL	10 mL	
CG-127-75-9-07132017	K1707384-005	7/13/17	7/14/17	10 mL	10 mL	
Method Blank	KQ1709657-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1709657-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1709657-03DUP	7/13/17	7/14/17	10 mL	10 mL	
Matrix Spike	KQ1709657-04MS	7/13/17	7/14/17	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	554768	50.0	49.2	98	250	248	99	250	250	100

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	554768				250	249	99	250	247	99

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6020A	554768	0.3	U	0.3	U	0.3	U	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	554768			0.3	U				

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	554768	1.1	1.0	112	70-130	07/24/17 17:39
LLCCV	Iron	6020A	554768	1.1	1.0	114	70-130	07/24/17 18:28
LLCCV	Iron	6020A	554768	1.2	1.0	118	70-130	07/24/17 19:44
LLCCV	Iron	6020A	554768	4.2	4.0	106	70-130	07/24/17 19:52

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	554768	46300	-	-	-	07/24/17 17:43

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	554768	47700	-	-	-	07/24/17 17:46



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1707384-001SDL	Iron	6020A	554768	12900	13000	1	10	07/24/17 18:58

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-06

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	45000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 554768

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	07/24/17 17:16	
ZZZZZZ	1	07/24/17 17:20	
ICV	1	07/24/17 17:24	X
CCV	1	07/24/17 17:27	X
ICB	1	07/24/17 17:31	X
CCB	1	07/24/17 17:35	X
LLICVW	1	07/24/17 17:39	X
ICSA	1	07/24/17 17:43	X
ICSAB	1	07/24/17 17:46	X
ZZZZZZ	1	07/24/17 17:50	
ZZZZZZ	1	07/24/17 17:54	
ZZZZZZ	1	07/24/17 17:58	
ZZZZZZ	1	07/24/17 18:02	
ZZZZZZ	1	07/24/17 18:05	
ZZZZZZ	1	07/24/17 18:09	
ZZZZZZ	1	07/24/17 18:13	
ZZZZZZ	1	07/24/17 18:17	
CCV	1	07/24/17 18:21	X
CCB	1	07/24/17 18:24	X
LLCCV	1	07/24/17 18:28	X
ZZZZZZ	1	07/24/17 18:32	
KQ1709657-01MB	1	07/24/17 18:36	X
ZZZZZZ	1	07/24/17 18:39	
ZZZZZZ	1	07/24/17 18:43	
ZZZZZZ	1	07/24/17 18:47	
K1707384-001	1	07/24/17 18:51	X
K1707384-001DUP	1	07/24/17 18:55	X
K1707384-001SDL	5	07/24/17 18:58	X
ZZZZZZ	1	07/24/17 19:02	
K1707384-001MS	1	07/24/17 19:06	X
KQ1709657-02LCS	1	07/24/17 19:10	X
CCV	1	07/24/17 19:14	X
CCB	1	07/24/17 19:17	X
K1707384-002	1	07/24/17 19:21	X
K1707384-003	1	07/24/17 19:25	X
K1707384-004	1	07/24/17 19:29	X
K1707384-005	1	07/24/17 19:33	X

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 554768

<b>Sample</b>	<b>Dilution Factor</b>	<b>Date/Time</b>	<b>F e</b>
CCV	1	07/24/17 19:36	X
CCB	1	07/24/17 19:40	X
LLCCV	1	07/24/17 19:44	X
ZZZZZZ	1	07/24/17 19:48	
LLCCV 4X	1	07/24/17 19:52	X
ZZZZZZ	10	07/24/17 19:55	
ZZZZZZ	1	07/24/17 19:59	
ZZZZZZ	1	07/24/17 20:03	

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 554768

Sample	Date/Time	Li6NG	Ge72H2	Ge72He	Tm169He	Lu175He
ZZZZZZ	07/24/17 17:16					
ZZZZZZ	07/24/17 17:20					
ICV	07/24/17 17:24	94	96	99		103
CCV	07/24/17 17:27	94	94	95		96
ICB	07/24/17 17:31	89	92	93		96
CCB	07/24/17 17:35	89	92	92		95
LLICVW	07/24/17 17:39	87	91	90		95
ICSA	07/24/17 17:43	79	83	85		91
ICSAB	07/24/17 17:46	78	85	86		95
ZZZZZZ	07/24/17 17:50					
ZZZZZZ	07/24/17 17:54					
ZZZZZZ	07/24/17 17:58					
ZZZZZZ	07/24/17 18:02					
ZZZZZZ	07/24/17 18:05					
ZZZZZZ	07/24/17 18:09					
ZZZZZZ	07/24/17 18:13					
ZZZZZZ	07/24/17 18:17					
CCV	07/24/17 18:21	117	111	112		103
CCB	07/24/17 18:24	111	107	106		101
LLCCV	07/24/17 18:28	108	104	108		101
ZZZZZZ	07/24/17 18:32					
KQ1709657-01MB	07/24/17 18:36	108	107	110		103
ZZZZZZ	07/24/17 18:39					
ZZZZZZ	07/24/17 18:43					
ZZZZZZ	07/24/17 18:47					
K1707384-001	07/24/17 18:51	87	93	96		98
K1707384-001DUP	07/24/17 18:55	90	97	100		101
K1707384-001SDL	07/24/17 18:58	94	99	99		102
ZZZZZZ	07/24/17 19:02					
K1707384-001MS	07/24/17 19:06	92	98	100		101
KQ1709657-02LCS	07/24/17 19:10	96	103	104		104
CCV	07/24/17 19:14	95	99	99		101
CCB	07/24/17 19:17	90	97	97		100
K1707384-002	07/24/17 19:21	84	94	97		100
K1707384-003	07/24/17 19:25	86	94	95		98
K1707384-004	07/24/17 19:29	90	96	99		99
K1707384-005	07/24/17 19:33	91	96	100		100

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 554768

Sample	Date/Time	Li6NG	Ge72H2	Ge72He	Tm169He	Lu175He
CCV	07/24/17 19:36	96	97	98		101
CCB	07/24/17 19:40	90	95	95		98
LLCCV	07/24/17 19:44	87	93	91		97
ZZZZZZ	07/24/17 19:48					
LLCCV 4X	07/24/17 19:52	82	87	89		95
ZZZZZZ	07/24/17 19:55					
ZZZZZZ	07/24/17 19:59					
ZZZZZZ	07/24/17 20:03					



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
CG-127-40-1G-07132017	K1707384-001	07/13/2017	07/14/2017
CG-127-40-07132017	K1707384-002	07/13/2017	07/14/2017
CG-127-75-1G-07132017	K1707384-003	07/13/2017	07/14/2017
CG-127-75-07132017	K1707384-004	07/13/2017	07/14/2017
CG-127-75-9-07132017	K1707384-005	07/13/2017	07/14/2017
Field Blank 07132017	K1707384-006	07/13/2017	07/14/2017
CG-127-40-1G-07132017MS	KWG1705961-1	07/13/2017	07/14/2017
CG-127-40-1G-07132017DMS	KWG1705961-2	07/13/2017	07/14/2017

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	360	D	8.0	3.2	20	07/17/17	07/28/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	96	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-07132017  
**Lab Code:** K1707384-002  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	320	D	8.0	3.2	20	07/17/17	07/28/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	94	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-1G-07132017  
**Lab Code:** K1707384-003  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	780	D	8.0	3.2	20	07/17/17	07/28/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-07132017  
**Lab Code:** K1707384-004  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	710	D	8.0	3.2	20	07/17/17	07/28/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	96	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-9-07132017  
**Lab Code:** K1707384-005  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	710	D	8.0	3.2	20	07/17/17	07/28/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** 07/13/2017  
**Date Received:** 07/14/2017

1,4-Dioxane by GCMS

**Sample Name:** Field Blank 07132017  
**Lab Code:** K1707384-006  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	07/17/17	07/19/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	91	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1705961-5  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	07/17/17	07/19/17	KWG1705961	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	07/19/17	Acceptable

**Comments:** \_\_\_\_\_



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
CG-127-40-1G-07132017	K1707384-001	96
CG-127-40-07132017	K1707384-002	94
CG-127-75-1G-07132017	K1707384-003	93
CG-127-75-07132017	K1707384-004	96
CG-127-75-9-07132017	K1707384-005	93
Field Blank 07132017	K1707384-006	91
Method Blank	KWG1705961-5	92
CG-127-40-1G-07132017MS	KWG1705961-1	97
CG-127-40-1G-07132017DMS	KWG1705961-2	94
Lab Control Sample	KWG1705961-3	87
Duplicate Lab Control Sample	KWG1705961-4	93

**Surrogate Recovery Control Limits (%)**

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Sur1 = 1,4-Dioxane-d8 64-120

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/19/2017  
**Time Analyzed:** 10:48

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071917\0719F002.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1706164-2  
**Analysis Lot:** KWG1706164

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	39,423	5.26
<b>Upper Limit ==&gt;</b>	78,846	5.76
<b>Lower Limit ==&gt;</b>	19,712	4.76
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Method Blank	KWG1705961-5	38,146	5.26
Lab Control Sample	KWG1705961-3	40,350	5.27
Duplicate Lab Control Sample	KWG1705961-4	41,417	5.27
CG-127-40-1G-07132017MS	KWG1705961-1	43,199	5.27
CG-127-40-1G-07132017DMS	KWG1705961-2	39,837	5.27
CG-127-40-1G-07132017	K1707384-001	41,178	5.27
CG-127-40-07132017	K1707384-002	39,024	5.27
CG-127-75-1G-07132017	K1707384-003	38,833	5.27
CG-127-75-07132017	K1707384-004	40,428	5.27
CG-127-75-9-07132017	K1707384-005	39,582	5.27
Field Blank 07132017	K1707384-006	38,682	5.27

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/28/2017  
**Time Analyzed:** 16:09

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\072817\0728F018.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1706506-2  
**Analysis Lot:** KWG1706506

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	43,425	5.26
<b>Upper Limit ==&gt;</b>	86,850	5.76
<b>Lower Limit ==&gt;</b>	21,713	4.76
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

CG-127-40-1G-07132017DL	K1707384-001	40,426	5.26
CG-127-40-07132017DL	K1707384-002	42,204	5.26
CG-127-75-1G-07132017DL	K1707384-003	42,641	5.26
CG-127-75-07132017DL	K1707384-004	42,144	5.26
CG-127-75-9-07132017DL	K1707384-005	42,754	5.26

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Extracted:** 07/17/2017  
**Date Analyzed:** 07/19/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** CG-127-40-1G-07132017  
**Lab Code:** K1707384-001  
**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705961

Analyte Name	Sample Result	CG-127-40-1G-07132017M S KWG1705961-1 Matrix Spike			CG-127-40-1G-07132017D MS KWG1705961-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	360	342E	10.0	-198 #	343E	10.0	-188 #	49-113	0	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Extracted:** 07/17/2017  
**Date Analyzed:** 07/19/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1705961

Analyte Name	Lab Control Sample KWG1705961-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705961-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	9.12	10.0	91	9.18	10.0	92	59-111	1	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Extracted:** 07/17/2017  
**Date Analyzed:** 07/19/2017  
**Time Analyzed:** 11:06

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1705961-5 **File ID:** J:\MS26\DATA\071917\0719F003.D  
**Extraction Method:** EPA 3510C **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1705961

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1705961-3	J:\MS26\DATA\071917\0719F004.D	07/19/17	11:25
Duplicate Lab Control Sample	KWG1705961-4	J:\MS26\DATA\071917\0719F005.D	07/19/17	11:43
CG-127-40-1G-07132017MS	KWG1705961-1	J:\MS26\DATA\071917\0719F006.D	07/19/17	12:01
CG-127-40-1G-07132017DMS	KWG1705961-2	J:\MS26\DATA\071917\0719F007.D	07/19/17	12:20
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\071917\0719F008.D	07/19/17	12:38
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\071917\0719F009.D	07/19/17	12:57
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\071917\0719F010.D	07/19/17	13:15
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\071917\0719F011.D	07/19/17	13:34
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\071917\0719F012.D	07/19/17	13:52
Field Blank 07132017	K1707384-006	J:\MS26\DATA\071917\0719F013.D	07/19/17	14:11
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\072817\0728F020.D	07/28/17	16:45
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\072817\0728F021.D	07/28/17	17:03
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\072817\0728F022.D	07/28/17	17:21
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\072817\0728F023.D	07/28/17	17:39
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\072817\0728F024.D	07/28/17	17:57

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Extracted:** 07/17/2017  
**Date Analyzed:** 07/19/2017  
**Time Analyzed:** 11:25

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample  
**Lab Code:** KWG1705961-3  
**Instrument ID:** MS26  
**File ID:** J:\MS26\DATA\071917\0719F004.D  
**Extraction Method:** EPA 3510C  
**Level:** Low  
**Analysis Method:** 8270D SIM  
**Extraction Lot:** KWG1705961

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1705961-3	J:\MS26\DATA\071917\0719F003.D	07/19/17	11:06
CG-127-40-1G-07132017MS	KWG1705961-1	J:\MS26\DATA\071917\0719F006.D	07/19/17	12:01
CG-127-40-1G-07132017DMS	KWG1705961-2	J:\MS26\DATA\071917\0719F007.D	07/19/17	12:20
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\071917\0719F008.D	07/19/17	12:38
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\071917\0719F009.D	07/19/17	12:57
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\071917\0719F010.D	07/19/17	13:15
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\071917\0719F011.D	07/19/17	13:34
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\071917\0719F012.D	07/19/17	13:52
Field Blank 07132017	K1707384-006	J:\MS26\DATA\071917\0719F013.D	07/19/17	14:11
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\072817\0728F020.D	07/28/17	16:45
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\072817\0728F021.D	07/28/17	17:03
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\072817\0728F022.D	07/28/17	17:21
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\072817\0728F023.D	07/28/17	17:39
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\072817\0728F024.D	07/28/17	17:57

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/19/2017  
**Time Analyzed:** 10:27

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\071917\0719F001.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1706164

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.4	409877	PASS
68	69	0	2	1.6	8128	PASS
69	198	0	100	20.5	512098	PASS
70	69	0	2	0.0	197	PASS
127	198	10	80	35.7	891701	PASS
197	198	0	2	0.0	0	PASS
198	442	30	100	63.8	2499584	PASS
199	198	5	9	6.7	166373	PASS
275	198	10	60	31.8	794886	PASS
365	442	1	50	2.6	100090	PASS
441	443	0	100	78.3	585066	PASS
442	442	100	100	100.0	3918336	PASS
443	442	15	24	19.1	747648	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1706164-2	J:\MS26\DATA\071917\0719F002.D	07/19/2017	10:48	
Method Blank	KWG1705961-5	J:\MS26\DATA\071917\0719F003.D	07/19/2017	11:06	
Lab Control Sample	KWG1705961-3	J:\MS26\DATA\071917\0719F004.D	07/19/2017	11:25	
Duplicate Lab Control Sample	KWG1705961-4	J:\MS26\DATA\071917\0719F005.D	07/19/2017	11:43	
CG-127-40-1G-07132017MS	KWG1705961-1	J:\MS26\DATA\071917\0719F006.D	07/19/2017	12:01	
CG-127-40-1G-07132017DMS	KWG1705961-2	J:\MS26\DATA\071917\0719F007.D	07/19/2017	12:20	
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\071917\0719F008.D	07/19/2017	12:38	
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\071917\0719F009.D	07/19/2017	12:57	
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\071917\0719F010.D	07/19/2017	13:15	
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\071917\0719F011.D	07/19/2017	13:34	
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\071917\0719F012.D	07/19/2017	13:52	
Field Blank 07132017	K1707384-006	J:\MS26\DATA\071917\0719F013.D	07/19/2017	14:11	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/28/2017  
**Time Analyzed:** 14:26

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\072817\0728F017.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1706506

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	15.6	4967	PASS
68	69	0	2	1.6	106	PASS
69	198	0	100	20.3	6470	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	36.1	11519	PASS
197	198	0	2	0.3	86	PASS
198	442	30	100	56.8	31894	PASS
199	198	5	9	6.7	2133	PASS
275	198	10	60	33.2	10583	PASS
365	442	1	50	2.5	1417	PASS
441	443	0	100	78.1	8549	PASS
442	442	100	100	100.0	56181	PASS
443	442	15	24	19.5	10945	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1706506-2	J:\MS26\DATA\072817\0728F018.D	07/28/2017	16:09	
CG-127-40-1G-07132017	K1707384-001	J:\MS26\DATA\072817\0728F020.D	07/28/2017	16:45	
CG-127-40-07132017	K1707384-002	J:\MS26\DATA\072817\0728F021.D	07/28/2017	17:03	
CG-127-75-1G-07132017	K1707384-003	J:\MS26\DATA\072817\0728F022.D	07/28/2017	17:21	
CG-127-75-07132017	K1707384-004	J:\MS26\DATA\072817\0728F023.D	07/28/2017	17:39	
CG-127-75-9-07132017	K1707384-005	J:\MS26\DATA\072817\0728F024.D	07/28/2017	17:57	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

<b>Level ID</b>	<b>File ID</b>	<b>Level ID</b>	<b>File ID</b>
A	J:\MS26\DATA\071817\0718F006.D	E	J:\MS26\DATA\071817\0718F010.D
B	J:\MS26\DATA\071817\0718F007.D	F	J:\MS26\DATA\071817\0718F011.D
C	J:\MS26\DATA\071817\0718F008.D	G	J:\MS26\DATA\071817\0718F012.D
D	J:\MS26\DATA\071817\0718F009.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.410	B	4.0	0.390	C	10	0.358	D	20	0.374	E	50	0.374
	F	100	0.374	G	200	0.375									
1,4-Dioxane-d8	A	2.0	0.383	B	4.0	0.397	C	10	0.387	D	20	0.382	E	50	0.371
	F	100	0.368	G	200	0.372									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	4.3		≤ 20	0.379		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	2.7		≤ 20	0.380		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Calibration Date:** 07/18/2017  
**Date Analyzed:** 07/18/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15481  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071817\0718F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.379	0.384	1	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/19/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1706164  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071917\0719F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.365	-4	NA	± 20	AverageRF
1,4-Dioxane-d8	20	19	0.01	0.380	0.357	-6	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384  
**Date Analyzed:** 07/28/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1706506  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\072817\0728F018.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.351	-7	NA	± 20	AverageRF
1,4-Dioxane-d8	20	19	0.01	0.380	0.355	-7	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1706164  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0719F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1706164-1	7/19/2017	10:27		7/19/2017	10:37
0719F002.D	Continuing Calibration Verification	KWG1706164-2	7/19/2017	10:48		7/19/2017	10:58
0719F003.D	Method Blank	KWG1705961-5	7/19/2017	11:06		7/19/2017	11:16
0719F004.D	Lab Control Sample	KWG1705961-3	7/19/2017	11:25		7/19/2017	11:35
0719F005.D	Duplicate Lab Control Sample	KWG1705961-4	7/19/2017	11:43		7/19/2017	11:53
0719F006.D	CG-127-40-1G-07132017MS	KWG1705961-1	7/19/2017	12:01		7/19/2017	12:11
0719F007.D	CG-127-40-1G-07132017DMS	KWG1705961-2	7/19/2017	12:20		7/19/2017	12:30
0719F008.D	CG-127-40-1G-07132017	K1707384-001	7/19/2017	12:38		7/19/2017	12:48
0719F009.D	CG-127-40-07132017	K1707384-002	7/19/2017	12:57		7/19/2017	13:07
0719F010.D	CG-127-75-1G-07132017	K1707384-003	7/19/2017	13:15		7/19/2017	13:25
0719F011.D	CG-127-75-07132017	K1707384-004	7/19/2017	13:34		7/19/2017	13:44
0719F012.D	CG-127-75-9-07132017	K1707384-005	7/19/2017	13:52		7/19/2017	14:02
0719F013.D	Field Blank 07132017	K1707384-006	7/19/2017	14:11		7/19/2017	14:21
0719F014.D	ZZZZZZ	ZZZZZZ	7/19/2017	14:29		7/19/2017	14:39
0719F015.D	ZZZZZZ	ZZZZZZ	7/19/2017	14:48		7/19/2017	14:58
0719F016.D	ZZZZZZ	ZZZZZZ	7/19/2017	15:06		7/19/2017	15:16
0719F017.D	ZZZZZZ	ZZZZZZ	7/19/2017	15:25		7/19/2017	15:35
0719F018.D	ZZZZZZ	ZZZZZZ	7/19/2017	15:43		7/19/2017	15:53
0719F019.D	ZZZZZZ	ZZZZZZ	7/19/2017	16:01		7/19/2017	16:11
0719F020.D	ZZZZZZ	ZZZZZZ	7/19/2017	16:20		7/19/2017	16:30
0719F021.D	ZZZZZZ	ZZZZZZ	7/19/2017	16:38		7/19/2017	16:48
0719F022.D	ZZZZZZ	ZZZZZZ	7/19/2017	16:57		7/19/2017	17:07
0719F023.D	ZZZZZZ	ZZZZZZ	7/19/2017	17:15		7/19/2017	17:25
0719F024.D	ZZZZZZ	ZZZZZZ	7/19/2017	17:34		7/19/2017	17:44
0719F025.D	ZZZZZZ	ZZZZZZ	7/19/2017	17:52		7/19/2017	18:02
0719F026.D	ZZZZZZ	ZZZZZZ	7/19/2017	18:11		7/19/2017	18:21
0719F027.D	ZZZZZZ	ZZZZZZ	7/19/2017	18:29		7/19/2017	18:39
0719F028.D	ZZZZZZ	ZZZZZZ	7/19/2017	18:48		7/19/2017	18:58
0719F029.D	ZZZZZZ	ZZZZZZ	7/19/2017	19:07		7/19/2017	19:17
0719F030.D	ZZZZZZ	ZZZZZZ	7/19/2017	19:25		7/19/2017	19:35
0719F031.D	ZZZZZZ	ZZZZZZ	7/19/2017	19:43		7/19/2017	19:53
0719F032.D	ZZZZZZ	ZZZZZZ	7/19/2017	20:02		7/19/2017	20:12
0719F033.D	ZZZZZZ	ZZZZZZ	7/19/2017	20:21		7/19/2017	20:31
0719F034.D	Continuing Calibration Verification	KWG1706164-3	7/19/2017	20:39		7/19/2017	20:49

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08

**Service Request:** K1707384

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1706506  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0728F017.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1706506-1	7/28/2017	14:26		7/28/2017	14:36
0728F018.D	Continuing Calibration Verification	KWG1706506-2	7/28/2017	16:09		7/28/2017	16:19
0728F020.D	CG-127-40-1G-07132017	K1707384-001	7/28/2017	16:45		7/28/2017	16:55
0728F021.D	CG-127-40-07132017	K1707384-002	7/28/2017	17:03		7/28/2017	17:13
0728F022.D	CG-127-75-1G-07132017	K1707384-003	7/28/2017	17:21		7/28/2017	17:31
0728F023.D	CG-127-75-07132017	K1707384-004	7/28/2017	17:39		7/28/2017	17:49
0728F024.D	CG-127-75-9-07132017	K1707384-005	7/28/2017	17:57		7/28/2017	18:07

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4 Dioxane ISB/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707384  
**Date Extracted:** 07/17/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3510C  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1705961  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
CG-127-40-1G-07132017	K1707384-001	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-40-1G-07132017DL	K1707384-001	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-40-07132017DL	K1707384-002	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-40-07132017	K1707384-002	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-1G-07132017DL	K1707384-003	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-1G-07132017	K1707384-003	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-07132017	K1707384-004	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-07132017DL	K1707384-004	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-9-07132017	K1707384-005	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-75-9-07132017DL	K1707384-005	07/13/17	07/14/17	10ml	2ml	NA	
Field Blank 07132017	K1707384-006	07/13/17	07/14/17	10ml	2ml	NA	
Method Blank	KWG1705961-5	NA	NA	10ml	2ml	NA	
CG-127-40-1G-07132017MS	KWG1705961-1	07/13/17	07/14/17	10ml	2ml	NA	
CG-127-40-1G-07132017DMS	KWG1705961-2	07/13/17	07/14/17	10ml	2ml	NA	
Lab Control Sample	KWG1705961-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1705961-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



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August 10, 2017

**Analytical Report for Service Request No: K1707614**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown Dalton Olmsted / STRCL-001 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory July 20, 2017  
For your reference, these analyses have been assigned our service request number **K1707614**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3356. You may also contact me via email at [Kurt.Clarkson@alsglobal.com](mailto:Kurt.Clarkson@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Kurt Clarkson  
Client Services  
Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
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## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1707614  
**Project:** PSC Georgetown Dalton Olmsted/  
STRCL-001 375.08      **Date Received:** 07/20/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Nine water samples were received for analysis at ALS Environmental on 07/20/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

Samples IMW-1-07192017 and IMV-2-07192017 were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

Samples IP-5-07192017, IP-6-07192017, and IP-7-07192017 contained high concentrations of sodium persulfate which limited the effectiveness, and reliability of the Appl Ferrous analysis. After discussions with the client, the Appl Ferrous analysis was cancelled for these three samples.

No other anomalies associated with the analysis of these samples were observed.

#### Total Metals

No anomalies associated with the analysis of these samples were observed.


#### 1,4-Dioxane by EPA Method 8270

##### **Matrix Spike Recovery Exceptions:**

The control criteria for replicate Matrix Spikes (MS/DMS) KWG1706246-4 and KWG1706246-5 recoveries of 1,4-Dioxane for sample IMW-1-07192017 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recoveries.

No other anomalies associated with the analysis of these samples were observed.

Approved by







## Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
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81267

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SR# K100004  
 COC Set \_\_\_\_\_ of \_\_\_\_\_  
 COC# \_\_\_\_\_

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 www.alsglobal.com

Project Name <b>STERICYLE</b> PSC Georgetown ISCO		Project Number JTRC-001 375,08		NUMBER OF CONTAINERS	24H	7D	28D	180D						Remarks
Project Manager TASJA GRAY					App/Env/Mic/7-87-1536-1540 /	8270D / 1,4-Dioxane X								
Company DOF					300.0 / SO4	3020A / Metals T								
Address 10827 NE 08 <sup>th</sup> St. Suite B, Kirkland WA														
Phone # 206-375-0211		email NGRAY@DOF-NW.COM												
Sampler Signature <i>L. Kerne</i>		Sampler Printed Name L. Kerne												
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix										
1. IMW-1-07192017		7/19/17	1000	Water	4	X	X	X	X					
2. IMW-2-07192017			1050		4	X	X	X	X					
3. IP-5-07192017			1145		4	X	X	X	X					HIGH Na <sub>2</sub> SO <sub>4</sub>
4. IP-6-07192017			1230		4	X	X	X	X					
5. IP-7-07192017			1300		4	X	X	X	X					
6. CG-122-10-07192017			1500		4	X	X	X	X					
7. CG-12-15-07192017			1420											
8. CG-9-12-25-07192017			1425											
9. FBI-07192017			1505		4	X	X	X	X					
10.														

**Report Requirements**

I. Routine Report: Method Blank, Surrogate, as required

II. Report Dup., MS, MSD as required

III. CLP Like Summary (no raw data)

IV. Data Validation Report

V. EDD

**Invoice Information**

P.O.# 375,08

Bill To: Bill Beck

Stericycle

**Turnaround Requirements**

24 hr.  48 hr.

Standard

Requested Report Date \_\_\_\_\_

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: SIP 5,6,7 have high Sodium Persulfate concentrations

\*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other \_\_\_\_\_ (Circle One)

- Use extra sample volume to perform MS/DS

- 1,4 Dioxane preserved with ascorbic acid

Relinquished By: <i>Lucas Kerne</i>	Received By: <i>Feder under custody</i>	Relinquished By: <i>Cody Graves</i>	Received By: <i>Cody Graves</i>	Relinquished By:	Received By:
Signature <i>Lucas Kerne</i>	Signature <i>Feder under custody</i>	Signature <i>Cody Graves</i>	Signature <i>Cody Graves</i>	Signature	Signature
Printed Name DOF	Printed Name <i>Seal</i>	Printed Name ALS	Printed Name ALS	Printed Name	Printed Name
Firm DOF	Firm <i>Seal</i>	Firm ALS	Firm ALS	Firm	Firm
Date/Time 07/19/17 1600	Date/Time	Date/Time 7/20/17 0940	Date/Time	Date/Time	Date/Time



PC KC

### Cooler Receipt and Preservation Form

Client DOF / Stericycle Service Request K17 076014  
 Received: 7/20/17 Opened: 7/20/17 By: CG Unloaded: 7/20/17 By: CG

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 2. Samples were received in: (circle) Cooler Box Envelope Other NA  
 3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 Front  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.3	0.2	4.5	4.4	-0.1	328	81267	7372 3394 9840		

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N  
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N  
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: SHORT HOLD TIME



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SR# K100004  
COC Set of \_\_\_\_\_  
COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
www.alsglobal.com

Project Name <b>STERecycle</b> PSC Georgetown ISCO		Project Number <b>STEC-001 375.08</b>		NUMBER OF CONTAINERS	24H	7D	28D	180D							
Project Manager <b>TASHA GILBY</b>		Company <b>DOF</b>			App/Ev/Mc/7-87-1536-1540/	270D/1,4-Dioxane X			300.D / SO4	5020A / Metals T	1	2	3	4	5
Address <b>10827 NE 68th St. Suite B, Kirkland WA</b>		Phone # <b>206-375-9211</b>				SM/500/10/MS/ET									
Sampler Signature <i>[Signature]</i>		Sampler Printed Name <b>L. Kerne</b>													
Email <b>NGRAY@DOF-NW.COM</b>		Remarks													

CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix	1	2	3	4	5	6	7	8	9	10	Remarks
1. IMU-1-07192017		7/14/17	1000	Water	X	X		X	X						
2. IMU-2-07192017			1050		X	X		X	X						
3. IP-5-07192017			1145		X	X		X	X						<b>MULTI Mg<sub>2</sub>SO<sub>4</sub></b>
4. IP-6-07192017			1230		X	X		X	X						↓
5. IP-7-07192017			1300		X	X		X	X						↓
6. CG-12-12-07192017			1500		X	X		X	X						
7. CG-12-15-07192017			1420		X	X		X	X						
8. CG-9-12-15-07192017			1425		X	X		X	X						
9. FB1-07192017			1505		X	X		X	X						
10.															

<b>Report Requirements</b> <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD		<b>Invoice Information</b> P.O.# <u>375.08</u> Bill To: <u>Bill Beck</u> <u>Sterecycle</u>		Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <input checked="" type="checkbox"/> Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
<b>Turnaround Requirements</b> <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input checked="" type="checkbox"/> Standard		Special Instructions/Comments: <u>IP5,6,7 have high Sodium Persulfate concentrations</u> <u>- Use extra sample volume to perform MS/DS</u> <u>* - 1,4 Dioxane preserved with ascorbic acid</u>		*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>
Signature <b>Lucas Kerne</b>	Signature <b>Federer under</b>	Signature	Signature <b>CODY GRAVES</b>	Signature	Signature
Printed Name <b>DOF</b>	Printed Name <b>custody</b>	Printed Name	Printed Name <b>ALS</b>	Printed Name	Printed Name
Firm <b>DOF</b>	Firm <b>Seal</b>	Firm	Firm <b>ALS</b>	Firm	Firm
Date/Time <b>07/19/17 1600</b>	Date/Time	Date/Time	Date/Time <b>7/20/17 0940</b>	Date/Time	Date/Time



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
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**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-07192017	K1707614-001	<b>1050</b>	2.0	0.2	20	07/29/17 21:21	7/29/17	
IMV-2-07192017	K1707614-002	<b>496</b>	1.0	0.1	10	07/29/17 21:31	7/29/17	
IP-5-07192017	K1707614-003	<b>846</b>	20	2	200	07/29/17 21:41	7/29/17	
IP-6-07192017	K1707614-004	<b>148</b>	20	2	200	07/29/17 21:51	7/29/17	
IP-7-07192017	K1707614-005	<b>501</b>	20	2	200	07/29/17 22:01	7/29/17	
CG-122-60-07192017	K1707614-006	<b>210</b>	1.0	0.1	10	07/29/17 22:11	7/29/17	
CG-122-75-07192017	K1707614-007	ND U	0.50	0.05	5	07/29/17 22:21	7/29/17	
CG-9-122-75-07192017	K1707614-008	ND U	0.50	0.05	5	07/29/17 22:31	7/29/17	
FB1-07192017	K1707614-009	ND U	0.20	0.02	2	07/29/17 22:41	7/29/17	
Method Blank	K1707614-MB1	ND U	0.10	0.01	1	07/29/17 09:58	NA	
Method Blank	K1707614-MB2	ND U	0.10	0.01	1	08/01/17 13:30	NA	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** None

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17

**Units:** mg/L  
**Basis:** NA

Replicate Sample Summary  
Sulfate

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
IMV-2-07192017	K1707614-002DUP	50	5	496	443	470	11	20	08/01/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17  
**Date Analyzed:** 08/1/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** IMV-2-07192017 **Units:** mg/L  
**Lab Code:** K1707614-002 **Basis:** NA  
**Analysis Method:** 300.0  
**Prep Method:** None

Analyte Name	Sample Result	Result	Matrix Spike K1707614-002MS		Duplicate Matrix Spike K1707614-002DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	496	1490	1000	99	1480	1000	98	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Analyzed:** 07/29/17  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 555986

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1707614-LCS1	5.35	5.00	107	90-110

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Analyzed:** 08/01/17  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 556108

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1707614-LCS2	5.22	5.00	104	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	555986	KQ1710673-03	07/29/17 10:08	5.00	5.35	107	90-110
CCV2	555986	KQ1710673-04	07/29/17 21:00	5.00	5.26	105	90-110
CCV3	555986	KQ1710673-05	07/29/17 23:02	5.00	5.18	104	90-110
CCV4	555986	KQ1710673-06	07/30/17 00:23	5.00	5.34	107	90-110
CCV5	556108	KQ1710751-03	08/01/17 13:40	5.00	5.19	104	90-110
CCV6	556108	KQ1710751-04	08/01/17 15:41	5.00	5.48	110	90-110
CCV7	556108	KQ1710751-05	08/01/17 19:16	5.00	5.22	104	90-110
CCV8	556108	KQ1710751-06	08/01/17 21:17	5.00	5.28	106	90-110
CCV9	556108	KQ1710751-07	08/01/17 22:29	5.00	5.05	101	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:**K1707614

**Continuing Calibration Blank (CCB) Summary**  
**Sulfate**

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	555986	KQ1710673-07	07/29/17 10:18	0.10	0.01	ND	U
CCB2	555986	KQ1710673-08	07/29/17 21:10	0.10	0.01	ND	U
CCB3	555986	KQ1710673-09	07/29/17 23:12	0.10	0.01	ND	U
CCB4	555986	KQ1710673-10	07/30/17 00:33	0.10	0.01	ND	U
CCB5	556108	KQ1710751-08	08/01/17 13:50	0.10	0.01	ND	U
CCB6	556108	KQ1710751-09	08/01/17 15:51	0.10	0.01	ND	U
CCB7	556108	KQ1710751-10	08/01/17 19:26	0.10	0.01	ND	U
CCB8	556108	KQ1710751-11	08/01/17 21:28	0.10	0.01	ND	U
CCB9	556108	KQ1710751-12	08/01/17 22:39	0.10	0.01	ND	U

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-07192017	K1707614-001	<b>0.84</b>	0.20	0.05	1	07/20/17 11:00	*
IMV-2-07192017	K1707614-002	<b>1.87</b>	0.20	0.05	1	07/20/17 11:00	*
CG-122-60-07192017	K1707614-006	<b>0.39</b>	0.20	0.05	1	07/20/17 11:00	
CG-122-75-07192017	K1707614-007	ND U	0.20	0.05	1	07/20/17 11:00	
CG-9-122-75-07192017	K1707614-008	ND U	0.20	0.05	1	07/20/17 11:00	
FB1-07192017	K1707614-009	ND U	0.20	0.05	1	07/20/17 11:00	
Method Blank	K1707614-MB1	ND U	0.20	0.05	1	07/20/17 11:00	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614

**Date Collected:** 07/19/17

**Date Received:** 07/20/17

**Date Analyzed:** 07/20/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-122-75-07192017

**Units:** mg/L

**Lab Code:** K1707614-007

**Basis:** NA

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Sample K1707614-007DUP Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17  
**Date Analyzed:** 07/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-122-75-07192017  
**Lab Code:** K1707614-007  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1707614-007MS			Duplicate Matrix Spike K1707614-007DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Iron, Divalent (Ferrous Iron)	ND U	2.10	2.00	105	2.10	2.00	105	75-125	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	554517	KQ1710026-04	07/20/17 11:00	4.00	3.74	94	90-110
CCV2	554517	KQ1710026-05	07/20/17 11:00	4.00	3.73	93	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:**K1707614

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	554517	KQ1710026-02	07/20/17 11:00	0.20	0.05	ND	U
CCB2	554517	KQ1710026-03	07/20/17 11:00	0.20	0.05	ND	U



# Metals

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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-07192017  
**Lab Code:** K1707614-001

**Service Request:** K1707614  
**Date Collected:** 07/19/17 10:00  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	7.77	mg/L	0.0020	0.0003	1	08/01/17 12:01	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** IMV-2-07192017  
**Lab Code:** K1707614-002

**Service Request:** K1707614  
**Date Collected:** 07/19/17 10:50  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	11.9	mg/L	0.0020	0.0003	1	08/01/17 12:24	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-5-07192017  
**Lab Code:** K1707614-003

**Service Request:** K1707614  
**Date Collected:** 07/19/17 11:45  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.160</b>	mg/L	0.020	0.003	1	08/01/17 12:47	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-07192017  
**Lab Code:** K1707614-004

**Service Request:** K1707614  
**Date Collected:** 07/19/17 12:30  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.287</b>	mg/L	0.020	0.003	1	08/01/17 12:50	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-7-07192017  
**Lab Code:** K1707614-005

**Service Request:** K1707614  
**Date Collected:** 07/19/17 13:00  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.765</b>	mg/L	0.020	0.003	1	08/01/17 12:54	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-07192017  
**Lab Code:** K1707614-006

**Service Request:** K1707614  
**Date Collected:** 07/19/17 15:00  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	2.50	mg/L	0.0020	0.0003	1	08/01/17 12:58	07/28/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-07192017  
**Lab Code:** K1707614-007

**Service Request:** K1707614  
**Date Collected:** 07/19/17 14:20  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	1.39	mg/L	0.0020	0.0003	1	08/01/17 13:02	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-75-07192017  
**Lab Code:** K1707614-008

**Service Request:** K1707614  
**Date Collected:** 07/19/17 14:25  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	1.39	mg/L	0.0020	0.0003	1	08/01/17 13:06	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** FB1-07192017  
**Lab Code:** K1707614-009

**Service Request:** K1707614  
**Date Collected:** 07/19/17 15:05  
**Date Received:** 07/20/17 09:40  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.0235	mg/L	0.0020	0.0003	1	08/01/17 13:09	07/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1710319-01

**Service Request:** K1707614  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0006 J</b>	mg/L	0.0020	0.0003	1	08/01/17 11:57	07/28/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
Sample Matrix: Water

Service Request: K1707614  
Date Collected: 07/19/17  
Date Received: 07/20/17  
Date Analyzed: 08/01/17

Replicate Sample Summary

Total Metals

Sample Name: IMW-1-07192017  
Lab Code: K1707614-001

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1710319-03 Result			
Iron	6020A	0.0020	0.0003	7.77	7.80	7.79	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/17  
**Date Received:** 07/20/17  
**Date Analyzed:** 08/1/17  
**Date Extracted:** 07/28/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** IMW-1-07192017  
**Lab Code:** K1707614-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1710319-04

<b>Analyte Name</b>	<b>Sample Result</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	7.77	7.94	0.0500	349 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Analyzed:** 08/01/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1710319-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0525	0.0500	105	80-120

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:**K1707614

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**293892

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-07192017	K1707614-001	7/19/17	7/20/17	10 mL	10 mL	
IMV-2-07192017	K1707614-002	7/19/17	7/20/17	10 mL	10 mL	
IP-5-07192017	K1707614-003	7/19/17	7/20/17	1 mL	10 mL	
IP-6-07192017	K1707614-004	7/19/17	7/20/17	1 mL	10 mL	
IP-7-07192017	K1707614-005	7/19/17	7/20/17	1 mL	10 mL	
CG-122-60-07192017	K1707614-006	7/19/17	7/20/17	10 mL	10 mL	
CG-122-75-07192017	K1707614-007	7/19/17	7/20/17	10 mL	10 mL	
CG-9-122-75-07192017	K1707614-008	7/19/17	7/20/17	10 mL	10 mL	
FB1-07192017	K1707614-009	7/19/17	7/20/17	10 mL	10 mL	
Method Blank	KQ1710319-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1710319-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1710319-03DUP	7/19/17	7/20/17	10 mL	10 mL	
Matrix Spike	KQ1710319-04MS	7/19/17	7/20/17	10 mL	10.3 mL	



**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1707614

**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	555962	50.0	51.5	103	250	250	100	250	252	101

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1707614

**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	555962				250	254	102			

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6020A	555962	0.3	U	0.3	U	0.3	U	0.3	U

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	555962	1.1	1.14	114	70-130	08/01/17 11:38
LLCCV	Iron	6020A	555962	1.1	1.12	112	70-130	08/01/17 13:24

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	555962	46900	-	-	-	08/01/17 11:46

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1707614

**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	555962	46300	-	-	-	08/01/17 11:50

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1707614-001SDL	Iron	6020A	555962	7770	7940	2	10	08/01/17 12:09

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1707614

**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A



**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1707614

**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-06

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	45000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 555962

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	08/01/17 11:11	
ZZZZZZ	1	08/01/17 11:15	
ICV	1	08/01/17 11:19	X
CCV	1	08/01/17 11:23	X
ZZZZZZ	1	08/01/17 11:27	
ICB	1	08/01/17 11:30	X
CCB	1	08/01/17 11:34	X
LLICVW	1	08/01/17 11:38	X
ZZZZZZ	1	08/01/17 11:42	
ICSA	1	08/01/17 11:46	X
ICSAB	1	08/01/17 11:50	X
ZZZZZZ	1	08/01/17 11:53	
KQ1710319-01MB	1	08/01/17 11:57	X
K1707614-001	1	08/01/17 12:01	X
K1707614-001DUP	1	08/01/17 12:05	X
K1707614-001SDL	5	08/01/17 12:09	X
ZZZZZZ	1	08/01/17 12:12	
K1707614-001MS	1	08/01/17 12:16	X
KQ1710319-02LCS	1	08/01/17 12:20	X
K1707614-002	1	08/01/17 12:24	X
ZZZZZZ	5	08/01/17 12:28	
ZZZZZZ	5	08/01/17 12:32	
CCV	1	08/01/17 12:35	X
CCB	1	08/01/17 12:39	X
ZZZZZZ	5	08/01/17 12:43	
K1707614-003	1	08/01/17 12:47	X
K1707614-004	1	08/01/17 12:50	X
K1707614-005	1	08/01/17 12:54	X
K1707614-006	1	08/01/17 12:58	X
K1707614-007	1	08/01/17 13:02	X
K1707614-008	1	08/01/17 13:06	X
K1707614-009	1	08/01/17 13:09	X
CCV	1	08/01/17 13:13	X
CCB	1	08/01/17 13:17	X
ZZZZZZ	1	08/01/17 13:21	
LLCCVW	1	08/01/17 13:24	X
ZZZZZZ	1	08/01/17 13:28	

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 555962

Sample	Date/Time	Li6NG	Ge72NG	Ge72H2	Ge72He	Tm169He	Lu175He	Th232He
ZZZZZZ	08/01/17 11:11							
ZZZZZZ	08/01/17 11:15							
ICV	08/01/17 11:19	99	99	99	97		100	100
CCV	08/01/17 11:23	101	99	100	98		99	100
ZZZZZZ	08/01/17 11:27							
ICB	08/01/17 11:30	98	99	100	97		100	100
CCB	08/01/17 11:34	98	98	100	100		100	100
LLICVW	08/01/17 11:38	99	99	100	98		99	99
ZZZZZZ	08/01/17 11:42							
ICSA	08/01/17 11:46	90	96	92	91		95	96
ICSAB	08/01/17 11:50	89	94	92	92		96	96
ZZZZZZ	08/01/17 11:53							
KQ1710319-01MB	08/01/17 11:57	95	97	99	95		100	100
K1707614-001	08/01/17 12:01	78	82	82	85		90	90
K1707614-001DUP	08/01/17 12:05	95	95	96	95		95	92
K1707614-001SDL	08/01/17 12:09	110	107	108	105		103	100
ZZZZZZ	08/01/17 12:12							
K1707614-001MS	08/01/17 12:16	104	101	102	99		98	94
KQ1710319-02LCS	08/01/17 12:20	128	120	123	119		110	107
K1707614-002	08/01/17 12:24	102	102	102	100		99	96
ZZZZZZ	08/01/17 12:28							
ZZZZZZ	08/01/17 12:32							
CCV	08/01/17 12:35	122	117	117	114		106	104
CCB	08/01/17 12:39	117	114	115	113		106	104
ZZZZZZ	08/01/17 12:43							
K1707614-003	08/01/17 12:47	98	98	104	100		100	100
K1707614-004	08/01/17 12:50	108	108	107	105		101	102
K1707614-005	08/01/17 12:54	122	123	107	105		102	103
K1707614-006	08/01/17 12:58	103	106	106	102		100	100
K1707614-007	08/01/17 13:02	106	106	108	105		104	102
K1707614-008	08/01/17 13:06	106	106	107	106		104	103
K1707614-009	08/01/17 13:09	115	114	113	109		106	106
CCV	08/01/17 13:13	113	112	110	107		104	105
CCB	08/01/17 13:17	107	109	109	105		102	104
ZZZZZZ	08/01/17 13:21							
LLCCVW	08/01/17 13:24	103	105	105	102		101	102
ZZZZZZ	08/01/17 13:28							



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**Cover Page - Organic Analysis Data Package  
 1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
IMW-1-07192017	K1707614-001	07/19/2017	07/20/2017
IMV-2-07192017	K1707614-002	07/19/2017	07/20/2017
IP-5-07192017	K1707614-003	07/19/2017	07/20/2017
IP-6-07192017	K1707614-004	07/19/2017	07/20/2017
IP-7-07192017	K1707614-005	07/19/2017	07/20/2017
CG-122-60-07192017	K1707614-006	07/19/2017	07/20/2017
CG-122-75-07192017	K1707614-007	07/19/2017	07/20/2017
CG-9-122-75-07192017	K1707614-008	07/19/2017	07/20/2017
FB1-07192017	K1707614-009	07/19/2017	07/20/2017
IMW-1-07192017MS	KWG1706246-4	07/19/2017	07/20/2017
IMW-1-07192017DMS	KWG1706246-5	07/19/2017	07/20/2017

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** IMW-1-07192017  
**Lab Code:** K1707614-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	160	D	2.0	0.80	5	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	90	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** IMV-2-07192017  
**Lab Code:** K1707614-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	430	D	8.0	3.2	20	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	97	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-5-07192017  
**Lab Code:** K1707614-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	200	D	4.0	1.6	10	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	98	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-6-07192017  
**Lab Code:** K1707614-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	200	D	4.0	1.6	10	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	89	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-7-07192017  
**Lab Code:** K1707614-005  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	120	D	2.0	0.80	5	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-122-60-07192017  
**Lab Code:** K1707614-006  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	250	D	4.0	1.6	10	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	83	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-122-75-07192017  
**Lab Code:** K1707614-007  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	100	D	2.0	0.80	5	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	91	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-9-122-75-07192017  
**Lab Code:** K1707614-008  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	100	D	2.0	0.80	5	07/25/17	08/01/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	94	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** 07/19/2017  
**Date Received:** 07/20/2017

1,4-Dioxane by GCMS

**Sample Name:** FB1-07192017  
**Lab Code:** K1707614-009  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	17		0.40	0.16	1	07/25/17	07/31/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	95	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1706246-3  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	07/25/17	07/31/17	KWG1706246	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	96	64-120	07/31/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
IMW-1-07192017	K1707614-001	90
IMV-2-07192017	K1707614-002	97
IP-5-07192017	K1707614-003	98
IP-6-07192017	K1707614-004	89
IP-7-07192017	K1707614-005	92
CG-122-60-07192017	K1707614-006	83
CG-122-75-07192017	K1707614-007	91
CG-9-122-75-07192017	K1707614-008	94
FB1-07192017	K1707614-009	95
Method Blank	KWG1706246-3	96
IMW-1-07192017MS	KWG1706246-4	94
IMW-1-07192017DMS	KWG1706246-5	91
Lab Control Sample	KWG1706246-1	95
Duplicate Lab Control Sample	KWG1706246-2	102

**Surrogate Recovery Control Limits (%)**

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Sur1 = 1,4-Dioxane-d8 64-120

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 07/31/2017  
**Time Analyzed:** 15:17

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\073117\0731F004.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1706550-2  
**Analysis Lot:** KWG1706550

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	51,586	5.26
<b>Upper Limit ==&gt;</b>	103,172	5.76
<b>Lower Limit ==&gt;</b>	25,793	4.76
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Method	Lab Code	Area	RT
Method Blank	KWG1706246-3	44,681	5.26
Lab Control Sample	KWG1706246-1	44,052	5.26
Duplicate Lab Control Sample	KWG1706246-2	45,679	5.27
IMW-1-07192017MS	KWG1706246-4	42,475	5.26
IMW-1-07192017DMS	KWG1706246-5	40,875	5.26
IMW-1-07192017	K1707614-001	45,663	5.27
IMV-2-07192017	K1707614-002	39,878	5.26
IP-5-07192017	K1707614-003	43,049	5.26
IP-6-07192017	K1707614-004	42,550	5.26
IP-7-07192017	K1707614-005	40,305	5.26
CG-122-60-07192017	K1707614-006	41,177	5.26
CG-122-75-07192017	K1707614-007	41,397	5.26
CG-9-122-75-07192017	K1707614-008	40,316	5.26
FB1-07192017	K1707614-009	41,185	5.26

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 08/01/2017  
**Time Analyzed:** 16:06

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\080117\0801F002.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1706609-2  
**Analysis Lot:** KWG1706609

1,4-Dichlorobenzene-d4		
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	55,086	5.26
<b>Upper Limit ==&gt;</b>	110,172	5.76
<b>Lower Limit ==&gt;</b>	27,543	4.76
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Sample ID	Reference ID	Area	RT
IMW-1-07192017DL	K1707614-001	41,845	5.26
IMV-2-07192017DL	K1707614-002	42,473	5.26
IP-5-07192017DL	K1707614-003	40,749	5.26
IP-6-07192017DL	K1707614-004	41,160	5.26
IP-7-07192017DL	K1707614-005	43,150	5.26
CG-122-60-07192017DL	K1707614-006	41,517	5.26
CG-122-75-07192017DL	K1707614-007	40,157	5.26
CG-9-122-75-07192017DL	K1707614-008	41,609	5.26

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Extracted:** 07/25/2017  
**Date Analyzed:** 07/31/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** IMW-1-07192017  
**Lab Code:** K1707614-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1706246

Analyte Name	Sample Result	IMW-1-07192017MS KWG1706246-4 Matrix Spike			IMW-1-07192017DMS KWG1706246-5 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	160	162E	10.0	32 #	155E	10.0	-37 #	49-113	4	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Extracted:** 07/25/2017  
**Date Analyzed:** 07/31/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1706246

Analyte Name	Lab Control Sample KWG1706246-1 Lab Control Spike			Duplicate Lab Control Sample KWG1706246-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	10.2	10.0	102	10.8	10.0	108	59-111	6	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Extracted:** 07/25/2017  
**Date Analyzed:** 07/31/2017  
**Time Analyzed:** 19:25

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank  
**Lab Code:** KWG1706246-3  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Instrument ID:** MS26  
**File ID:** J:\MS26\DATA\073117\0731F018.D  
**Level:** Low  
**Extraction Lot:** KWG1706246

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1706246-1	J:\MS26\DATA\073117\0731F019.D	07/31/17	19:42
Duplicate Lab Control Sample	KWG1706246-2	J:\MS26\DATA\073117\0731F020.D	07/31/17	20:00
IMW-1-07192017MS	KWG1706246-4	J:\MS26\DATA\073117\0731F021.D	07/31/17	20:18
IMW-1-07192017DMS	KWG1706246-5	J:\MS26\DATA\073117\0731F022.D	07/31/17	20:36
IMW-1-07192017	K1707614-001	J:\MS26\DATA\073117\0731F023.D	07/31/17	20:54
IMV-2-07192017	K1707614-002	J:\MS26\DATA\073117\0731F024.D	07/31/17	21:12
IP-5-07192017	K1707614-003	J:\MS26\DATA\073117\0731F025.D	07/31/17	21:30
IP-6-07192017	K1707614-004	J:\MS26\DATA\073117\0731F026.D	07/31/17	21:47
IP-7-07192017	K1707614-005	J:\MS26\DATA\073117\0731F027.D	07/31/17	22:05
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\073117\0731F028.D	07/31/17	22:23
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\073117\0731F029.D	07/31/17	22:41
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\073117\0731F030.D	07/31/17	22:59
FB1-07192017	K1707614-009	J:\MS26\DATA\073117\0731F031.D	07/31/17	23:17
IMW-1-07192017	K1707614-001	J:\MS26\DATA\080117\0801F008.D	08/01/17	17:53
IMV-2-07192017	K1707614-002	J:\MS26\DATA\080117\0801F009.D	08/01/17	18:11
IP-5-07192017	K1707614-003	J:\MS26\DATA\080117\0801F010.D	08/01/17	18:29
IP-6-07192017	K1707614-004	J:\MS26\DATA\080117\0801F011.D	08/01/17	18:47
IP-7-07192017	K1707614-005	J:\MS26\DATA\080117\0801F012.D	08/01/17	19:04
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\080117\0801F013.D	08/01/17	19:22
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\080117\0801F014.D	08/01/17	19:40
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\080117\0801F015.D	08/01/17	19:58

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Extracted:** 07/25/2017  
**Date Analyzed:** 07/31/2017  
**Time Analyzed:** 19:42

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample      **Instrument ID:** MS26  
**Lab Code:** KWG1706246-1      **File ID:** J:\MS26\DATA\073117\0731F019.D  
**Extraction Method:** EPA 3535A      **Level:** Low  
**Analysis Method:** 8270D SIM      **Extraction Lot:** KWG1706246

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1706246-3	J:\MS26\DATA\073117\0731F018.D	07/31/17	19:25
IMW-1-07192017MS	KWG1706246-4	J:\MS26\DATA\073117\0731F021.D	07/31/17	20:18
IMW-1-07192017DMS	KWG1706246-5	J:\MS26\DATA\073117\0731F022.D	07/31/17	20:36
IMW-1-07192017	K1707614-001	J:\MS26\DATA\073117\0731F023.D	07/31/17	20:54
IMV-2-07192017	K1707614-002	J:\MS26\DATA\073117\0731F024.D	07/31/17	21:12
IP-5-07192017	K1707614-003	J:\MS26\DATA\073117\0731F025.D	07/31/17	21:30
IP-6-07192017	K1707614-004	J:\MS26\DATA\073117\0731F026.D	07/31/17	21:47
IP-7-07192017	K1707614-005	J:\MS26\DATA\073117\0731F027.D	07/31/17	22:05
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\073117\0731F028.D	07/31/17	22:23
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\073117\0731F029.D	07/31/17	22:41
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\073117\0731F030.D	07/31/17	22:59
FB1-07192017	K1707614-009	J:\MS26\DATA\073117\0731F031.D	07/31/17	23:17
IMW-1-07192017	K1707614-001	J:\MS26\DATA\080117\0801F008.D	08/01/17	17:53
IMV-2-07192017	K1707614-002	J:\MS26\DATA\080117\0801F009.D	08/01/17	18:11
IP-5-07192017	K1707614-003	J:\MS26\DATA\080117\0801F010.D	08/01/17	18:29
IP-6-07192017	K1707614-004	J:\MS26\DATA\080117\0801F011.D	08/01/17	18:47
IP-7-07192017	K1707614-005	J:\MS26\DATA\080117\0801F012.D	08/01/17	19:04
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\080117\0801F013.D	08/01/17	19:22
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\080117\0801F014.D	08/01/17	19:40
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\080117\0801F015.D	08/01/17	19:58

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 07/31/2017  
**Time Analyzed:** 14:42

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\073117\0731F003.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1706550

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	15.8	5164	PASS
68	69	0	2	1.6	105	PASS
69	198	0	100	20.4	6659	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	36.5	11916	PASS
197	198	0	2	0.2	79	PASS
198	442	30	100	56.2	32662	PASS
199	198	5	9	6.8	2214	PASS
275	198	10	60	33.5	10952	PASS
365	442	1	50	2.6	1498	PASS
441	443	0	100	78.2	8888	PASS
442	442	100	100	100.0	58112	PASS
443	442	15	24	19.6	11361	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1706550-2	J:\MS26\DATA\073117\0731F004.D	07/31/2017	15:17	
Method Blank	KWG1706246-3	J:\MS26\DATA\073117\0731F018.D	07/31/2017	19:25	
Lab Control Sample	KWG1706246-1	J:\MS26\DATA\073117\0731F019.D	07/31/2017	19:42	
Duplicate Lab Control Sample	KWG1706246-2	J:\MS26\DATA\073117\0731F020.D	07/31/2017	20:00	
IMW-1-07192017MS	KWG1706246-4	J:\MS26\DATA\073117\0731F021.D	07/31/2017	20:18	
IMW-1-07192017DMS	KWG1706246-5	J:\MS26\DATA\073117\0731F022.D	07/31/2017	20:36	
IMW-1-07192017	K1707614-001	J:\MS26\DATA\073117\0731F023.D	07/31/2017	20:54	
IMV-2-07192017	K1707614-002	J:\MS26\DATA\073117\0731F024.D	07/31/2017	21:12	
IP-5-07192017	K1707614-003	J:\MS26\DATA\073117\0731F025.D	07/31/2017	21:30	
IP-6-07192017	K1707614-004	J:\MS26\DATA\073117\0731F026.D	07/31/2017	21:47	
IP-7-07192017	K1707614-005	J:\MS26\DATA\073117\0731F027.D	07/31/2017	22:05	
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\073117\0731F028.D	07/31/2017	22:23	
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\073117\0731F029.D	07/31/2017	22:41	
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\073117\0731F030.D	07/31/2017	22:59	
FB1-07192017	K1707614-009	J:\MS26\DATA\073117\0731F031.D	07/31/2017	23:17	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 08/01/2017  
**Time Analyzed:** 13:50

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\080117\0801F001.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1706609

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.5	6220	PASS
68	69	0	2	0.7	60	PASS
69	198	0	100	21.6	8119	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	36.9	13884	PASS
197	198	0	2	0.2	63	PASS
198	442	30	100	82.7	37616	PASS
199	198	5	9	6.8	2543	PASS
275	198	10	60	31.1	11715	PASS
365	442	1	50	3.0	1380	PASS
441	443	0	100	77.3	6955	PASS
442	442	100	100	100.0	45472	PASS
443	442	15	24	19.8	9001	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1706609-2	J:\MS26\DATA\080117\0801F002.D	08/01/2017	16:06	
IMW-1-07192017	K1707614-001	J:\MS26\DATA\080117\0801F008.D	08/01/2017	17:53	
IMV-2-07192017	K1707614-002	J:\MS26\DATA\080117\0801F009.D	08/01/2017	18:11	
IP-5-07192017	K1707614-003	J:\MS26\DATA\080117\0801F010.D	08/01/2017	18:29	
IP-6-07192017	K1707614-004	J:\MS26\DATA\080117\0801F011.D	08/01/2017	18:47	
IP-7-07192017	K1707614-005	J:\MS26\DATA\080117\0801F012.D	08/01/2017	19:04	
CG-122-60-07192017	K1707614-006	J:\MS26\DATA\080117\0801F013.D	08/01/2017	19:22	
CG-122-75-07192017	K1707614-007	J:\MS26\DATA\080117\0801F014.D	08/01/2017	19:40	
CG-9-122-75-07192017	K1707614-008	J:\MS26\DATA\080117\0801F015.D	08/01/2017	19:58	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window



ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\071817\0718F006.D	E	J:\MS26\DATA\071817\0718F010.D
B	J:\MS26\DATA\071817\0718F007.D	F	J:\MS26\DATA\071817\0718F011.D
C	J:\MS26\DATA\071817\0718F008.D	G	J:\MS26\DATA\071817\0718F012.D
D	J:\MS26\DATA\071817\0718F009.D		

Analyte Name	Level			Level			Level			Level			Level		
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF
1,4-Dioxane	A	2.0	0.410	B	4.0	0.390	C	10	0.358	D	20	0.374	E	50	0.374
	F	100	0.374	G	200	0.375									
1,4-Dioxane-d8	A	2.0	0.383	B	4.0	0.397	C	10	0.387	D	20	0.382	E	50	0.371
	F	100	0.368	G	200	0.372									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	4.3		≤ 20	0.379		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	2.7		≤ 20	0.380		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Calibration Date:** 07/18/2017  
**Date Analyzed:** 07/18/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15481  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071817\0718F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.379	0.384	1	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 07/31/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1706550  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\073117\0731F004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.368	-3	NA	± 20	AverageRF
1,4-Dioxane-d8	20	19	0.01	0.380	0.356	-6	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614  
**Date Analyzed:** 08/01/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1706609  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\080117\0801F002.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.369	-3	NA	± 20	AverageRF
1,4-Dioxane-d8	20	19	0.01	0.380	0.354	-7	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1706550  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0731F003.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1706550-1	7/31/2017	14:42		7/31/2017	14:52
0731F004.D	Continuing Calibration Verification	KWG1706550-2	7/31/2017	15:17		7/31/2017	15:27
0731F005.D	ZZZZZZ	ZZZZZZ	7/31/2017	15:34		7/31/2017	15:44
0731F006.D	ZZZZZZ	ZZZZZZ	7/31/2017	15:52		7/31/2017	16:02
0731F007.D	ZZZZZZ	ZZZZZZ	7/31/2017	16:09		7/31/2017	16:19
0731F008.D	ZZZZZZ	ZZZZZZ	7/31/2017	16:27		7/31/2017	16:37
0731F009.D	ZZZZZZ	ZZZZZZ	7/31/2017	16:45		7/31/2017	16:55
0731F010.D	ZZZZZZ	ZZZZZZ	7/31/2017	17:03		7/31/2017	17:13
0731F011.D	ZZZZZZ	ZZZZZZ	7/31/2017	17:20		7/31/2017	17:30
0731F012.D	ZZZZZZ	ZZZZZZ	7/31/2017	17:38		7/31/2017	17:48
0731F013.D	ZZZZZZ	ZZZZZZ	7/31/2017	17:56		7/31/2017	18:06
0731F014.D	ZZZZZZ	ZZZZZZ	7/31/2017	18:14		7/31/2017	18:24
0731F015.D	ZZZZZZ	ZZZZZZ	7/31/2017	18:31		7/31/2017	18:41
0731F016.D	ZZZZZZ	ZZZZZZ	7/31/2017	18:49		7/31/2017	18:59
0731F017.D	ZZZZZZ	ZZZZZZ	7/31/2017	19:07		7/31/2017	19:17
0731F018.D	Method Blank	KWG1706246-3	7/31/2017	19:25		7/31/2017	19:35
0731F019.D	Lab Control Sample	KWG1706246-1	7/31/2017	19:42		7/31/2017	19:52
0731F020.D	Duplicate Lab Control Sample	KWG1706246-2	7/31/2017	20:00		7/31/2017	20:10
0731F021.D	IMW-1-07192017MS	KWG1706246-4	7/31/2017	20:18		7/31/2017	20:28
0731F022.D	IMW-1-07192017DMS	KWG1706246-5	7/31/2017	20:36		7/31/2017	20:46
0731F023.D	IMW-1-07192017	K1707614-001	7/31/2017	20:54		7/31/2017	21:04
0731F024.D	IMV-2-07192017	K1707614-002	7/31/2017	21:12		7/31/2017	21:22
0731F025.D	IP-5-07192017	K1707614-003	7/31/2017	21:30		7/31/2017	21:40
0731F026.D	IP-6-07192017	K1707614-004	7/31/2017	21:47		7/31/2017	21:57
0731F027.D	IP-7-07192017	K1707614-005	7/31/2017	22:05		7/31/2017	22:15
0731F028.D	CG-122-60-07192017	K1707614-006	7/31/2017	22:23		7/31/2017	22:33
0731F029.D	CG-122-75-07192017	K1707614-007	7/31/2017	22:41		7/31/2017	22:51
0731F030.D	CG-9-122-75-07192017	K1707614-008	7/31/2017	22:59		7/31/2017	23:09
0731F031.D	FB1-07192017	K1707614-009	7/31/2017	23:17		7/31/2017	23:27
0731F032.D	Continuing Calibration Verification	KWG1706550-3	8/1/2017	08:30		8/1/2017	08:40

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08

**Service Request:** K1707614

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1706609  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0801F001.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1706609-1	8/1/2017	13:50		8/1/2017	14:00
0801F002.D	Continuing Calibration Verification	KWG1706609-2	8/1/2017	16:06		8/1/2017	16:16
0801F003.D	ZZZZZZ	ZZZZZZ	8/1/2017	16:24		8/1/2017	16:34
0801F004.D	ZZZZZZ	ZZZZZZ	8/1/2017	16:41		8/1/2017	16:51
0801F005.D	ZZZZZZ	ZZZZZZ	8/1/2017	16:59		8/1/2017	17:09
0801F006.D	ZZZZZZ	ZZZZZZ	8/1/2017	17:17		8/1/2017	17:27
0801F007.D	ZZZZZZ	ZZZZZZ	8/1/2017	17:35		8/1/2017	17:45
0801F008.D	IMW-1-07192017	K1707614-001	8/1/2017	17:53		8/1/2017	18:03
0801F009.D	IMV-2-07192017	K1707614-002	8/1/2017	18:11		8/1/2017	18:21
0801F010.D	IP-5-07192017	K1707614-003	8/1/2017	18:29		8/1/2017	18:39
0801F011.D	IP-6-07192017	K1707614-004	8/1/2017	18:47		8/1/2017	18:57
0801F012.D	IP-7-07192017	K1707614-005	8/1/2017	19:04		8/1/2017	19:14
0801F013.D	CG-122-60-07192017	K1707614-006	8/1/2017	19:22		8/1/2017	19:32
0801F014.D	CG-122-75-07192017	K1707614-007	8/1/2017	19:40		8/1/2017	19:50
0801F015.D	CG-9-122-75-07192017	K1707614-008	8/1/2017	19:58		8/1/2017	20:08

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1707614  
**Date Extracted:** 07/25/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1706246  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
IMW-1-07192017	K1707614-001	07/19/17	07/20/17	10ml	2ml	NA	
IMW-1-07192017DL	K1707614-001	07/19/17	07/20/17	10ml	2ml	NA	
IMV-2-07192017DL	K1707614-002	07/19/17	07/20/17	10ml	2ml	NA	
IMV-2-07192017	K1707614-002	07/19/17	07/20/17	10ml	2ml	NA	
IP-5-07192017DL	K1707614-003	07/19/17	07/20/17	10ml	2ml	NA	
IP-5-07192017	K1707614-003	07/19/17	07/20/17	10ml	2ml	NA	
IP-6-07192017DL	K1707614-004	07/19/17	07/20/17	10ml	2ml	NA	
IP-6-07192017	K1707614-004	07/19/17	07/20/17	10ml	2ml	NA	
IP-7-07192017	K1707614-005	07/19/17	07/20/17	10ml	2ml	NA	
IP-7-07192017DL	K1707614-005	07/19/17	07/20/17	10ml	2ml	NA	
CG-122-60-07192017	K1707614-006	07/19/17	07/20/17	10ml	2ml	NA	
CG-122-60-07192017DL	K1707614-006	07/19/17	07/20/17	10ml	2ml	NA	
CG-122-75-07192017DL	K1707614-007	07/19/17	07/20/17	10ml	2ml	NA	
CG-122-75-07192017	K1707614-007	07/19/17	07/20/17	10ml	2ml	NA	
CG-9-122-75-07192017DL	K1707614-008	07/19/17	07/20/17	10ml	2ml	NA	
CG-9-122-75-07192017	K1707614-008	07/19/17	07/20/17	10ml	2ml	NA	
FB1-07192017	K1707614-009	07/19/17	07/20/17	10ml	2ml	NA	
Method Blank	KWG1706246-3	NA	NA	10ml	2ml	NA	
IMW-1-07192017MS	KWG1706246-4	07/19/17	07/20/17	10ml	2ml	NA	
IMW-1-07192017DMS	KWG1706246-5	07/19/17	07/20/17	10ml	2ml	NA	
Lab Control Sample	KWG1706246-1	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1706246-2	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis





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September 26, 2017

**Analytical Report for Service Request No: K1709181**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown ISCO / STRCL-001**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory August 31, 2017  
For your reference, these analyses have been assigned our service request number **K1709181**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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Acronyms

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State Certifications, Accreditations, And Licenses

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Metals

1,4-Dioxane by GCMS

Raw Data

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    Metals

    1,4-Dioxane by GCMS

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1709181  
**Project:** PSC Georgetown ISCO/ STRCL-001      **Date Received:** 08/31/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

### Sample Receipt

Nine water samples were received for analysis at ALS Environmental on 08/31/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

### General Chemistry Parameters

#### **Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

Samples IMW-1-08302017, CG-122-60-08302017, CG-122-75-0830207, CG-9-122-75-08302017 and FB01-08302017 were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

### Total Metals

No anomalies associated with the analysis of these samples were observed.

### 1,4-Dioxane by EPA Method 8270

#### **Elevated Detection Limits:**

Several samples required dilution due to the presence of elevated levels of target analyte. The reporting limits were adjusted to reflect the dilution.

#### **Matrix Spike Recovery Exceptions:**

The control criteria for matrix spike recovery of 1,4-Dioxane for sample IMW-1-08302017 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

Approved by \_\_\_\_\_

*Nael D. O'Neil*



# Chain of Custody

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CHAIN OF CUSTODY

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www.alsglobal.com

SR# K1709181  
COC Set \_\_\_\_\_ of \_\_\_\_\_  
COC# \_\_\_\_\_

375.08

Project Name <u>Sterigade Ground ID</u>		Project Number <u>STRCL-001</u>		NUMBER OF CONTAINERS	24H	7D	28D	180D						Remarks
Project Manager <u>TARYA GIRNY</u>					Appl Env Mic 7-87-1536-1940 /									
Company <u>Dalton, Olmsted, &amp; Englewood (DOE)</u>					8270D / 1,4-Dioxane									
Address <u>Dalton, Olmsted, &amp; Englewood (DOE)</u>					300.0 / SO4									
Phone # <u>206-325-0211</u> email <u>ngirny@doe.wa.gov</u>					8020A / Metals T (Fe)									
Sampler Signature <u>L Kerne</u>		Sampler Printed Name <u>L Kerne</u>												
CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix										
1. <u>IMW-1-08302017</u>		<u>8/30/17</u>	<u>1130</u>	<u>Water</u>	<u>4</u>	<u>0</u>	<u>X</u>	<u>X</u>	<u>X</u>					
2. <u>IMW-2-08302017</u>			<u>1215</u>		<u>4</u>									
3. <u>IP-5-08302017</u>			<u>1420</u>		<u>4</u>								<u>*</u>	
4. <u>IP-6-08302017</u>			<u>1345</u>		<u>4</u>								<u>*</u>	
5. <u>IP-7-08302017</u>			<u>1315</u>		<u>4</u>								<u>*</u>	
6. <u>CG-122-60-08302017</u>			<u>1015</u>		<u>4</u>									
7. <u>CG-122-75-08302017</u>			<u>0935</u>		<u>4</u>									
8. <u>CG-9-122-75-08302017</u>			<u>0940</u>		<u>4</u>									
9. <u>FB01-08302017</u>		<u>*</u>	<u>1020</u>	<u>*</u>	<u>4</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>					
10.														

<b>Report Requirements</b> <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD	<b>Invoice Information</b> P.O.# <u>375.08</u> Bill To: <u>Bill Beck</u> <u>Sterigade</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <u>Fe</u> Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
	<b>Turnaround Requirements</b> <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 Day <input checked="" type="checkbox"/> Standard	Special Instructions/Comments: <u>* IP 5,6,7 have high Na2SO4 concentration</u> <u>- 1,4Dioxane preserved with Ascorbic Acid</u>

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <u>L Kerne</u>	Signature <u>Under Custody</u>	Signature	Signature <u>JANORF</u>	Signature	Signature
Printed Name <u>L. Kerne</u>	Printed Name <u>Sean</u>	Printed Name	Printed Name <u>TRIS</u>	Printed Name	Printed Name
Firm <u>DOE</u>	Firm <u>FEDEX</u>	Firm	Firm <u>8/31/17 0940</u>	Firm	Firm
Date/Time <u>8/30/17 1515</u>	Date/Time <u>8/30/17 1515</u>	Date/Time	Date/Time	Date/Time	Date/Time



PC KC

### Cooler Receipt and Preservation Form

Client Stricocycle Service Request K17 09181  
Received: 8/31/17 Opened: 8/31/17 By: km Unloaded: 8/31/17 By: km

- 1. Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- 3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? 1 Front
- If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
<u>2.3</u>	<u>2.2</u>	<u>6.7</u>	<u>6.6</u>	<u>-0.1</u>	<u>375</u>		<u>7875 0864 2666</u>		

- 1. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- 2. Were custody papers properly filled out (ink, signed, etc.)?  NA  Y  N
- 3. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.*  NA  Y  N  
If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- 4. Were all sample labels complete (i.e analysis, preservation, etc.)?  NA  Y  N
- 5. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*  NA  Y  N
- 6. Were appropriate bottles/containers and volumes received for the tests indicated?  NA  Y  N
- 7. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA  Y  N
- 8. Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
- 9. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

# SHORT HOLD TIME



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-08302017	K1709181-001	<b>811</b>	20	2	200	09/07/17 21:46	9/7/17	
IMW-2-08302017	K1709181-002	<b>386</b>	20	2	200	09/07/17 21:55	9/7/17	
IP-5-08302017	K1709181-003	<b>599</b>	20	2	200	09/07/17 22:15	9/7/17	
IP-6-08302017	K1709181-004	<b>75</b>	20	2	200	09/07/17 22:24	9/7/17	
IP-7-08302017	K1709181-005	<b>398</b>	20	2	200	09/07/17 22:34	9/7/17	
CG-122-60-08302017	K1709181-006	<b>234</b>	20	2	200	09/07/17 22:05	9/7/17	
CG-122-75-08302017	K1709181-007	ND U	0.20	0.02	2	09/07/17 22:43	9/7/17	
CG-9-122-75-08302017	K1709181-008	ND U	0.20	0.02	2	09/07/17 22:53	9/7/17	
FB01-08302017	K1709181-009	ND U	0.10	0.01	1	09/07/17 23:03	9/7/17	
Method Blank	K1709181-MB	ND U	0.10	0.01	1	09/07/17 21:17	9/7/17	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17

**Units:** mg/L  
**Basis:** NA

Replicate Sample Summary  
Sulfate

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
IMW-1-08302017	K1709181-001DUP	20	2	811	789	800	3	20	09/08/17
Batch QC	K1709277-001DUP	1.0	0.1	8.4	8.6	8.48	2	20	09/07/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Date Analyzed:** 09/8/17  
**Date Extracted:** 09/7/17

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** IMW-1-08302017  
**Lab Code:** K1709181-001  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike K1709181-001MS		Duplicate Matrix Spike K1709181-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	811	1570	800	95	1570	800	95	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 09/7/17  
**Date Extracted:** 09/7/17

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1709277-001 **Basis:** NA  
**Analysis Method:** 300.0  
**Prep Method:** Method

Analyte Name	Sample Result	Result	Matrix Spike K1709277-001MS		Duplicate Matrix Spike K1709277-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	8.4	47.2	40.0	97	47.5	40.0	98	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Analyzed:** 09/07/17  
**Date Extracted:** 09/07/17

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 561138

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1709181-LCS	4.95	5.00	99	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	561138	KQ1713020-01	09/07/17 21:27	5.00	4.86	97	90-110
CCV2	561138	KQ1713020-02	09/07/17 23:22	5.00	4.88	98	90-110
CCV3	561138	KQ1713020-03	09/08/17 01:17	5.00	4.92	98	90-110
CCV4	561138	KQ1713020-04	09/08/17 02:34	5.00	4.92	98	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:**K1709181

**Continuing Calibration Blank (CCB) Summary**  
Sulfate

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	561138	KQ1713020-05	09/07/17 21:36	0.10	0.01	ND	U
CCB2	561138	KQ1713020-06	09/07/17 23:31	0.10	0.01	ND	U
CCB3	561138	KQ1713020-07	09/08/17 01:27	0.10	0.01	ND	U
CCB4	561138	KQ1713020-08	09/08/17 02:44	0.10	0.01	ND	U

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-08302017	K1709181-001	<b>1.96</b>	0.20	0.05	1	08/31/17 12:00	*
IMW-2-08302017	K1709181-002	<b>0.54</b>	0.20	0.05	1	08/31/17 12:00	*
CG-122-60-08302017	K1709181-006	ND U	0.20	0.05	1	08/31/17 12:00	*
CG-122-75-08302017	K1709181-007	ND U	0.20	0.05	1	08/31/17 12:00	*
CG-9-122-75-08302017	K1709181-008	ND U	0.20	0.05	1	08/31/17 12:00	*
FB01-08302017	K1709181-009	ND U	0.20	0.05	1	08/31/17 12:00	*
Method Blank	K1709181-MB	ND U	0.20	0.05	1	08/31/17 12:00	*

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Date Analyzed:** 08/31/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-122-60-08302017  
**Lab Code:** K1709181-006

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1709181-006DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Date Analyzed:** 08/31/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-122-60-08302017  
**Lab Code:** K1709181-006  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1709181-006MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	ND U	2.01	2.00	101	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	560080	KQ1712571-04	08/31/17 12:00	4.00	3.74	94	90-110
CCV2	560080	KQ1712571-05	08/31/17 12:00	4.00	3.75	94	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:**K1709181

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	560080	KQ1712571-02	08/31/17 12:00	0.20	0.05	ND	U
CCB2	560080	KQ1712571-03	08/31/17 12:00	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-08302017  
**Lab Code:** K1709181-001

**Service Request:** K1709181  
**Date Collected:** 08/30/17 11:30  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	8.22	mg/L	0.0040	0.0006	2	09/21/17 16:57	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-08302017  
**Lab Code:** K1709181-002

**Service Request:** K1709181  
**Date Collected:** 08/30/17 12:15  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>10.9</b>	mg/L	0.0040	0.0006	2	09/21/17 17:12	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-5-08302017  
**Lab Code:** K1709181-003

**Service Request:** K1709181  
**Date Collected:** 08/30/17 14:20  
**Date Received:** 08/31/17 09:40

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.224</b>	mg/L	0.0040	0.0006	2	09/21/17 17:14	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-6-08302017  
**Lab Code:** K1709181-004

**Service Request:** K1709181  
**Date Collected:** 08/30/17 13:45  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	<b>0.440</b>	mg/L	0.0040	0.0006	2	09/21/17 17:16	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** IP-7-08302017  
**Lab Code:** K1709181-005

**Service Request:** K1709181  
**Date Collected:** 08/30/17 13:15  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.0750	mg/L	0.0040	0.0006	2	09/21/17 17:18	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-08302017  
**Lab Code:** K1709181-006

**Service Request:** K1709181  
**Date Collected:** 08/30/17 10:15  
**Date Received:** 08/31/17 09:40

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	2.68	mg/L	0.0040	0.0006	2	09/21/17 17:20	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-08302017  
**Lab Code:** K1709181-007

**Service Request:** K1709181  
**Date Collected:** 08/30/17 09:35  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	1.52	mg/L	0.0040	0.0006	2	09/21/17 17:23	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-75-08302017  
**Lab Code:** K1709181-008

**Service Request:** K1709181  
**Date Collected:** 08/30/17 09:40  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	1.55	mg/L	0.0040	0.0006	2	09/21/17 17:25	09/08/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** FB01-08302017  
**Lab Code:** K1709181-009

**Service Request:** K1709181  
**Date Collected:** 08/30/17 10:20  
**Date Received:** 08/31/17 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0489</b>	mg/L	0.0040	0.0006	2	09/21/17 17:27	09/08/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1712886-01

**Service Request:** K1709181  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	ND U	mg/L	0.0020	0.0003	1	09/21/17 16:52	09/08/17	

ALS Group USA, Corp.

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: PSC Georgetown ISCO/STRCL-001  
Sample Matrix: Water

Service Request: K1709181  
Date Collected: 08/30/17  
Date Received: 08/31/17  
Date Analyzed: 09/21/17

Replicate Sample Summary

Total Metals

Sample Name: IMW-1-08302017  
Lab Code: K1709181-001

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1712886-03 Result			
Iron	6020A	0.0040	0.0006	8.22	8.22	8.22	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/17  
**Date Received:** 08/31/17  
**Date Analyzed:** 09/21/17  
**Date Extracted:** 09/8/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** IMW-1-08302017  
**Lab Code:** K1709181-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1712886-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	8.22	8.28	0.0500	105 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Analyzed:** 09/21/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1712886-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0529	0.0500	106	80-120

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:**K1709181

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**297557

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-08302017	K1709181-001	8/30/17	8/31/17	10 mL	10 mL	
IMW-2-08302017	K1709181-002	8/30/17	8/31/17	10 mL	10 mL	
IP-5-08302017	K1709181-003	8/30/17	8/31/17	10 mL	10 mL	
IP-6-08302017	K1709181-004	8/30/17	8/31/17	10 mL	10 mL	
IP-7-08302017	K1709181-005	8/30/17	8/31/17	10 mL	10 mL	
CG-122-60-08302017	K1709181-006	8/30/17	8/31/17	10 mL	10 mL	
CG-122-75-08302017	K1709181-007	8/30/17	8/31/17	10 mL	10 mL	
CG-9-122-75-08302017	K1709181-008	8/30/17	8/31/17	10 mL	10 mL	
FB01-08302017	K1709181-009	8/30/17	8/31/17	10 mL	10 mL	
Method Blank	KQ1712886-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1712886-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1712886-03DUP	8/30/17	8/31/17	10 mL	10 mL	
Matrix Spike	KQ1712886-04MS	8/30/17	8/31/17	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	562688	50.0	49.5	99	250	240	96	250	242	97

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	562688				250	243	97			



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	562688	0.3	U	0.3	U	0.3	U	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	562688	1.04	1.0	104	70-130	09/21/17 16:44
LLCCV	Iron	6020A	562688	1.02	1.0	102	70-130	09/21/17 17:33

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	562688	43800	-	-	-	09/21/17 16:46

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	562688	43900	-	-	-	09/21/17 16:48

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1709181-001SDL	Iron	6020A	562688	8220	8350	1	10	09/21/17 17:01

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-06

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	45000	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 562688

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	09/21/17 16:31	
ZZZZZZ	1	09/21/17 16:33	
ICV	1	09/21/17 16:35	X
CCV	1	09/21/17 16:37	X
ICB	1	09/21/17 16:39	X
CCB	1	09/21/17 16:41	X
LLICVW	1	09/21/17 16:44	X
ICSA	1	09/21/17 16:46	X
ICSAB	1	09/21/17 16:48	X
ZZZZZZ	1	09/21/17 16:50	
KQ1712886-01MB	1	09/21/17 16:52	
KQ1712886-02LCS	1	09/21/17 16:54	
K1709181-001	2	09/21/17 16:57	
K1709181-001DUP	2	09/21/17 16:59	
K1709181-001SDL	10	09/21/17 17:01	
ZZZZZZ	2	09/21/17 17:03	
K1709181-001MS	2	09/21/17 17:05	
CCV	1	09/21/17 17:07	X
CCB	1	09/21/17 17:10	X
K1709181-002	2	09/21/17 17:12	X
K1709181-003	2	09/21/17 17:14	X
K1709181-004	2	09/21/17 17:16	X
K1709181-005	2	09/21/17 17:18	X
K1709181-006	2	09/21/17 17:20	X
K1709181-007	2	09/21/17 17:23	X
K1709181-008	2	09/21/17 17:25	X
K1709181-009	2	09/21/17 17:27	X
CCV	1	09/21/17 17:29	X
CCB	1	09/21/17 17:31	X
LLCCV	1	09/21/17 17:33	X



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 562688

Sample	Date/Time	Ge72He
ZZZZZZ	09/21/17 16:31	
ZZZZZZ	09/21/17 16:33	
ICV	09/21/17 16:35	101
CCV	09/21/17 16:37	104
ICB	09/21/17 16:39	102
CCB	09/21/17 16:41	102
LLICVW	09/21/17 16:44	103
ICSA	09/21/17 16:46	101
ICSAB	09/21/17 16:48	98
ZZZZZZ	09/21/17 16:50	
KQ1712886-01MB	09/21/17 16:52	90
KQ1712886-02LCS	09/21/17 16:54	100
K1709181-001	09/21/17 16:57	96
K1709181-001DUP	09/21/17 16:59	95
K1709181-001SDL	09/21/17 17:01	102
ZZZZZZ	09/21/17 17:03	
K1709181-001MS	09/21/17 17:05	95
CCV	09/21/17 17:07	106
CCB	09/21/17 17:10	105
K1709181-002	09/21/17 17:12	99
K1709181-003	09/21/17 17:14	91
K1709181-004	09/21/17 17:16	100
K1709181-005	09/21/17 17:18	91
K1709181-006	09/21/17 17:20	102
K1709181-007	09/21/17 17:23	102
K1709181-008	09/21/17 17:25	101
K1709181-009	09/21/17 17:27	105
CCV	09/21/17 17:29	106
CCB	09/21/17 17:31	106
LLCCV	09/21/17 17:33	108



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
IMW-1-08302017	K1709181-001	08/30/2017	08/31/2017
IMW-2-08302017	K1709181-002	08/30/2017	08/31/2017
IP-5-08302017	K1709181-003	08/30/2017	08/31/2017
IP-6-08302017	K1709181-004	08/30/2017	08/31/2017
IP-7-08302017	K1709181-005	08/30/2017	08/31/2017
CG-122-60-08302017	K1709181-006	08/30/2017	08/31/2017
CG-122-75-08302017	K1709181-007	08/30/2017	08/31/2017
CG-9-122-75-08302017	K1709181-008	08/30/2017	08/31/2017
FB01-08302017	K1709181-009	08/30/2017	08/31/2017
IMW-1-08302017MS	KWG1707873-1	08/30/2017	08/31/2017
IMW-1-08302017DMS	KWG1707873-2	08/30/2017	08/31/2017

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** IMW-1-08302017  
**Lab Code:** K1709181-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	150	D	2.0	0.80	5	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** IMW-2-08302017  
**Lab Code:** K1709181-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	320	D	4.0	1.6	10	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	75	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-5-08302017  
**Lab Code:** K1709181-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	120	D	2.0	0.80	5	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	84	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-6-08302017  
**Lab Code:** K1709181-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	190	D	2.0	0.80	5	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	86	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** IP-7-08302017  
**Lab Code:** K1709181-005  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	50	D	0.80	0.32	2	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	91	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_



Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-122-60-08302017  
**Lab Code:** K1709181-006  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	270	D	4.0	1.6	10	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	96	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-122-75-08302017  
**Lab Code:** K1709181-007  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	88	D	2.0	0.80	5	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	90	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-9-122-75-08302017  
**Lab Code:** K1709181-008  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	89	D	2.0	0.80	5	09/06/17	09/21/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** 08/30/2017  
**Date Received:** 08/31/2017

1,4-Dioxane by GCMS

**Sample Name:** FB01-08302017  
**Lab Code:** K1709181-009  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	09/06/17	09/20/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	93	64-120	09/20/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1707873-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	09/06/17	09/19/17	KWG1707873	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	89	64-120	09/19/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
IMW-1-08302017	K1709181-001	93
IMW-2-08302017	K1709181-002	75
IP-5-08302017	K1709181-003	84
IP-6-08302017	K1709181-004	86
IP-7-08302017	K1709181-005	91
CG-122-60-08302017	K1709181-006	96
CG-122-75-08302017	K1709181-007	90
CG-9-122-75-08302017	K1709181-008	93
FB01-08302017	K1709181-009	93
Method Blank	KWG1707873-5	89
IMW-1-08302017MS	KWG1707873-1	98
IMW-1-08302017DMS	KWG1707873-2	91
Lab Control Sample	KWG1707873-3	100
Duplicate Lab Control Sample	KWG1707873-4	97

**Surrogate Recovery Control Limits (%)**

---

Sur1 = 1,4-Dioxane-d8 64-120

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/19/2017  
**Time Analyzed:** 22:17

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\091917\0919F033.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1708451-2  
**Analysis Lot:** KWG1708451

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	31,371	5.25
<b>Upper Limit ==&gt;</b>	62,742	5.75
<b>Lower Limit ==&gt;</b>	15,686	4.75
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Method Blank	KWG1707873-5	29,302	5.25
Lab Control Sample	KWG1707873-3	30,400	5.25
Duplicate Lab Control Sample	KWG1707873-4	29,051	5.25
IMW-1-08302017MS	KWG1707873-1	28,604	5.25
IMW-1-08302017DMS	KWG1707873-2	30,073	5.25
IMW-1-08302017	K1709181-001	29,024	5.25
IMW-2-08302017	K1709181-002	28,595	5.25
IP-5-08302017	K1709181-003	29,831	5.25
IP-6-08302017	K1709181-004	29,506	5.25
IP-7-08302017	K1709181-005	28,798	5.25
CG-122-60-08302017	K1709181-006	27,050	5.25
CG-122-75-08302017	K1709181-007	31,494	5.25
CG-9-122-75-08302017	K1709181-008	27,694	5.25
FB01-08302017	K1709181-009	29,378	5.25

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/21/2017  
**Time Analyzed:** 09:17

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092117\0921F004.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1708452-2  
**Analysis Lot:** KWG1708452

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	34,184	5.25
<b>Upper Limit ==&gt;</b>	68,368	5.75
<b>Lower Limit ==&gt;</b>	17,092	4.75
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Sample ID	Reference ID	Area	RT
IMW-1-08302017DL	K1709181-001	28,158	5.25
IMW-2-08302017DL	K1709181-002	28,440	5.25
IP-5-08302017DL	K1709181-003	29,015	5.24
IP-6-08302017DL	K1709181-004	33,117	5.25
IP-7-08302017DL	K1709181-005	30,103	5.25
CG-122-60-08302017DL	K1709181-006	30,629	5.25
CG-122-75-08302017DL	K1709181-007	27,509	5.25
CG-9-122-75-08302017DL	K1709181-008	29,674	5.25

Results flagged with an asterisk (\*) indicate values outside control criteria.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Extracted:** 09/06/2017  
**Date Analyzed:** 09/19/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** IMW-1-08302017  
**Lab Code:** K1709181-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1707873

Analyte Name	Sample Result	IMW-1-08302017MS KWG1707873-1 Matrix Spike			IMW-1-08302017DMS KWG1707873-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	150	155E	10.0	18 #	148E	10.0	-52 #	49-113	5	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Extracted:** 09/06/2017  
**Date Analyzed:** 09/19/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1707873

Analyte Name	Lab Control Sample KWG1707873-3 Lab Control Spike			Duplicate Lab Control Sample KWG1707873-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	9.79	10.0	98	9.70	10.0	97	59-111	1	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Extracted:** 09/06/2017  
**Date Analyzed:** 09/19/2017  
**Time Analyzed:** 22:35

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1707873-5 **File ID:** J:\MS26\DATA\091917\0919F034.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1707873

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1707873-3	J:\MS26\DATA\091917\0919F035.D	09/19/17	22:53
Duplicate Lab Control Sample	KWG1707873-4	J:\MS26\DATA\091917\0919F036.D	09/19/17	23:10
IMW-1-08302017MS	KWG1707873-1	J:\MS26\DATA\091917\0919F037.D	09/19/17	23:28
IMW-1-08302017DMS	KWG1707873-2	J:\MS26\DATA\091917\0919F038.D	09/19/17	23:46
IMW-1-08302017	K1709181-001	J:\MS26\DATA\091917\0919F039.D	09/20/17	00:04
IMW-2-08302017	K1709181-002	J:\MS26\DATA\091917\0919F040.D	09/20/17	00:22
IP-5-08302017	K1709181-003	J:\MS26\DATA\091917\0919F041.D	09/20/17	00:40
IP-6-08302017	K1709181-004	J:\MS26\DATA\091917\0919F042.D	09/20/17	00:57
IP-7-08302017	K1709181-005	J:\MS26\DATA\091917\0919F043.D	09/20/17	01:15
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\091917\0919F044.D	09/20/17	01:33
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\091917\0919F045.D	09/20/17	01:51
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\091917\0919F046.D	09/20/17	02:09
FB01-08302017	K1709181-009	J:\MS26\DATA\091917\0919F047.D	09/20/17	02:26
IMW-1-08302017	K1709181-001	J:\MS26\DATA\092117\0921F018.D	09/21/17	13:51
IMW-2-08302017	K1709181-002	J:\MS26\DATA\092117\0921F019.D	09/21/17	14:09
IP-5-08302017	K1709181-003	J:\MS26\DATA\092117\0921F020.D	09/21/17	14:26
IP-6-08302017	K1709181-004	J:\MS26\DATA\092117\0921F021.D	09/21/17	14:44
IP-7-08302017	K1709181-005	J:\MS26\DATA\092117\0921F022.D	09/21/17	15:02
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\092117\0921F023.D	09/21/17	15:19
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\092117\0921F024.D	09/21/17	15:37
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\092117\0921F025.D	09/21/17	15:55

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Extracted:** 09/06/2017  
**Date Analyzed:** 09/19/2017  
**Time Analyzed:** 22:53

**Lab Control Sample Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Lab Control Sample  
**Lab Code:** KWG1707873-3  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM  
**Instrument ID:** MS26  
**File ID:** J:\MS26\DATA\091917\0919F035.D  
**Level:** Low  
**Extraction Lot:** KWG1707873

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1707873-5	J:\MS26\DATA\091917\0919F034.D	09/19/17	22:35
IMW-1-08302017MS	KWG1707873-1	J:\MS26\DATA\091917\0919F037.D	09/19/17	23:28
IMW-1-08302017DMS	KWG1707873-2	J:\MS26\DATA\091917\0919F038.D	09/19/17	23:46
IMW-1-08302017	K1709181-001	J:\MS26\DATA\091917\0919F039.D	09/20/17	00:04
IMW-2-08302017	K1709181-002	J:\MS26\DATA\091917\0919F040.D	09/20/17	00:22
IP-5-08302017	K1709181-003	J:\MS26\DATA\091917\0919F041.D	09/20/17	00:40
IP-6-08302017	K1709181-004	J:\MS26\DATA\091917\0919F042.D	09/20/17	00:57
IP-7-08302017	K1709181-005	J:\MS26\DATA\091917\0919F043.D	09/20/17	01:15
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\091917\0919F044.D	09/20/17	01:33
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\091917\0919F045.D	09/20/17	01:51
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\091917\0919F046.D	09/20/17	02:09
FB01-08302017	K1709181-009	J:\MS26\DATA\091917\0919F047.D	09/20/17	02:26
IMW-1-08302017	K1709181-001	J:\MS26\DATA\092117\0921F018.D	09/21/17	13:51
IMW-2-08302017	K1709181-002	J:\MS26\DATA\092117\0921F019.D	09/21/17	14:09
IP-5-08302017	K1709181-003	J:\MS26\DATA\092117\0921F020.D	09/21/17	14:26
IP-6-08302017	K1709181-004	J:\MS26\DATA\092117\0921F021.D	09/21/17	14:44
IP-7-08302017	K1709181-005	J:\MS26\DATA\092117\0921F022.D	09/21/17	15:02
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\092117\0921F023.D	09/21/17	15:19
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\092117\0921F024.D	09/21/17	15:37
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\092117\0921F025.D	09/21/17	15:55

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/19/2017  
**Time Analyzed:** 21:59

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\091917\0919F032.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1708451

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	17.1	4937	PASS
68	69	0	2	0.8	51	PASS
69	198	0	100	21.8	6309	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	37.2	10738	PASS
197	198	0	2	0.2	61	PASS
198	442	30	100	80.0	28896	PASS
199	198	5	9	6.8	1952	PASS
275	198	10	60	31.2	9009	PASS
365	442	1	50	3.0	1067	PASS
441	443	0	100	77.1	5513	PASS
442	442	100	100	100.0	36101	PASS
443	442	15	24	19.8	7150	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1708451-2	J:\MS26\DATA\091917\0919F033.D	09/19/2017	22:17	
Method Blank	KWG1707873-5	J:\MS26\DATA\091917\0919F034.D	09/19/2017	22:35	
Lab Control Sample	KWG1707873-3	J:\MS26\DATA\091917\0919F035.D	09/19/2017	22:53	
Duplicate Lab Control Sample	KWG1707873-4	J:\MS26\DATA\091917\0919F036.D	09/19/2017	23:10	
IMW-1-08302017MS	KWG1707873-1	J:\MS26\DATA\091917\0919F037.D	09/19/2017	23:28	
IMW-1-08302017DMS	KWG1707873-2	J:\MS26\DATA\091917\0919F038.D	09/19/2017	23:46	
IMW-1-08302017	K1709181-001	J:\MS26\DATA\091917\0919F039.D	09/20/2017	00:04	
IMW-2-08302017	K1709181-002	J:\MS26\DATA\091917\0919F040.D	09/20/2017	00:22	
IP-5-08302017	K1709181-003	J:\MS26\DATA\091917\0919F041.D	09/20/2017	00:40	
IP-6-08302017	K1709181-004	J:\MS26\DATA\091917\0919F042.D	09/20/2017	00:57	
IP-7-08302017	K1709181-005	J:\MS26\DATA\091917\0919F043.D	09/20/2017	01:15	
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\091917\0919F044.D	09/20/2017	01:33	
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\091917\0919F045.D	09/20/2017	01:51	
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\091917\0919F046.D	09/20/2017	02:09	
FB01-08302017	K1709181-009	J:\MS26\DATA\091917\0919F047.D	09/20/2017	02:26	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/21/2017  
**Time Analyzed:** 08:59

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092117\0921F003.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1708452

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.2	4319	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	20.4	5431	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	35.5	9445	PASS
197	198	0	2	0.2	64	PASS
198	442	30	100	62.6	26600	PASS
199	198	5	9	6.7	1788	PASS
275	198	10	60	33.7	8963	PASS
365	442	1	50	2.7	1147	PASS
441	443	0	100	77.7	6484	PASS
442	442	100	100	100.0	42496	PASS
443	442	15	24	19.6	8347	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1708452-2	J:\MS26\DATA\092117\0921F004.D	09/21/2017	09:17	
IMW-1-08302017	K1709181-001	J:\MS26\DATA\092117\0921F018.D	09/21/2017	13:51	
IMW-2-08302017	K1709181-002	J:\MS26\DATA\092117\0921F019.D	09/21/2017	14:09	
IP-5-08302017	K1709181-003	J:\MS26\DATA\092117\0921F020.D	09/21/2017	14:26	
IP-6-08302017	K1709181-004	J:\MS26\DATA\092117\0921F021.D	09/21/2017	14:44	
IP-7-08302017	K1709181-005	J:\MS26\DATA\092117\0921F022.D	09/21/2017	15:02	
CG-122-60-08302017	K1709181-006	J:\MS26\DATA\092117\0921F023.D	09/21/2017	15:19	
CG-122-75-08302017	K1709181-007	J:\MS26\DATA\092117\0921F024.D	09/21/2017	15:37	
CG-9-122-75-08302017	K1709181-008	J:\MS26\DATA\092117\0921F025.D	09/21/2017	15:55	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\071817\0718F006.D	E	J:\MS26\DATA\071817\0718F010.D
B	J:\MS26\DATA\071817\0718F007.D	F	J:\MS26\DATA\071817\0718F011.D
C	J:\MS26\DATA\071817\0718F008.D	G	J:\MS26\DATA\071817\0718F012.D
D	J:\MS26\DATA\071817\0718F009.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.410	B	4.0	0.390	C	10	0.358	D	20	0.374	E	50	0.374
	F	100	0.374	G	200	0.375									
1,4-Dioxane-d8	A	2.0	0.383	B	4.0	0.397	C	10	0.387	D	20	0.382	E	50	0.371
	F	100	0.368	G	200	0.372									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	4.3		≤ 20	0.379		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	2.7		≤ 20	0.380		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Calibration Date:** 07/18/2017  
**Date Analyzed:** 07/18/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15481  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071817\0718F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.379	0.384	1	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/19/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1708451  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\091917\0919F033.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.01	0.379	0.371	-2	NA	± 20	AverageRF
1,4-Dioxane-d8	20	20	0.01	0.380	0.379	0	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181  
**Date Analyzed:** 09/21/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1708452  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\092117\0921F004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.369	-3	NA	± 20	AverageRF
1,4-Dioxane-d8	20	20	0.01	0.380	0.383	1	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1708451  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0919F032.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1708451-1	9/19/2017	21:59		9/19/2017	22:09
0919F033.D	Continuing Calibration Verification	KWG1708451-2	9/19/2017	22:17		9/19/2017	22:27
0919F034.D	Method Blank	KWG1707873-5	9/19/2017	22:35		9/19/2017	22:45
0919F035.D	Lab Control Sample	KWG1707873-3	9/19/2017	22:53		9/19/2017	23:03
0919F036.D	Duplicate Lab Control Sample	KWG1707873-4	9/19/2017	23:10		9/19/2017	23:20
0919F037.D	IMW-1-08302017MS	KWG1707873-1	9/19/2017	23:28		9/19/2017	23:38
0919F038.D	IMW-1-08302017DMS	KWG1707873-2	9/19/2017	23:46		9/19/2017	23:56
0919F039.D	IMW-1-08302017	K1709181-001	9/20/2017	00:04		9/20/2017	00:14
0919F040.D	IMW-2-08302017	K1709181-002	9/20/2017	00:22		9/20/2017	00:32
0919F041.D	IP-5-08302017	K1709181-003	9/20/2017	00:40		9/20/2017	00:50
0919F042.D	IP-6-08302017	K1709181-004	9/20/2017	00:57		9/20/2017	01:07
0919F043.D	IP-7-08302017	K1709181-005	9/20/2017	01:15		9/20/2017	01:25
0919F044.D	CG-122-60-08302017	K1709181-006	9/20/2017	01:33		9/20/2017	01:43
0919F045.D	CG-122-75-08302017	K1709181-007	9/20/2017	01:51		9/20/2017	02:01
0919F046.D	CG-9-122-75-08302017	K1709181-008	9/20/2017	02:09		9/20/2017	02:19
0919F047.D	FB01-08302017	K1709181-009	9/20/2017	02:26		9/20/2017	02:36
0919F048.D	ZZZZZZ	ZZZZZZ	9/20/2017	02:44		9/20/2017	02:54
0919F049.D	ZZZZZZ	ZZZZZZ	9/20/2017	03:02		9/20/2017	03:12
0919F050.D	ZZZZZZ	ZZZZZZ	9/20/2017	03:20		9/20/2017	03:30
0919F051.D	ZZZZZZ	ZZZZZZ	9/20/2017	03:38		9/20/2017	03:48
0919F052.D	ZZZZZZ	ZZZZZZ	9/20/2017	03:55		9/20/2017	04:05

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001

**Service Request:** K1709181

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1708452  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0921F003.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1708452-1	9/21/2017	08:59		9/21/2017	09:09
0921F004.D	Continuing Calibration Verification	KWG1708452-2	9/21/2017	09:17		9/21/2017	09:27
0921F006.D	ZZZZZZ	ZZZZZZ	9/21/2017	10:19		9/21/2017	10:29
0921F007.D	ZZZZZZ	ZZZZZZ	9/21/2017	10:37		9/21/2017	10:47
0921F008.D	ZZZZZZ	ZZZZZZ	9/21/2017	10:54		9/21/2017	11:04
0921F009.D	ZZZZZZ	ZZZZZZ	9/21/2017	11:12		9/21/2017	11:22
0921F010.D	ZZZZZZ	ZZZZZZ	9/21/2017	11:30		9/21/2017	11:40
0921F011.D	ZZZZZZ	ZZZZZZ	9/21/2017	11:47		9/21/2017	11:57
0921F012.D	ZZZZZZ	ZZZZZZ	9/21/2017	12:05		9/21/2017	12:15
0921F013.D	ZZZZZZ	ZZZZZZ	9/21/2017	12:23		9/21/2017	12:33
0921F014.D	ZZZZZZ	ZZZZZZ	9/21/2017	12:40		9/21/2017	12:50
0921F015.D	ZZZZZZ	ZZZZZZ	9/21/2017	12:58		9/21/2017	13:08
0921F016.D	ZZZZZZ	ZZZZZZ	9/21/2017	13:16		9/21/2017	13:26
0921F017.D	ZZZZZZ	ZZZZZZ	9/21/2017	13:33		9/21/2017	13:43
0921F018.D	IMW-1-08302017	K1709181-001	9/21/2017	13:51		9/21/2017	14:01
0921F019.D	IMW-2-08302017	K1709181-002	9/21/2017	14:09		9/21/2017	14:19
0921F020.D	IP-5-08302017	K1709181-003	9/21/2017	14:26		9/21/2017	14:36
0921F021.D	IP-6-08302017	K1709181-004	9/21/2017	14:44		9/21/2017	14:54
0921F022.D	IP-7-08302017	K1709181-005	9/21/2017	15:02		9/21/2017	15:12
0921F023.D	CG-122-60-08302017	K1709181-006	9/21/2017	15:19		9/21/2017	15:29
0921F024.D	CG-122-75-08302017	K1709181-007	9/21/2017	15:37		9/21/2017	15:47
0921F025.D	CG-9-122-75-08302017	K1709181-008	9/21/2017	15:55		9/21/2017	16:05
0921F026.D	ZZZZZZ	ZZZZZZ	9/21/2017	16:12		9/21/2017	16:22

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown ISCO/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709181  
**Date Extracted:** 09/06/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1707873  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
IMW-1-08302017	K1709181-001	08/30/17	08/31/17	10ml	2ml	NA	
IMW-1-08302017DL	K1709181-001	08/30/17	08/31/17	10ml	2ml	NA	
IMW-2-08302017DL	K1709181-002	08/30/17	08/31/17	10ml	2ml	NA	
IMW-2-08302017	K1709181-002	08/30/17	08/31/17	10ml	2ml	NA	
IP-5-08302017DL	K1709181-003	08/30/17	08/31/17	10ml	2ml	NA	
IP-5-08302017	K1709181-003	08/30/17	08/31/17	10ml	2ml	NA	
IP-6-08302017DL	K1709181-004	08/30/17	08/31/17	10ml	2ml	NA	
IP-6-08302017	K1709181-004	08/30/17	08/31/17	10ml	2ml	NA	
IP-7-08302017	K1709181-005	08/30/17	08/31/17	10ml	2ml	NA	
IP-7-08302017DL	K1709181-005	08/30/17	08/31/17	10ml	2ml	NA	
CG-122-60-08302017	K1709181-006	08/30/17	08/31/17	10ml	2ml	NA	
CG-122-60-08302017DL	K1709181-006	08/30/17	08/31/17	10ml	2ml	NA	
CG-122-75-08302017DL	K1709181-007	08/30/17	08/31/17	10ml	2ml	NA	
CG-122-75-08302017	K1709181-007	08/30/17	08/31/17	10ml	2ml	NA	
CG-9-122-75-08302017DL	K1709181-008	08/30/17	08/31/17	10ml	2ml	NA	
CG-9-122-75-08302017	K1709181-008	08/30/17	08/31/17	10ml	2ml	NA	
FB01-08302017	K1709181-009	08/30/17	08/31/17	10ml	2ml	NA	
Method Blank	KWG1707873-5	NA	NA	10ml	2ml	NA	
IMW-1-08302017MS	KWG1707873-1	08/30/17	08/31/17	10ml	2ml	NA	
IMW-1-08302017DMS	KWG1707873-2	08/30/17	08/31/17	10ml	2ml	NA	
Lab Control Sample	KWG1707873-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1707873-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis



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October 11, 2017

**Analytical Report for Service Request No: K1709916**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown I5B / STRCL-001**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory September 19, 2017  
For your reference, these analyses have been assigned our service request number **K1709916**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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Acronyms

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1,4-Dioxane by GCMS

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    General Chemistry

    Metals

    1,4-Dioxane by GCMS



## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Stericycle Environmental Solutions, Inc.      **Service Request No.:** K1709916  
**Project:** PSC Georgetown I5B/ STRCL-001      **Date Received:** 09/19/17  
**Sample Matrix:** Water

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Five water samples were received for analysis at ALS Environmental on 09/19/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### General Chemistry Parameters

##### **Nitrate as Nitrogen by EPA Method 300.0:**

Samples 001 thru 004 were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

##### **Divalent Iron (Ferrous Iron) by ApplEnvMic7-87-1536-1540:**

All samples were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

#### Total Metals

No anomalies associated with the analysis of these samples were observed.

#### 1,4-Dioxane by EPA Method 8270

##### **Elevated Detection Limits:**

All field samples required dilution due to the presence of elevated levels of target analyte. The reporting limits were adjusted to reflect the dilution.

No other anomalies associated with the analysis of these samples were observed.

Approved by \_\_\_\_\_

*Noel D. O'Neil*



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)



CHAIN OF CUSTODY

81268

005

SR# K1701916  
 COC Set \_\_\_\_\_ of \_\_\_\_\_  
 COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-895-7222 / FAX (360) 636-1068  
 www.alsglobal.com

Project Name: <u>Georgetown ISB</u>		Project Number: <u>STRCL-001</u>		NUMBER OF CONTAINERS	24H	48H	7D	180D						Remarks
Project Manager: <u>TASYA GRAY</u>					ApplEnvMic7-87-1536-1540/									
Company: <u>DOF</u>					300.0 / NO2									
Address: <u>1001 S Klickitat Way, Suite 200B, Seila WA</u>					8270D / 1,4-Dioxane									
Phone # <u>206-375-0211</u>		email <u>98134</u>			9020A / Metals T									
Sampler Signature: <u>[Signature]</u>		Sampler Printed Name: <u>L. Kerner</u>												
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix										
1. <u>CG-17-40-1G-091717</u>		<u>9/17/17</u>	<u>1002</u>	<u>W</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>					
2. <u>CG-17-40-091717</u>		<u>1030</u>	<u>W</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>						
3. <u>CG-17-40-091717</u>		<u>1035</u>	<u>W</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>						
4. <u>CG-17-75-1G-091717</u>		<u>1150</u>	<u>W</u>	<u>4</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>						
5. <u>CG-17-75-091717</u>		<u>1215</u>	<u>W</u>	<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>						<u>X2 Perform MSMSDU/extra volume</u>
6.														
7.														
8.														
9.														
10.														

**Report Requirements**

I. Routine Report: Method Blank, Surrogate, as required

II. Report Dup., MS, MSD as required

III. CLP Like Summary (no raw data)

IV. Data Validation Report

V. EDD

**Invoice Information**

P.O.# 375.08

Bill To: STEREILITE

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**Turnaround Requirements**

24 hr.  48 hr.

5 Day

Standard

Requested Report Date \_\_\_\_\_

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu  Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: \_\_\_\_\_

\*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other \_\_\_\_\_ (Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <u>[Signature]</u>	Signature <u>FEDER under</u>	Signature _____	Signature <u>[Signature]</u>	Signature _____	Signature _____
Printed Name <u>Lucas Kerner</u>	Printed Name <u>Custody Seal</u>	Printed Name _____	Printed Name <u>[Signature]</u>	Printed Name _____	Printed Name _____
Firm <u>DOF</u>	Firm _____	Firm _____	Firm <u>[Signature]</u>	Firm _____	Firm _____
Date/Time <u>9/17/17 1500</u>	Date/Time _____	Date/Time _____	Date/Time <u>9/19/17 0920</u>	Date/Time _____	Date/Time _____



PC KE

### Cooler Receipt and Preservation Form

Client Sericycle Service Request K17 09916  
 Received: 9/19/17 Opened: 9/19/17 By: [Signature] Unloaded: 9/19/17 By: [Signature]

- Samples were received via?  USPS  ~~FedEx~~  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- Were custody seals on coolers? NA  Y  N  If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y  N  If present, were they signed and dated? Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
3.5	3.7	—	—	10.2	379		787767739308	

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves wet ice
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.* NA  Y  N
- Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

# SHORT HOLD TIME





# General Chemistry

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Service Request:** K1709916  
**Date Collected:** 09/17/17  
**Date Received:** 09/19/17  
**Units:** mg/L  
**Basis:** NA

Nitrite as Nitrogen

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
CG-127-40-1G-091717	K1709916-001	ND U	0.25	0.01	5	09/19/17 12:16	9/19/17	*
CG-127-40-091717	K1709916-002	ND U	0.25	0.01	5	09/19/17 12:26	9/19/17	*
CG-09-127-40-091717	K1709916-003	ND U	0.25	0.01	5	09/19/17 12:36	9/19/17	*
CG-127-75-1G-091717	K1709916-004	ND U	0.50	0.02	10	09/19/17 12:06	9/19/17	*
CG-127-75-091717	K1709916-005	ND U	0.50	0.02	10	09/19/17 11:56	9/19/17	*
Method Blank	K1709916-MB	ND U	0.050	0.002	1	09/19/17 11:26	9/19/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** NA  
**Date Received:** NA  
**Date Analyzed:** 09/19/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** Batch QC  
**Lab Code:** KQ1713673-06

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample KQ1713673-06DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Nitrite as Nitrogen	300.0	25	1	137	139	138	1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 09/19/17  
**Date Extracted:** 09/19/17

**Duplicate Matrix Spike Summary**  
**Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** KQ1713673-06  
**Analysis Method:** 300.0  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1713673-06MS		Duplicate Matrix Spike KQ1713673-06DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Nitrite as Nitrogen	137	2100	2000	98	2110	2000	99	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Analyzed:** 09/19/17  
**Date Extracted:** 09/19/17

**Lab Control Sample Summary**  
**Nitrite as Nitrogen**

**Analysis Method:** 300.0  
**Prep Method:** Method

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 562523

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1709916-LCS	2.34	2.50	94	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

### Continuing Calibration Verification (CCV) Summary

#### Nitrite as Nitrogen

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	562523	KQ1713676-01	09/19/17 11:36	2.50	2.44	98	90-110
CCV2	562523	KQ1713676-02	09/19/17 13:37	2.50	2.47	99	90-110
CCV3	562523	KQ1713676-03	09/19/17 16:11	2.50	2.46	99	90-110
CCV4	562523	KQ1713676-04	09/19/17 20:27	2.50	2.47	99	90-110
CCV5	562523	KQ1713676-05	09/19/17 20:58	2.50	2.47	99	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:**K1709916

**Continuing Calibration Blank (CCB) Summary**  
**Nitrite as Nitrogen**

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	562523	KQ1713676-06	09/19/17 11:46	0.050	0.002	ND	U
CCB2	562523	KQ1713676-07	09/19/17 13:47	0.050	0.002	ND	U
CCB3	562523	KQ1713676-08	09/19/17 16:21	0.050	0.002	ND	U
CCB4	562523	KQ1713676-09	09/19/17 20:38	0.050	0.002	ND	U
CCB5	562523	KQ1713676-10	09/19/17 21:09	0.050	0.002	ND	U

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1709916  
**Date Collected:** 09/17/17  
**Date Received:** 09/19/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-1G-091717	K1709916-001	5.6	1.0	0.3	5	09/19/17 11:20	*
CG-127-40-091717	K1709916-002	7.8	1.0	0.3	5	09/19/17 11:20	*
CG-09-127-40-091717	K1709916-003	5.9	1.0	0.3	5	09/19/17 11:20	*
CG-127-75-1G-091717	K1709916-004	ND U	0.20	0.05	1	09/19/17 11:20	*
CG-127-75-091717	K1709916-005	ND U	0.20	0.05	1	09/19/17 11:20	*
Method Blank	K1709916-MB	ND U	0.20	0.05	1	09/19/17 11:20	



ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/17  
**Date Received:** 09/19/17  
**Date Analyzed:** 09/19/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-127-75-091717  
**Lab Code:** K1709916-005

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1709916-005DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/17  
**Date Received:** 09/19/17  
**Date Analyzed:** 09/19/17  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-127-75-091717  
**Lab Code:** K1709916-005  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1709916-005MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron, Divalent (Ferrous Iron)	ND U	2.09	2.00	105	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	562181	KQ1713532-04	09/19/17 11:20	4.00	4.00	100	90-110
CCV2	562181	KQ1713532-05	09/19/17 11:20	4.00	4.00	100	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:**K1709916

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	562181	KQ1713532-02	09/19/17 11:20	0.20	0.05	ND	U
CCB2	562181	KQ1713532-03	09/19/17 11:20	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-1G-091717  
**Lab Code:** K1709916-001

**Service Request:** K1709916  
**Date Collected:** 09/17/17 10:02  
**Date Received:** 09/19/17 09:20  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	12.5	mg/L	0.0020	0.0003	1	09/27/17 10:57	09/26/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-091717  
**Lab Code:** K1709916-002

**Service Request:** K1709916  
**Date Collected:** 09/17/17 10:30  
**Date Received:** 09/19/17 09:20  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	13.1	mg/L	0.0020	0.0003	1	09/27/17 10:59	09/26/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-09-127-40-091717  
**Lab Code:** K1709916-003

**Service Request:** K1709916  
**Date Collected:** 09/17/17 10:35  
**Date Received:** 09/19/17 09:20  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	12.8	mg/L	0.0020	0.0003	1	09/27/17 11:01	09/26/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-1G-091717  
**Lab Code:** K1709916-004

**Service Request:** K1709916  
**Date Collected:** 09/17/17 11:50  
**Date Received:** 09/19/17 09:20  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	3.91	mg/L	0.0020	0.0003	1	09/27/17 11:03	09/26/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-091717  
**Lab Code:** K1709916-005

**Service Request:** K1709916  
**Date Collected:** 09/17/17 12:15  
**Date Received:** 09/19/17 09:20  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	3.94	mg/L	0.0020	0.0003	1	09/27/17 11:05	09/26/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1714002-01

**Service Request:** K1709916  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0003 J</b>	mg/L	0.0020	0.0003	1	09/27/17 10:53	09/26/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: PSC Georgetown I5B/STRCL-001  
Sample Matrix: Water

Service Request: K1709916  
Date Collected: 09/17/17  
Date Received: 09/19/17  
Date Analyzed: 09/27/17

Replicate Sample Summary

Total Metals

Sample Name: CG-127-75-091717  
Lab Code: K1709916-005

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1714002-03 Result			
Iron	6020A	0.0020	0.0003	3.94	3.91	3.93	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/17  
**Date Received:** 09/19/17  
**Date Analyzed:** 09/27/17  
**Date Extracted:** 09/26/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** CG-127-75-091717  
**Lab Code:** K1709916-005  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1714002-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	3.94	4.01	0.0500	142 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Analyzed:** 09/27/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1714002-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0530	0.0500	106	80-120

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:**K1709916

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**299061

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
CG-127-40-1G-091717	K1709916-001	9/17/17	9/19/17	10 mL	10 mL	
CG-127-40-091717	K1709916-002	9/17/17	9/19/17	10 mL	10 mL	
CG-09-127-40-091717	K1709916-003	9/17/17	9/19/17	10 mL	10 mL	
CG-127-75-1G-091717	K1709916-004	9/17/17	9/19/17	10 mL	10 mL	
CG-127-75-091717	K1709916-005	9/17/17	9/19/17	10 mL	10 mL	
Method Blank	KQ1714002-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1714002-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1714002-03DUP	9/17/17	9/19/17	10 mL	10 mL	
Matrix Spike	KQ1714002-04MS	9/17/17	9/19/17	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	563374	50.0	49.4	99	250	250	100	250	247	99



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	563374				250	247	99	250	245	98

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	563374				250	245	98	250	243	97

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	563374	0.3	U	0.3	U	0.5	J	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	563374	0.3	U	0.3	U	0.3	U	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	563374	1.0	1.0	102	70-130	09/27/17 10:37
LLCCV	Iron	6020A	563374	1.0	1.0	98	70-130	09/27/17 12:15
LLCCV	Iron	6020A	563374	0.8	1.0	84	70-130	09/27/17 13:03

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	563374	47200	-	-	-	09/27/17 10:39

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	563374	46800	-	-	-	09/27/17 10:41

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1709916-005SDL	Iron	6020A	563374	3940	769	2	10	09/27/17 11:10



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-05

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	50000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 563374

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	09/27/17 10:24	
ZZZZZZ	1	09/27/17 10:26	
ICV	1	09/27/17 10:28	X
CCV	1	09/27/17 10:30	X
ICB	1	09/27/17 10:33	X
CCB	1	09/27/17 10:35	X
LLICVW	1	09/27/17 10:37	X
ICSA	1	09/27/17 10:39	X
ICSAB	1	09/27/17 10:41	X
KQ1714002-01MB	1	09/27/17 10:53	X
KQ1714002-02LCS	1	09/27/17 10:55	X
K1709916-001	1	09/27/17 10:57	X
K1709916-002	1	09/27/17 10:59	X
K1709916-003	1	09/27/17 11:01	X
K1709916-004	1	09/27/17 11:03	X
K1709916-005	1	09/27/17 11:05	X
K1709916-005DUP	1	09/27/17 11:08	X
K1709916-005SDL	1	09/27/17 11:10	X
ZZZZZZ	1	09/27/17 11:12	
CCV	1	09/27/17 11:15	X
CCB	1	09/27/17 11:17	X
K1709916-005MS	1	09/27/17 11:20	X
ZZZZZZ	1	09/27/17 11:22	
ZZZZZZ	1	09/27/17 11:24	
ZZZZZZ	1	09/27/17 11:27	
ZZZZZZ	1	09/27/17 11:29	
ZZZZZZ	1	09/27/17 11:31	
ZZZZZZ	1	09/27/17 11:34	
ZZZZZZ	1	09/27/17 11:36	
ZZZZZZ	1	09/27/17 11:38	
ZZZZZZ	1	09/27/17 11:41	
CCV	1	09/27/17 11:43	X
CCB	1	09/27/17 11:45	X
ZZZZZZ	1	09/27/17 11:48	
ZZZZZZ	1	09/27/17 11:50	
ZZZZZZ	1	09/27/17 11:52	
ZZZZZZ	1	09/27/17 11:54	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 563374

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	09/27/17 11:57	
ZZZZZZ	1	09/27/17 11:59	
ZZZZZZ	1	09/27/17 12:01	
ZZZZZZ	1	09/27/17 12:04	
ZZZZZZ	1	09/27/17 12:06	
ZZZZZZ	1	09/27/17 12:08	
CCV	1	09/27/17 12:11	X
CCB	1	09/27/17 12:13	X
LLCCVW	1	09/27/17 12:15	X
ZZZZZZ	1	09/27/17 12:18	
ZZZZZZ	1	09/27/17 12:20	
ZZZZZZ	1	09/27/17 12:22	
ZZZZZZ	1	09/27/17 12:25	
ZZZZZZ	1	09/27/17 12:27	
ZZZZZZ	1	09/27/17 12:29	
ZZZZZZ	1	09/27/17 12:32	
ZZZZZZ	1	09/27/17 12:34	
ZZZZZZ	1	09/27/17 12:36	
ZZZZZZ	1	09/27/17 12:39	
CCV	1	09/27/17 12:41	X
CCB	1	09/27/17 12:43	X
ZZZZZZ	1	09/27/17 12:45	
ZZZZZZ	1	09/27/17 12:47	
ZZZZZZ	1	09/27/17 12:49	
ZZZZZZ	1	09/27/17 12:51	
ZZZZZZ	1	09/27/17 12:53	
ZZZZZZ	1	09/27/17 12:55	
ZZZZZZ	1	09/27/17 12:57	
CCV	1	09/27/17 12:59	X
CCB	1	09/27/17 13:01	X
LLCCVW	1	09/27/17 13:03	X

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 563374

Sample	Date/Time	Ge72He	Ge72H2
ZZZZZZ	09/27/17 10:24		
ZZZZZZ	09/27/17 10:26		
ICV	09/27/17 10:28	99	99
CCV	09/27/17 10:30	100	99
ICB	09/27/17 10:33	99	99
CCB	09/27/17 10:35	100	101
LLICVW	09/27/17 10:37	100	101
ICSA	09/27/17 10:39	95	96
ICSAB	09/27/17 10:41	97	95
KQ1714002-01MB	09/27/17 10:53	103	102
KQ1714002-02LCS	09/27/17 10:55	103	101
K1709916-001	09/27/17 10:57	98	100
K1709916-002	09/27/17 10:59	102	101
K1709916-003	09/27/17 11:01	105	104
K1709916-004	09/27/17 11:03	107	105
K1709916-005	09/27/17 11:05	110	106
K1709916-005DUP	09/27/17 11:08	111	107
K1709916-005SDL	09/27/17 11:10	116	112
ZZZZZZ	09/27/17 11:12		
CCV	09/27/17 11:15	112	108
CCB	09/27/17 11:17	109	106
K1709916-005MS	09/27/17 11:20	107	103
ZZZZZZ	09/27/17 11:22		
ZZZZZZ	09/27/17 11:24		
ZZZZZZ	09/27/17 11:27		
ZZZZZZ	09/27/17 11:29		
ZZZZZZ	09/27/17 11:31		
ZZZZZZ	09/27/17 11:34		
ZZZZZZ	09/27/17 11:36		
ZZZZZZ	09/27/17 11:38		
ZZZZZZ	09/27/17 11:41		
CCV	09/27/17 11:43	102	99
CCB	09/27/17 11:45	101	99
ZZZZZZ	09/27/17 11:48		
ZZZZZZ	09/27/17 11:50		
ZZZZZZ	09/27/17 11:52		
ZZZZZZ	09/27/17 11:54		

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 563374

Sample	Date/Time	Ge72He	Ge72H2
ZZZZZZ	09/27/17 11:57		
ZZZZZZ	09/27/17 11:59		
ZZZZZZ	09/27/17 12:01		
ZZZZZZ	09/27/17 12:04		
ZZZZZZ	09/27/17 12:06		
ZZZZZZ	09/27/17 12:08		
CCV	09/27/17 12:11	103	99
CCB	09/27/17 12:13	103	101
LLCCVW	09/27/17 12:15	104	100
ZZZZZZ	09/27/17 12:18		
ZZZZZZ	09/27/17 12:20		
ZZZZZZ	09/27/17 12:22		
ZZZZZZ	09/27/17 12:25		
ZZZZZZ	09/27/17 12:27		
ZZZZZZ	09/27/17 12:29		
ZZZZZZ	09/27/17 12:32		
ZZZZZZ	09/27/17 12:34		
ZZZZZZ	09/27/17 12:36		
ZZZZZZ	09/27/17 12:39		
CCV	09/27/17 12:41	105	102
CCB	09/27/17 12:43	104	102
ZZZZZZ	09/27/17 12:45		
ZZZZZZ	09/27/17 12:47		
ZZZZZZ	09/27/17 12:49		
ZZZZZZ	09/27/17 12:51		
ZZZZZZ	09/27/17 12:53		
ZZZZZZ	09/27/17 12:55		
ZZZZZZ	09/27/17 12:57		
CCV	09/27/17 12:59	106	101
CCB	09/27/17 13:01	104	100
LLCCVW	09/27/17 13:03	106	101





## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916

**Cover Page - Organic Analysis Data Package**  
**1,4-Dioxane by GCMS**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>
CG-127-40-1G-091717	K1709916-001	09/17/2017	09/19/2017
CG-127-40-091717	K1709916-002	09/17/2017	09/19/2017
CG-09-127-40-091717	K1709916-003	09/17/2017	09/19/2017
CG-127-75-1G-091717	K1709916-004	09/17/2017	09/19/2017
CG-127-75-091717	K1709916-005	09/17/2017	09/19/2017

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/2017  
**Date Received:** 09/19/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-1G-091717  
**Lab Code:** K1709916-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	300	D	4.0	1.6	10	09/24/17	09/29/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	92	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/2017  
**Date Received:** 09/19/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-40-091717  
**Lab Code:** K1709916-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	250	D	4.0	1.6	10	09/24/17	09/29/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	80	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/2017  
**Date Received:** 09/19/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-09-127-40-091717  
**Lab Code:** K1709916-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	310	D	4.0	1.6	10	09/24/17	09/29/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	87	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/2017  
**Date Received:** 09/19/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-1G-091717  
**Lab Code:** K1709916-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	650	D	8.0	3.2	20	09/24/17	09/29/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	85	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** 09/17/2017  
**Date Received:** 09/19/2017

1,4-Dioxane by GCMS

**Sample Name:** CG-127-75-091717  
**Lab Code:** K1709916-005  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	710	D	8.0	3.2	20	09/24/17	09/29/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	84	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Collected:** NA  
**Date Received:** NA

1,4-Dioxane by GCMS

**Sample Name:** Method Blank  
**Lab Code:** KWG1708497-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
1,4-Dioxane	ND	U	0.40	0.16	1	09/24/17	09/28/17	KWG1708497	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,4-Dioxane-d8	87	64-120	09/28/17	Acceptable

**Comments:** \_\_\_\_\_

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916

**Surrogate Recovery Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
CG-127-40-1G-091717	K1709916-001	92
CG-127-40-091717	K1709916-002	80
CG-09-127-40-091717	K1709916-003	87
CG-127-75-1G-091717	K1709916-004	85
CG-127-75-091717	K1709916-005	84
Batch QC	K1710186-005	88
Method Blank	KWG1708497-5	87
Batch QCMS	KWG1708497-1	84
Batch QCDMS	KWG1708497-2	89
Lab Control Sample	KWG1708497-3	78
Duplicate Lab Control Sample	KWG1708497-4	80

**Surrogate Recovery Control Limits (%)**

---

Sur1 = 1,4-Dioxane-d8 64-120

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.



QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/28/2017  
**Time Analyzed:** 00:30

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092717\0927F051.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1708709-2  
**Analysis Lot:** KWG1708709

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	24,913	5.24
<b>Upper Limit ==&gt;</b>	49,826	5.74
<b>Lower Limit ==&gt;</b>	12,457	4.74
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

Method Blank	KWG1708497-5	27,213	5.23
Lab Control Sample	KWG1708497-3	28,195	5.24
Duplicate Lab Control Sample	KWG1708497-4	28,578	5.24
Batch QCMS	KWG1708497-1	28,605	5.24
Batch QCDMS	KWG1708497-2	24,000	5.23
CG-127-75-091717	K1709916-005	25,463	5.23
CG-127-40-1G-091717	K1709916-001	26,484	5.24
CG-127-40-091717	K1709916-002	26,269	5.24
CG-09-127-40-091717	K1709916-003	24,290	5.24
CG-127-75-1G-091717	K1709916-004	25,171	5.24
Batch QC	K1710186-005	25,662	5.23

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/29/2017  
**Time Analyzed:** 10:16

**Internal Standard Area and RT Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092917\0929F004.D  
**Instrument ID:** MS26  
**Analysis Method:** 8270D SIM

**Lab Code:** KWG1708748-2  
**Analysis Lot:** KWG1708748

	1,4-Dichlorobenzene-d4	
	<u>Area</u>	<u>RT</u>
<b>Results ==&gt;</b>	24,535	5.24
<b>Upper Limit ==&gt;</b>	49,070	5.74
<b>Lower Limit ==&gt;</b>	12,268	4.74
<b>ICAL Result ==&gt;</b>	41,760	5.27

*Associated Analyses*

CG-127-40-1G-091717DL	K1709916-001	28,366	5.24
CG-127-40-091717DL	K1709916-002	24,235	5.23
CG-09-127-40-091717DL	K1709916-003	25,672	5.24
CG-127-75-1G-091717DL	K1709916-004	26,307	5.24
CG-127-75-091717DL	K1709916-005	25,639	5.24

Results flagged with an asterisk (\*) indicate values outside control criteria.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Extracted:** 09/24/2017  
**Date Analyzed:** 09/28/2017

**Matrix Spike/Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Batch QC  
**Lab Code:** K1710186-005  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1708497

Analyte Name	Sample Result	Batch QCMS KWG1708497-1 Matrix Spike			Batch QCDMS KWG1708497-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	ND	9.03	10.0	90	9.08	10.0	91	49-113	0	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Extracted:** 09/24/2017  
**Date Analyzed:** 09/28/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Units:** ug/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1708497

Analyte Name	Lab Control Sample KWG1708497-3 Lab Control Spike			Duplicate Lab Control Sample KWG1708497-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
1,4-Dioxane	8.37	10.0	84	8.62	10.0	86	59-111	3	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Extracted:** 09/24/2017  
**Date Analyzed:** 09/28/2017  
**Time Analyzed:** 00:47

**Method Blank Summary**  
**1,4-Dioxane by GCMS**

**Sample Name:** Method Blank **Instrument ID:** MS26  
**Lab Code:** KWG1708497-5 **File ID:** J:\MS26\DATA\092717\0927F052.D  
**Extraction Method:** EPA 3535A **Level:** Low  
**Analysis Method:** 8270D SIM **Extraction Lot:** KWG1708497

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1708497-3	J:\MS26\DATA\092717\0927F053.D	09/28/17	01:05
Duplicate Lab Control Sample	KWG1708497-4	J:\MS26\DATA\092717\0927F054.D	09/28/17	01:23
Batch QCMS	KWG1708497-1	J:\MS26\DATA\092717\0927F055.D	09/28/17	01:41
Batch QCDMS	KWG1708497-2	J:\MS26\DATA\092717\0927F056.D	09/28/17	01:59
CG-127-75-091717	K1709916-005	J:\MS26\DATA\092717\0927F057.D	09/28/17	02:17
CG-127-40-1G-091717	K1709916-001	J:\MS26\DATA\092717\0927F058.D	09/28/17	02:35
CG-127-40-091717	K1709916-002	J:\MS26\DATA\092717\0927F059.D	09/28/17	02:52
CG-09-127-40-091717	K1709916-003	J:\MS26\DATA\092717\0927F060.D	09/28/17	03:10
CG-127-75-1G-091717	K1709916-004	J:\MS26\DATA\092717\0927F061.D	09/28/17	03:28
Batch QC	K1710186-005	J:\MS26\DATA\092717\0927F067.D	09/28/17	05:16
CG-127-40-1G-091717	K1709916-001	J:\MS26\DATA\092917\0929F025.D	09/29/17	16:45
CG-127-40-091717	K1709916-002	J:\MS26\DATA\092917\0929F026.D	09/29/17	17:03
CG-09-127-40-091717	K1709916-003	J:\MS26\DATA\092917\0929F027.D	09/29/17	17:21
CG-127-75-1G-091717	K1709916-004	J:\MS26\DATA\092917\0929F028.D	09/29/17	17:39
CG-127-75-091717	K1709916-005	J:\MS26\DATA\092917\0929F029.D	09/29/17	17:56



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/28/2017  
**Time Analyzed:** 00:12

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092717\0927F050.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1708709

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.2	3609	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	20.6	4581	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	36.3	8090	PASS
197	198	0	2	0.2	52	PASS
198	442	30	100	55.0	22281	PASS
199	198	5	9	6.8	1509	PASS
275	198	10	60	33.5	7457	PASS
365	442	1	50	2.4	986	PASS
441	443	0	100	78.4	6185	PASS
442	442	100	100	100.0	40517	PASS
443	442	15	24	19.5	7888	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1708709-2	J:\MS26\DATA\092717\0927F051.D	09/28/2017	00:30	
Method Blank	KWG1708497-5	J:\MS26\DATA\092717\0927F052.D	09/28/2017	00:47	
Lab Control Sample	KWG1708497-3	J:\MS26\DATA\092717\0927F053.D	09/28/2017	01:05	
Duplicate Lab Control Sample	KWG1708497-4	J:\MS26\DATA\092717\0927F054.D	09/28/2017	01:23	
Batch QCMS	KWG1708497-1	J:\MS26\DATA\092717\0927F055.D	09/28/2017	01:41	
Batch QCDMS	KWG1708497-2	J:\MS26\DATA\092717\0927F056.D	09/28/2017	01:59	
CG-127-75-091717	K1709916-005	J:\MS26\DATA\092717\0927F057.D	09/28/2017	02:17	
CG-127-40-1G-091717	K1709916-001	J:\MS26\DATA\092717\0927F058.D	09/28/2017	02:35	
CG-127-40-091717	K1709916-002	J:\MS26\DATA\092717\0927F059.D	09/28/2017	02:52	
CG-09-127-40-091717	K1709916-003	J:\MS26\DATA\092717\0927F060.D	09/28/2017	03:10	
CG-127-75-1G-091717	K1709916-004	J:\MS26\DATA\092717\0927F061.D	09/28/2017	03:28	
Batch QC	K1710186-005	J:\MS26\DATA\092717\0927F067.D	09/28/2017	05:16	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/29/2017  
**Time Analyzed:** 09:59

**Tune Summary**  
**1,4-Dioxane by GCMS**

**File ID:** J:\MS26\DATA\092917\0929F003.D  
**Instrument ID:** MS26  
**Column:**

**Analysis Method:** 8270D SIM  
**Analysis Lot:** KWG1708748

Target Mass	Relative to Mass	Lower Limit%	Upper Limit%	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	15.7	3729	PASS
68	69	0	2	0.0	0	PASS
69	198	0	100	20.0	4748	PASS
70	69	0	2	0.0	0	PASS
127	198	10	80	35.6	8445	PASS
197	198	0	2	0.2	50	PASS
198	442	30	100	57.0	23696	PASS
199	198	5	9	6.8	1610	PASS
275	198	10	60	34.1	8089	PASS
365	442	1	50	2.6	1068	PASS
441	443	0	100	78.2	6353	PASS
442	442	100	100	100.0	41576	PASS
443	442	15	24	19.5	8127	PASS

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed	Q
Continuing Calibration Verification	KWG1708748-2	J:\MS26\DATA\092917\0929F004.D	09/29/2017	10:16	
CG-127-40-1G-091717	K1709916-001	J:\MS26\DATA\092917\0929F025.D	09/29/2017	16:45	
CG-127-40-091717	K1709916-002	J:\MS26\DATA\092917\0929F026.D	09/29/2017	17:03	
CG-09-127-40-091717	K1709916-003	J:\MS26\DATA\092917\0929F027.D	09/29/2017	17:21	
CG-127-75-1G-091717	K1709916-004	J:\MS26\DATA\092917\0929F028.D	09/29/2017	17:39	
CG-127-75-091717	K1709916-005	J:\MS26\DATA\092917\0929F029.D	09/29/2017	17:56	

Results flagged with an asterisk (\*) indicate the analysis performed outside specified tune window



QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Level ID	File ID	Level ID	File ID
A	J:\MS26\DATA\071817\0718F006.D	E	J:\MS26\DATA\071817\0718F010.D
B	J:\MS26\DATA\071817\0718F007.D	F	J:\MS26\DATA\071817\0718F011.D
C	J:\MS26\DATA\071817\0718F008.D	G	J:\MS26\DATA\071817\0718F012.D
D	J:\MS26\DATA\071817\0718F009.D		

Analyte Name	Level ID			Level ID			Level ID			Level ID					
	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF	ID	Amt	RRF			
1,4-Dioxane	A	2.0	0.410	B	4.0	0.390	C	10	0.358	D	20	0.374	E	50	0.374
	F	100	0.374	G	200	0.375									
1,4-Dioxane-d8	A	2.0	0.383	B	4.0	0.397	C	10	0.387	D	20	0.382	E	50	0.371
	F	100	0.368	G	200	0.372									

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Calibration Date:** 07/18/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GCMS**

**Calibration ID:** CAL15481  
**Instrument ID:** MS26

**Column:** MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
1,4-Dioxane	MS	AverageRF	% RSD	4.3		≤ 20	0.379		0.01
1,4-Dioxane-d8	SURR	AverageRF	% RSD	2.7		≤ 20	0.380		0.01

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Calibration Date:** 07/18/2017  
**Date Analyzed:** 07/18/2017

**Second Source Calibration Verification**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration ID:** CAL15481  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\071817\0718F013.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	20	0.379	0.384	1	NA	± 30 %	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/28/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1708709  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\092717\0927F051.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.367	-3	NA	± 20	AverageRF
1,4-Dioxane-d8	20	20	0.01	0.380	0.384	1	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001

**Service Request:** K1709916  
**Date Analyzed:** 09/29/2017

**Continuing Calibration Verification Summary**  
**1,4-Dioxane by GCMS**

**Calibration Type:** Internal Standard  
**Analysis Method:** 8270D SIM

**Calibration Date:** 07/18/2017  
**Calibration ID:** CAL15481  
**Analysis Lot:** KWG1708748  
**Units:** ng/ml

**File ID:** J:\MS26\DATA\092917\0929F004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
1,4-Dioxane	20	19	0.01	0.379	0.353	-7	NA	± 20	AverageRF
1,4-Dioxane-d8	20	19	0.01	0.380	0.367	-3	NA	± 20	AverageRF

Results flagged with an asterisk (\*) indicate values outside control criteria.

† SPCC Compound

‡ CCC Compound

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001

**Service Request:** K1709916

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1708709  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0927F050.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1708709-1	9/28/2017	00:12		9/28/2017	00:22
0927F051.D	Continuing Calibration Verification	KWG1708709-2	9/28/2017	00:30		9/28/2017	00:40
0927F052.D	Method Blank	KWG1708497-5	9/28/2017	00:47		9/28/2017	00:57
0927F053.D	Lab Control Sample	KWG1708497-3	9/28/2017	01:05		9/28/2017	01:15
0927F054.D	Duplicate Lab Control Sample	KWG1708497-4	9/28/2017	01:23		9/28/2017	01:33
0927F055.D	Batch QCMS	KWG1708497-1	9/28/2017	01:41		9/28/2017	01:51
0927F056.D	Batch QCDMS	KWG1708497-2	9/28/2017	01:59		9/28/2017	02:09
0927F057.D	CG-127-75-091717	K1709916-005	9/28/2017	02:17		9/28/2017	02:27
0927F058.D	CG-127-40-1G-091717	K1709916-001	9/28/2017	02:35		9/28/2017	02:45
0927F059.D	CG-127-40-091717	K1709916-002	9/28/2017	02:52		9/28/2017	03:02
0927F060.D	CG-09-127-40-091717	K1709916-003	9/28/2017	03:10		9/28/2017	03:20
0927F061.D	CG-127-75-1G-091717	K1709916-004	9/28/2017	03:28		9/28/2017	03:38
0927F062.D	ZZZZZZ	ZZZZZZ	9/28/2017	03:46		9/28/2017	03:56
0927F063.D	ZZZZZZ	ZZZZZZ	9/28/2017	04:04		9/28/2017	04:14
0927F064.D	ZZZZZZ	ZZZZZZ	9/28/2017	04:22		9/28/2017	04:32
0927F065.D	ZZZZZZ	ZZZZZZ	9/28/2017	04:40		9/28/2017	04:50
0927F066.D	ZZZZZZ	ZZZZZZ	9/28/2017	04:58		9/28/2017	05:08
0927F067.D	Batch QC	K1710186-005	9/28/2017	05:16		9/28/2017	05:26
0927F068.D	ZZZZZZ	ZZZZZZ	9/28/2017	05:34		9/28/2017	05:44
0927F069.D	ZZZZZZ	ZZZZZZ	9/28/2017	05:51		9/28/2017	06:01
0927F070.D	ZZZZZZ	ZZZZZZ	9/28/2017	06:09		9/28/2017	06:19
0927F071.D	ZZZZZZ	ZZZZZZ	9/28/2017	06:27		9/28/2017	06:37
0927F072.D	ZZZZZZ	ZZZZZZ	9/28/2017	06:45		9/28/2017	06:55
0927F073.D	ZZZZZZ	ZZZZZZ	9/28/2017	07:03		9/28/2017	07:13
0927F074.D	ZZZZZZ	ZZZZZZ	9/28/2017	07:21		9/28/2017	07:31
0927F075.D	ZZZZZZ	ZZZZZZ	9/28/2017	07:39		9/28/2017	07:49

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown 15B/STRCL-001

**Service Request:** K1709916

**Analysis Run Log**  
**1,4-Dioxane by GCMS**

**Analysis Method:** 8270D SIM

**Analysis Lot:** KWG1708748  
**Instrument ID:** MS26

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
0929F003.D	GC/MS Tuning - Decafluorotriphenylphosph	KWG1708748-1	9/29/2017	09:59		9/29/2017	10:09
0929F004.D	Continuing Calibration Verification	KWG1708748-2	9/29/2017	10:16		9/29/2017	10:26
0929F005.D	ZZZZZZ	ZZZZZZ	9/29/2017	10:50		9/29/2017	11:00
0929F006.D	ZZZZZZ	ZZZZZZ	9/29/2017	11:07		9/29/2017	11:17
0929F007.D	ZZZZZZ	ZZZZZZ	9/29/2017	11:25		9/29/2017	11:35
0929F008.D	ZZZZZZ	ZZZZZZ	9/29/2017	11:43		9/29/2017	11:53
0929F009.D	ZZZZZZ	ZZZZZZ	9/29/2017	12:01		9/29/2017	12:11
0929F010.D	ZZZZZZ	ZZZZZZ	9/29/2017	12:18		9/29/2017	12:28
0929F011.D	ZZZZZZ	ZZZZZZ	9/29/2017	12:36		9/29/2017	12:46
0929F012.D	ZZZZZZ	ZZZZZZ	9/29/2017	12:54		9/29/2017	13:04
0929F013.D	ZZZZZZ	ZZZZZZ	9/29/2017	13:12		9/29/2017	13:22
0929F014.D	ZZZZZZ	ZZZZZZ	9/29/2017	13:29		9/29/2017	13:39
0929F015.D	ZZZZZZ	ZZZZZZ	9/29/2017	13:47		9/29/2017	13:57
0929F016.D	ZZZZZZ	ZZZZZZ	9/29/2017	14:05		9/29/2017	14:15
0929F017.D	ZZZZZZ	ZZZZZZ	9/29/2017	14:23		9/29/2017	14:33
0929F018.D	ZZZZZZ	ZZZZZZ	9/29/2017	14:41		9/29/2017	14:51
0929F019.D	ZZZZZZ	ZZZZZZ	9/29/2017	14:58		9/29/2017	15:08
0929F020.D	ZZZZZZ	ZZZZZZ	9/29/2017	15:16		9/29/2017	15:26
0929F021.D	ZZZZZZ	ZZZZZZ	9/29/2017	15:34		9/29/2017	15:44
0929F022.D	ZZZZZZ	ZZZZZZ	9/29/2017	15:52		9/29/2017	16:02
0929F023.D	ZZZZZZ	ZZZZZZ	9/29/2017	16:10		9/29/2017	16:20
0929F024.D	ZZZZZZ	ZZZZZZ	9/29/2017	16:27		9/29/2017	16:37
0929F025.D	CG-127-40-1G-091717	K1709916-001	9/29/2017	16:45		9/29/2017	16:55
0929F026.D	CG-127-40-091717	K1709916-002	9/29/2017	17:03		9/29/2017	17:13
0929F027.D	CG-09-127-40-091717	K1709916-003	9/29/2017	17:21		9/29/2017	17:31
0929F028.D	CG-127-75-1G-091717	K1709916-004	9/29/2017	17:39		9/29/2017	17:49
0929F029.D	CG-127-75-091717	K1709916-005	9/29/2017	17:56		9/29/2017	18:06
0929F030.D	ZZZZZZ	ZZZZZZ	9/29/2017	18:14		9/29/2017	18:24
0929F031.D	Continuing Calibration Verification	KWG1708748-3	9/29/2017	18:32		9/29/2017	18:42

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis

QA/QC Results

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown I5B/STRCL-001  
**Sample Matrix:** Water

**Service Request:** K1709916  
**Date Extracted:** 09/24/2017

**Extraction Prep Log**  
**1,4-Dioxane by GCMS**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8270D SIM

**Extraction Lot:** KWG1708497  
**Level:** Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
CG-127-40-1G-091717	K1709916-001	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-40-1G-091717DL	K1709916-001	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-40-091717DL	K1709916-002	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-40-091717	K1709916-002	09/17/17	09/19/17	10ml	2ml	NA	
CG-09-127-40-091717DL	K1709916-003	09/17/17	09/19/17	10ml	2ml	NA	
CG-09-127-40-091717	K1709916-003	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-75-1G-091717	K1709916-004	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-75-1G-091717DL	K1709916-004	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-75-091717	K1709916-005	09/17/17	09/19/17	10ml	2ml	NA	
CG-127-75-091717DL	K1709916-005	09/17/17	09/19/17	10ml	2ml	NA	
Method Blank	KWG1708497-5	NA	NA	10ml	2ml	NA	
Batch QC	K1710186-005	NA	NA	10ml	2ml	NA	
Batch QCMS	KWG1708497-1	NA	NA	10ml	2ml	NA	
Batch QCDMS	KWG1708497-2	NA	NA	10ml	2ml	NA	
Lab Control Sample	KWG1708497-3	NA	NA	10ml	2ml	NA	
Duplicate Lab Control Sample	KWG1708497-4	NA	NA	10ml	2ml	NA	

Results flagged with an asterisk (\*) indicate the holding time was exceeded for the analysis





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December 27, 2017

**Analytical Report for Service Request No: K1712610**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: Stericycle Georgtown / 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory November 21, 2017  
For your reference, these analyses have been assigned our service request number **K1712610**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Received:** 11/21/2017

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt:

Nine water samples were received for analysis at ALS Environmental on 11/21/2017. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Semivolatiles by GC/MS:

Method 8270D, 11/28/2017: Most samples required dilution due to the presence of elevated levels of target analyte. The reporting limits are adjusted to reflect the dilution.

Method 8270D, 11/28/2017: The control criteria for matrix spike recovery of 1,4-Dioxane for sample IMW-1-112017 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

#### Metals:

No significant anomalies were noted with this analysis.

#### General Chemistry:

Method ApplEnvMic7-87-1536-1540, 11/21/2017: All samples were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

Method ApplEnvMic7-87-1536-1540, 11/21/2017: The matrix spike recovery of Divalent Iron (Ferrous Iron) for sample IMW-1-112017 were outside control criteria because of suspected matrix interference. As a result of the interference, the results for this analyte contained a potential high bias. No further corrective action was taken.

Approved by  Date 12/27/2017



# Chain of Custody

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SR# 11712610  
COC Set 1 of 1  
COC# \_\_\_\_\_

Page 1 of 1

Project Name: <u>STEREYCLE Georgetown AK</u>		Project Number: <u>375.08 - STREL-001</u>		NUMBER OF CONTAINERS	24H	48H	7D	180D						Remarks
Project Manager: <u>Tessia Gray</u>					App/Env/Mic/7-87-1-536-1540/									
Company: <u>Dalton Olmsted &amp; Englewood (DOE)</u>					300/504									
Address: <u>1001 TULKIKENT Way Suite 200B, Seattle, WA 98134</u>					82700 / 1,4-Dioxane									
Phone #: <u>206-375-0211</u>		email: <u>N.GRAY@DOE.NW.COM</u>		8020A / Metals T										
Sampler Signature: <u>[Signature]</u>		Sampler Printed Name: <u>L. Hermer</u>												

<b>Report Requirements</b> <input checked="" type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD	<b>Invoice Information</b> P.O.# <u>375.08</u> Bill To: <u>Bill Beut Stereycle</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <input checked="" type="checkbox"/> Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
	<b>Turnaround Requirements</b> <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input checked="" type="checkbox"/> Standard	Special Instructions/Comments: <u>*IP 5, 6, 7 have high concentrations of Sodium phosphate - 1,4 Dioxane preserved w/ Ascorbic Acid</u> *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: <u>[Signature]</u>	Signature: <u>Feder under</u>	Signature: _____	Signature: <u>[Signature]</u>	Signature: _____	Signature: _____
Printed Name: <u>Luke Hermer</u>	Printed Name: <u>Custody Seal</u>	Printed Name: _____	Printed Name: <u>DAVID S. DUMPTON</u>	Printed Name: _____	Printed Name: _____
Firm: <u>DOE</u>	Firm: _____	Firm: _____	Firm: <u>ALS</u>	Firm: _____	Firm: _____
Date/Time: <u>11/20/17</u>	Date/Time: <u>11/20/17</u>	Date/Time: _____	Date/Time: <u>11-21-17 0930 0910</u>	Date/Time: _____	Date/Time: _____



PC Mark

### Cooler Receipt and Preservation Form

Client DAVID OLIVIERO & FUGLEMAN (DOF) Service Request K17 12610  
 Received: 11-21-17 Opened: 11-21-17 By: ASP Unloaded: 11-21-17 By: ASP

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other NA
- Were custody seals on coolers?  NA  Y  N If yes, how many and where? 1 TOP FRONT  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number	NA	Filed
5.3	5.3			0.0	360		7885 4065 0094		

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
- Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# General Chemistry

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** None

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-112017	K1712610-001	<b>660</b>	20	2	200	12/16/17 13:03	
IMW-2-112017	K1712610-002	<b>374</b>	10	1	100	12/16/17 13:45	
CG-122-60-112017	K1712610-003	<b>457</b>	5.0	0.5	50	12/16/17 14:17	
CG-9-122-60-112017	K1712610-004	<b>453</b>	5.0	0.5	50	12/16/17 14:28	
IP-5-112017	K1712610-005	<b>810</b>	20	2	200	12/16/17 14:38	
IP-6-112017	K1712610-006	<b>136</b>	5.0	0.5	50	12/16/17 14:49	
IP-7-112017	K1712610-007	<b>278</b>	10	1	100	12/16/17 15:00	
CG-122-75-112017	K1712610-008	<b>0.26</b>	0.20	0.02	2	12/16/17 15:10	
FB1-112017	K1712610-009	ND U	0.10	0.01	1	12/16/17 15:21	
Method Blank	K1712610-MB	ND U	0.10	0.01	1	12/16/17 11:38	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** None

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17

**Units:** mg/L  
**Basis:** NA

Replicate Sample Summary  
Sulfate

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
IMW-1-112017	K1712610-001DUP	20	2	660	661	661	<1	20	12/16/17
Batch QC	K1713442-001DUP	0.20	0.02	2.14	2.15	2.15	<1	20	12/16/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Date Analyzed:** 12/16/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** IMW-1-112017 **Units:** mg/L  
**Lab Code:** K1712610-001 **Basis:** NA  
**Analysis Method:** 300.0  
**Prep Method:** None

Analyte Name	Sample Result	Result	Matrix Spike		Duplicate Matrix Spike		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	660	1440	800	98	1470	800	101	90-110	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/16/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** Batch QC  
**Lab Code:** K1713442-001  
**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike K1713442-001MS		Duplicate Matrix Spike K1713442-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	2.14	9.97	8.00	98	10.1	8.00	99	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Analyzed:** 12/16/17  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 574015

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1712610-LCS	4.98	5.00	100	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	574015	KQ1718693-15	12/16/17 11:48	5.00	4.99	100	90-110
CCV2	574015	KQ1718693-16	12/16/17 13:56	5.00	4.96	99	90-110
CCV3	574015	KQ1718693-17	12/16/17 16:03	5.00	4.94	99	90-110
CCV4	574015	KQ1718693-18	12/16/17 17:29	5.00	4.95	99	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:**K1712610

**Continuing Calibration Blank (CCB) Summary**  
**Sulfate**

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	574015	KQ1718693-19	12/16/17 11:59	0.10	0.01	ND	U
CCB2	574015	KQ1718693-20	12/16/17 14:07	0.10	0.01	ND	U
CCB3	574015	KQ1718693-21	12/16/17 16:14	0.10	0.01	ND	U
CCB4	574015	KQ1718693-22	12/16/17 17:39	0.10	0.01	ND	U

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-112017	K1712610-001	9.6	1.0	0.3	5	11/21/17 13:00	*
IMW-2-112017	K1712610-002	12.6	1.0	0.3	5	11/21/17 13:00	*
CG-122-60-112017	K1712610-003	6.9	1.0	0.3	5	11/21/17 13:00	*
CG-9-122-60-112017	K1712610-004	6.9	1.0	0.3	5	11/21/17 13:00	*
IP-6-112017	K1712610-006	ND U	0.20	0.05	1	11/21/17 13:00	
IP-7-112017	K1712610-007	0.29	0.20	0.05	1	11/21/17 13:00	
CG-122-75-112017	K1712610-008	2.00	0.20	0.05	1	11/21/17 13:00	
FB1-112017	K1712610-009	ND U	0.20	0.05	1	11/21/17 13:00	
Method Blank	K1712610-MB	ND U	0.20	0.05	1	11/21/17 13:00	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Date Analyzed:** 11/21/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-112017 **Units:** mg/L  
**Lab Code:** K1712610-001 **Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1712610-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	1.0	0.3	9.6	9.6	9.63	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Date Analyzed:** 11/21/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** IMW-1-112017  
**Lab Code:** K1712610-001  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Matrix Spike K1712610-001MS				Duplicate Matrix Spike K1712610-001DMS				RPD	RPD Limit
	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
Iron, Divalent (Ferrous Iron)	9.6	22.2	10.0	126 *	22.2	10.0	126 *	75-125	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	570982	KQ1717368-05	11/21/17 13:00	4.00	3.93	98	90-110
CCV2	570982	KQ1717368-06	11/21/17 13:00	4.00	3.92	98	90-110
CCV3	570982	KQ1717368-07	11/21/17 13:00	4.00	3.92	98	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:**K1712610

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	570982	KQ1717368-02	11/21/17 13:00	0.20	0.05	ND	U
CCB2	570982	KQ1717368-03	11/21/17 13:00	0.20	0.05	ND	U
CCB3	570982	KQ1717368-04	11/21/17 13:00	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-112017  
**Lab Code:** K1712610-001

**Service Request:** K1712610  
**Date Collected:** 11/20/17 10:40  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	7.60	mg/L	0.010	0.0003	1	12/06/17 11:18	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-112017  
**Lab Code:** K1712610-002

**Service Request:** K1712610  
**Date Collected:** 11/20/17 11:30  
**Date Received:** 11/21/17 09:10

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	10.1	mg/L	0.010	0.0003	1	12/06/17 11:42	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-112017  
**Lab Code:** K1712610-003

**Service Request:** K1712610  
**Date Collected:** 11/20/17 12:25  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	5.10	mg/L	0.010	0.0003	1	12/06/17 11:45	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-60-112017  
**Lab Code:** K1712610-004

**Service Request:** K1712610  
**Date Collected:** 11/20/17 12:30  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>5.09</b>	mg/L	0.010	0.0003	1	12/06/17 11:48	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-5-112017  
**Lab Code:** K1712610-005

**Service Request:** K1712610  
**Date Collected:** 11/20/17 14:50  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	1.14	mg/L	0.20	0.006	20	12/06/17 11:50	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-112017  
**Lab Code:** K1712610-006

**Service Request:** K1712610  
**Date Collected:** 11/20/17 15:25  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	4.65	mg/L	0.20	0.006	20	12/06/17 11:53	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-7-112017  
**Lab Code:** K1712610-007

**Service Request:** K1712610  
**Date Collected:** 11/20/17 16:00  
**Date Received:** 11/21/17 09:10

**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	3.34	mg/L	0.20	0.006	20	12/06/17 11:55	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-112017  
**Lab Code:** K1712610-008

**Service Request:** K1712610  
**Date Collected:** 11/20/17 13:05  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	<b>1.60</b>	mg/L	0.010	0.0003	1	12/06/17 11:58	11/29/17	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** FB1-112017  
**Lab Code:** K1712610-009

**Service Request:** K1712610  
**Date Collected:** 11/20/17 13:00  
**Date Received:** 11/21/17 09:10  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.003 J	mg/L	0.010	0.0003	1	12/06/17 12:00	11/29/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1717626-01

**Service Request:** K1712610  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	<b>0.001 J</b>	mg/L	0.010	0.0003	1	12/06/17 11:08	11/29/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project Stericycle Georgetown/375.08  
Sample Matrix: Water

Service Request: K1712610  
Date Collected: NA  
Date Received: NA  
Date Analyzed: 12/06/17

Replicate Sample Summary

Total Metals

Sample Name: Batch QC  
Lab Code: K1712377-001

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1717626-03 Result			
Iron	6020A	0.10	0.003	0.65	0.68	0.66	5	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.

Service Request: K1712610

Project: Stericycle Georgetown/375.08

Date Collected: 11/20/17

Sample Matrix: Water

Date Received: 11/21/17

Date Analyzed: 12/06/17

Replicate Sample Summary

Total Metals

Sample Name: IMW-1-112017

Units: mg/L

Lab Code: K1712610-001

Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1717626-06 Result			
Iron	6020A	0.010	0.0003	7.60	7.53	7.57	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Date Analyzed:** 12/6/17  
**Date Extracted:** 11/29/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** IMW-1-112017  
**Lab Code:** K1712610-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1717626-07

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	7.60	7.74	0.050	292 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/6/17  
**Date Extracted:** 11/29/17

**Duplicate Matrix Spike Summary  
Total Metals**

**Sample Name:** Batch QC  
**Lab Code:** K1712377-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1717626-04		Result	Duplicate Matrix Spike KQ1717626-05		% Rec Limits	RPD	RPD Limit
			Spike Amount	% Rec		Spike Amount	% Rec			
Iron	0.65	0.73	0.05	155 #	0.71	0.05	118	75-125	3	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Analyzed:** 12/06/17

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1717626-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.052	0.050	104	80-120

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:**K1712610

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**303928

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-112017	K1712610-001	11/20/17	11/21/17	10 mL	10 mL	
IMW-2-112017	K1712610-002	11/20/17	11/21/17	10 mL	10 mL	
CG-122-60-112017	K1712610-003	11/20/17	11/21/17	10 mL	10 mL	
CG-9-122-60-112017	K1712610-004	11/20/17	11/21/17	10 mL	10 mL	
IP-5-112017	K1712610-005	11/20/17	11/21/17	10 mL	10 mL	
IP-6-112017	K1712610-006	11/20/17	11/21/17	10 mL	10 mL	
IP-7-112017	K1712610-007	11/20/17	11/21/17	10 mL	10 mL	
CG-122-75-112017	K1712610-008	11/20/17	11/21/17	10 mL	10 mL	
FB1-112017	K1712610-009	11/20/17	11/21/17	10 mL	10 mL	
Method Blank	KQ1717626-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1717626-02LCS	NA	NA	10 mL	10.3 mL	
Batch QC	KQ1717626-03DUP	NA	NA	10 mL	10 mL	
Batch QC	KQ1717626-04MS	NA	NA	10 mL	10.3 mL	
Batch QC	KQ1717626-05DMS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1717626-06DUP	11/20/17	11/21/17	10 mL	10 mL	
Matrix Spike	KQ1717626-07MS	11/20/17	11/21/17	10 mL	10.3 mL	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	572539	50	50	99	250	247	99	250	243	97

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	572539				250	260	104	250	247	99

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	572539				250	251	100	250	252	101

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	572539				250	249	99			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6020A	572539	0.3	U	0.3	U	0.8	J	4	J

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	572539			0.8	J	0.4	J	0.7	J

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	572539			0.3	J				

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	572539	2.0	2.0	98	70-130	12/06/17 09:32
LLCCV	Iron	6020A	572539	10.7	10.0	107	70-130	12/06/17 11:05
LLCCV	Iron	6020A	572539	10.4	10.0	104	70-130	12/06/17 12:11
LLCCV	Iron	6020A	572539	10.2	10.0	102	70-130	12/06/17 13:16



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	572539	51700	-	-	-	12/06/17 09:34

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	572539	51900	-	-	-	12/06/17 09:37

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1712377-001A	Iron	6020A	572539	60 J	110	50	91	80-120	12/06/17 12:21

Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1712377-001SDL	Iron	6020A	572539	648	658	2	10	12/06/17 12:19
K1712610-001SDL	Iron	6020A	572539	7600	1580	4	10	12/06/17 11:23

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	10	0.3	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-05

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	50000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	12/06/17 09:14	
ZZZZZZ	1	12/06/17 09:17	
ICV	1	12/06/17 09:19	X
CCV	1	12/06/17 09:22	X
ICB	1	12/06/17 09:24	X
CCB	1	12/06/17 09:27	X
ZZZZZZ	1	12/06/17 09:29	
LLICVW	1	12/06/17 09:32	X
ICSA	1	12/06/17 09:34	X
ICSAB	1	12/06/17 09:37	X
ZZZZZZ	1	12/06/17 09:45	
ZZZZZZ	1	12/06/17 09:47	
ZZZZZZ	2	12/06/17 09:50	
ZZZZZZ	2	12/06/17 09:52	
ZZZZZZ	10	12/06/17 09:55	
ZZZZZZ	2	12/06/17 09:57	
ZZZZZZ	2	12/06/17 10:00	
ZZZZZZ	1	12/06/17 10:02	
ZZZZZZ	2	12/06/17 10:13	
ZZZZZZ	1	12/06/17 10:22	
CCV	1	12/06/17 10:25	X
CCB	1	12/06/17 10:27	X
ZZZZZZ	1	12/06/17 10:30	
ZZZZZZ	1	12/06/17 10:33	
ZZZZZZ	1	12/06/17 10:35	
ZZZZZZ	1	12/06/17 10:38	
CCV	1	12/06/17 10:40	X
ZZZZZZ	1	12/06/17 10:43	
CCB	1	12/06/17 10:49	X
ZZZZZZ	1	12/06/17 10:52	
ZZZZZZ	1	12/06/17 10:55	
ZZZZZZ	1	12/06/17 10:57	
ZZZZZZ	1	12/06/17 11:00	
LLCCVW 10 ppb	1	12/06/17 11:05	X
KQ1717626-01MB	1	12/06/17 11:08	X
KQ1717626-02LCS	1	12/06/17 11:10	X
ZZZZZZ	1	12/06/17 11:13	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	12/06/17 11:16	
K1712610-001	1	12/06/17 11:18	X
K1712610-001DUP	1	12/06/17 11:21	X
K1712610-001SDL	1	12/06/17 11:23	X
ZZZZZZ	1	12/06/17 11:26	
K1712610-001MS	1	12/06/17 11:29	X
ZZZZZZ	1	12/06/17 11:31	
CCV	1	12/06/17 11:34	X
ZZZZZZ	1	12/06/17 11:36	
CCB	1	12/06/17 11:39	X
K1712610-002	1	12/06/17 11:42	X
K1712610-003	1	12/06/17 11:45	X
K1712610-004	1	12/06/17 11:48	X
K1712610-005	20	12/06/17 11:50	X
K1712610-006	20	12/06/17 11:53	X
K1712610-007	20	12/06/17 11:55	X
K1712610-008	1	12/06/17 11:58	X
K1712610-009	1	12/06/17 12:00	X
CCV	1	12/06/17 12:03	X
CCB	1	12/06/17 12:06	X
ZZZZZZ	1	12/06/17 12:08	
LLCCVW 10 ppb	1	12/06/17 12:11	X
ZZZZZZ	10	12/06/17 12:13	
K1712377-001DUP	10	12/06/17 12:16	X
K1712377-001SDL	50	12/06/17 12:19	X
K1712377-001PS	10	12/06/17 12:21	X
K1712377-001MS	10	12/06/17 12:24	X
K1712377-001DMS	10	12/06/17 12:26	X
ZZZZZZ	1	12/06/17 12:29	
ZZZZZZ	1	12/06/17 12:32	
ZZZZZZ	1	12/06/17 12:34	
CCV	1	12/06/17 12:37	X
CCB	1	12/06/17 12:39	X
ZZZZZZ	10	12/06/17 12:42	
ZZZZZZ	1	12/06/17 12:45	
ZZZZZZ	1	12/06/17 12:47	
ZZZZZZ	1	12/06/17 12:50	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Dilution Factor	Date/Time	F e
CCV	1	12/06/17 12:52	X
CCB	1	12/06/17 12:55	X
ZZZZZZ	1	12/06/17 12:58	
ZZZZZZ	1	12/06/17 13:00	
ZZZZZZ	1	12/06/17 13:03	
ZZZZZZ	1	12/06/17 13:05	
ZZZZZZ	1	12/06/17 13:08	
ZZZZZZ	1	12/06/17 13:10	
ZZZZZZ	1	12/06/17 13:13	
LLCCVW 10 ppb	1	12/06/17 13:16	X

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Date/Time	Sc45NG	Ge72He	Ge72H2	In115He	Lu175He
ZZZZZZ	12/06/17 09:14					
ZZZZZZ	12/06/17 09:17					
ICV	12/06/17 09:19	100	100	99	99	101
CCV	12/06/17 09:22	100	101	101	98	100
ICB	12/06/17 09:24	102	100	102	99	100
CCB	12/06/17 09:27	100	101	101	100	100
ZZZZZZ	12/06/17 09:29					
LLICVW	12/06/17 09:32	100	100	102	101	101
ICSA	12/06/17 09:34	99	98	97	93	97
ICSAB	12/06/17 09:37	99	97	99	94	98
ZZZZZZ	12/06/17 09:45					
ZZZZZZ	12/06/17 09:47					
ZZZZZZ	12/06/17 09:50					
ZZZZZZ	12/06/17 09:52					
ZZZZZZ	12/06/17 09:55					
ZZZZZZ	12/06/17 09:57					
ZZZZZZ	12/06/17 10:00					
ZZZZZZ	12/06/17 10:02					
ZZZZZZ	12/06/17 10:13					
ZZZZZZ	12/06/17 10:22					
CCV	12/06/17 10:25	110	117	110	114	111
CCB	12/06/17 10:27	108	114	107	114	111
ZZZZZZ	12/06/17 10:30					
ZZZZZZ	12/06/17 10:33					
ZZZZZZ	12/06/17 10:35					
ZZZZZZ	12/06/17 10:38					
CCV	12/06/17 10:40	105	108	106	108	109
ZZZZZZ	12/06/17 10:43					
CCB	12/06/17 10:49	105	109	106	109	106
ZZZZZZ	12/06/17 10:52					
ZZZZZZ	12/06/17 10:55					
ZZZZZZ	12/06/17 10:57					
ZZZZZZ	12/06/17 11:00					
LLCCVW 10 ppb	12/06/17 11:05	107	110	107	110	109
KQ1717626-01MB	12/06/17 11:08	106	110	107	108	107
KQ1717626-02LCS	12/06/17 11:10	106	109	107	109	109
ZZZZZZ	12/06/17 11:13					

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Date/Time	Sc45NG	Ge72He	Ge72H2	In115He	Lu175He
ZZZZZZ	12/06/17 11:16					
K1712610-001	12/06/17 11:18	103	102	100	99	100
K1712610-001DUP	12/06/17 11:21	104	101	97	98	99
K1712610-001SDL	12/06/17 11:23	107	107	104	105	106
ZZZZZZ	12/06/17 11:26					
K1712610-001MS	12/06/17 11:29	102	100	98	97	100
ZZZZZZ	12/06/17 11:31					
CCV	12/06/17 11:34	104	108	104	106	107
ZZZZZZ	12/06/17 11:36					
CCB	12/06/17 11:39	104	108	104	106	105
K1712610-002	12/06/17 11:42	99	100	98	96	101
K1712610-003	12/06/17 11:45	101	100	99	97	101
K1712610-004	12/06/17 11:48	103	100	100	98	101
K1712610-005	12/06/17 11:50	106	107	106	105	106
K1712610-006	12/06/17 11:53	105	108	104	105	105
K1712610-007	12/06/17 11:55	105	109	104	105	106
K1712610-008	12/06/17 11:58	104	102	101	99	103
K1712610-009	12/06/17 12:00	107	106	105	106	107
CCV	12/06/17 12:03	105	107	104	105	105
CCB	12/06/17 12:06	105	105	105	105	104
ZZZZZZ	12/06/17 12:08					
LLCCVW 10 ppb	12/06/17 12:11	105	107	103	105	105
ZZZZZZ	12/06/17 12:13					
K1712377-001DUP	12/06/17 12:16	111	111	109	107	107
K1712377-001SDL	12/06/17 12:19	113	120	114	114	113
K1712377-001PS	12/06/17 12:21	112	116	110	108	109
K1712377-001MS	12/06/17 12:24	114	120	114	112	111
K1712377-001DMS	12/06/17 12:26	118	120	117	112	110
ZZZZZZ	12/06/17 12:29					
ZZZZZZ	12/06/17 12:32					
ZZZZZZ	12/06/17 12:34					
CCV	12/06/17 12:37	110	110	108	109	108
CCB	12/06/17 12:39	110	113	108	111	109
ZZZZZZ	12/06/17 12:42					
ZZZZZZ	12/06/17 12:45					
ZZZZZZ	12/06/17 12:47					
ZZZZZZ	12/06/17 12:50					

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 572539

Sample	Date/Time	Sc45NG	Ge72He	Ge72H2	In115He	Lu175He
CCV	12/06/17 12:52	113	115	117	114	113
CCB	12/06/17 12:55	114	115	112	113	111
ZZZZZZ	12/06/17 12:58					
ZZZZZZ	12/06/17 13:00					
ZZZZZZ	12/06/17 13:03					
ZZZZZZ	12/06/17 13:05					
ZZZZZZ	12/06/17 13:08					
ZZZZZZ	12/06/17 13:10					
ZZZZZZ	12/06/17 13:13					
LLCCVW 10 ppb	12/06/17 13:16	106	107	106	108	109



# 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 10:40  
**Date Received:** 11/21/17 09:10

**Sample Name:** IMW-1-112017  
**Lab Code:** K1712610-001

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	110	2.0	0.80	5	11/29/17 16:18	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	70	64 - 120	11/28/17 18:28	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 11:30  
**Date Received:** 11/21/17 09:10

**Sample Name:** IMW-2-112017  
**Lab Code:** K1712610-002

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	350	4.0	1.6	10	11/29/17 16:37	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	74	64 - 120	11/28/17 18:47	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 12:25  
**Date Received:** 11/21/17 09:10

**Sample Name:** CG-122-60-112017  
**Lab Code:** K1712610-003

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	210	4.0	1.6	10	11/29/17 16:57	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	76	64 - 120	11/28/17 19:06	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 12:30  
**Date Received:** 11/21/17 09:10

**Sample Name:** CG-9-122-60-112017  
**Lab Code:** K1712610-004

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	230	4.0	1.6	10	11/29/17 17:16	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	72	64 - 120	11/28/17 19:26	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 14:50  
**Date Received:** 11/21/17 09:10

**Sample Name:** IP-5-112017  
**Lab Code:** K1712610-005

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	130	2.0	0.80	5	11/29/17 17:35	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	78	64 - 120	11/28/17 19:45	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 15:25  
**Date Received:** 11/21/17 09:10

**Sample Name:** IP-6-112017  
**Lab Code:** K1712610-006

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	180	4.0	1.6	10	11/29/17 17:54	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	73	64 - 120	11/28/17 20:04	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 16:00  
**Date Received:** 11/21/17 09:10

**Sample Name:** IP-7-112017  
**Lab Code:** K1712610-007

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	34	0.40	0.16	1	11/28/17 20:23	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	75	64 - 120	11/28/17 20:23	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 13:05  
**Date Received:** 11/21/17 09:10

**Sample Name:** CG-122-75-112017  
**Lab Code:** K1712610-008

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	82	2.0	0.80	5	11/29/17 18:13	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	79	64 - 120	11/28/17 20:42	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17 13:00  
**Date Received:** 11/21/17 09:10

**Sample Name:** FB1-112017  
**Lab Code:** K1712610-009

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	11/28/17 21:01	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	74	64 - 120	11/28/17 21:01	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** KQ1717587-04

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	11/28/17 17:12	11/27/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	73	64 - 120	11/28/17 17:12	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610

**SURROGATE RECOVERY SUMMARY**

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Extraction Method:** EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		64 - 120
IMW-1-112017	K1712610-001	70
IMW-2-112017	K1712610-002	74
CG-122-60-112017	K1712610-003	76
CG-9-122-60-112017	K1712610-004	72
IP-5-112017	K1712610-005	78
IP-6-112017	K1712610-006	73
IP-7-112017	K1712610-007	75
CG-122-75-112017	K1712610-008	79
FB1-112017	K1712610-009	74
IMW-1-112017	KQ1717587-01	72
IMW-1-112017	KQ1717587-02	78
Lab Control Sample	KQ1717587-03	74
Method Blank	KQ1717587-04	73



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17 16:52

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\112817\1128F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1717643-02  
**Analysis Lot:** 571750  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	53,647	5.23
<b>Upper Limit ==&gt;</b>	107,294	5.73
<b>Lower Limit ==&gt;</b>	26,824	4.73

**Associated Analyses**

Method Blank	KQ1717587-04	63799	5.21
Lab Control Sample	KQ1717587-03	66177	5.22
IMW-1-112017	KQ1717587-01	71759	5.22
IMW-1-112017	KQ1717587-02	65719	5.21
IMW-1-112017	K1712610-001.R01	67280	5.22
IMW-2-112017	K1712610-002.R01	65885	5.21
CG-122-60-112017	K1712610-003.R01	68941	5.22
CG-9-122-60-112017	K1712610-004.R01	68807	5.22
IP-5-112017	K1712610-005.R01	65097	5.21
IP-6-112017	K1712610-006.R01	67579	5.21
IP-7-112017	K1712610-007	64105	5.21
CG-122-75-112017	K1712610-008.R01	65131	5.21
FB1-112017	K1712610-009	68768	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/29/17 13:41

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\112917\1129F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1717721-02  
**Analysis Lot:** 571985  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	48,624	5.22
<b>Upper Limit ==&gt;</b>	97,248	5.72
<b>Lower Limit ==&gt;</b>	24,312	4.72

**Associated Analyses**

IMW-1-112017	K1712610-001	63131	5.21
IMW-2-112017	K1712610-002	59719	5.22
CG-122-60-112017	K1712610-003	60757	5.22
CG-9-122-60-112017	K1712610-004	58762	5.22
IP-5-112017	K1712610-005	62991	5.22
IP-6-112017	K1712610-006	62337	5.22
CG-122-75-112017	K1712610-008	57345	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Collected:** 11/20/17  
**Date Received:** 11/21/17  
**Date Analyzed:** 11/28/17  
**Date Extracted:** 11/27/17

**Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** IMW-1-112017  
**Lab Code:** K1712610-001  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1717587-01		Duplicate Matrix Spike KQ1717587-02		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
1,4-Dioxane	110	101 E	10.0	-40 #	105 E	10.0	-1 #	49-113	4	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17  
**Date Extracted:** 11/27/17

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA  
**Analysis Lot:** 571750

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	KQ1717587-03	7.17	10.0	72	59-111

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17 17:12  
**Date Extracted:** 11/27/17

**Method Blank Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Method Blank  
**Lab Code:** KQ1717587-04  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Instrument ID:** K-MS-26  
**File ID:** J:\MS26\DATA\112817\1128F005.D\  
**Analysis Lot:** 571750  
**Extraction Lot:** 303741

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1717587-03	J:\MS26\DATA\112817\1128F006.D\	11/28/17 17:31
IMW-1-112017	KQ1717587-01	J:\MS26\DATA\112817\1128F007.D\	11/28/17 17:50
IMW-1-112017	KQ1717587-02	J:\MS26\DATA\112817\1128F008.D\	11/28/17 18:09
IMW-1-112017	K1712610-001	J:\MS26\DATA\112817\1128F009.D\	11/28/17 18:28
IMW-2-112017	K1712610-002	J:\MS26\DATA\112817\1128F010.D\	11/28/17 18:47
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112817\1128F011.D\	11/28/17 19:06
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112817\1128F012.D\	11/28/17 19:26
IP-5-112017	K1712610-005	J:\MS26\DATA\112817\1128F013.D\	11/28/17 19:45
IP-6-112017	K1712610-006	J:\MS26\DATA\112817\1128F014.D\	11/28/17 20:04
IP-7-112017	K1712610-007	J:\MS26\DATA\112817\1128F015.D\	11/28/17 20:23
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112817\1128F016.D\	11/28/17 20:42
FB1-112017	K1712610-009	J:\MS26\DATA\112817\1128F017.D\	11/28/17 21:01
IMW-1-112017	K1712610-001	J:\MS26\DATA\112917\1129F006.D\	11/29/17 16:18
IMW-2-112017	K1712610-002	J:\MS26\DATA\112917\1129F007.D\	11/29/17 16:37
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112917\1129F008.D\	11/29/17 16:57
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112917\1129F009.D\	11/29/17 17:16
IP-5-112017	K1712610-005	J:\MS26\DATA\112917\1129F010.D\	11/29/17 17:35
IP-6-112017	K1712610-006	J:\MS26\DATA\112917\1129F011.D\	11/29/17 17:54
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112917\1129F012.D\	11/29/17 18:13

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17 17:31  
**Date Extracted:** 11/27/17

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Lab Control Sample      **Instrument ID:** K-MS-26  
**Lab Code:** KQ1717587-03      **File ID:** J:\MS26\DATA\112817\1128F006.D\  
**Analysis Method:** 8270D      **Analysis Lot:** 571750  
**Prep Method:** EPA 3535A      **Extraction Lot:** 303741

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1717587-04	J:\MS26\DATA\112817\1128F005.D\	11/28/17 17:12
IMW-1-112017	KQ1717587-01	J:\MS26\DATA\112817\1128F007.D\	11/28/17 17:50
IMW-1-112017	KQ1717587-02	J:\MS26\DATA\112817\1128F008.D\	11/28/17 18:09
IMW-1-112017	K1712610-001	J:\MS26\DATA\112817\1128F009.D\	11/28/17 18:28
IMW-2-112017	K1712610-002	J:\MS26\DATA\112817\1128F010.D\	11/28/17 18:47
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112817\1128F011.D\	11/28/17 19:06
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112817\1128F012.D\	11/28/17 19:26
IP-5-112017	K1712610-005	J:\MS26\DATA\112817\1128F013.D\	11/28/17 19:45
IP-6-112017	K1712610-006	J:\MS26\DATA\112817\1128F014.D\	11/28/17 20:04
IP-7-112017	K1712610-007	J:\MS26\DATA\112817\1128F015.D\	11/28/17 20:23
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112817\1128F016.D\	11/28/17 20:42
FB1-112017	K1712610-009	J:\MS26\DATA\112817\1128F017.D\	11/28/17 21:01
IMW-1-112017	K1712610-001	J:\MS26\DATA\112917\1129F006.D\	11/29/17 16:18
IMW-2-112017	K1712610-002	J:\MS26\DATA\112917\1129F007.D\	11/29/17 16:37
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112917\1129F008.D\	11/29/17 16:57
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112917\1129F009.D\	11/29/17 17:16
IP-5-112017	K1712610-005	J:\MS26\DATA\112917\1129F010.D\	11/29/17 17:35
IP-6-112017	K1712610-006	J:\MS26\DATA\112917\1129F011.D\	11/29/17 17:54
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112917\1129F012.D\	11/29/17 18:13

**ALS Group USA, Corp.**  
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QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17 16:33

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\112817\1128F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 571750

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	21.05	575774	Pass
68	69	0	2	1.99	12992	Pass
69	198	0	100	23.88	653082	Pass
70	69	0	2	0.52	3381	Pass
127	198	10	80	37.42	1023495	Pass
197	198	0	2	0.07	1921	Pass
198	442	30	100	61.56	2734893	Pass
199	198	5	9	6.65	181912	Pass
275	198	10	60	32.12	878574	Pass
365	442	1	50	2.75	122207	Pass
441	443	0.01	100	77.57	655603	Pass
442	442	100	100	100.00	4442870	Pass
443	442	15	24	19.02	845169	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1717643-02	J:\MS26\DATA\112817\1128F004.D\	11/28/17 16:52	
Method Blank	KQ1717587-04	J:\MS26\DATA\112817\1128F005.D\	11/28/17 17:12	
Lab Control Sample	KQ1717587-03	J:\MS26\DATA\112817\1128F006.D\	11/28/17 17:31	
IMW-1-112017	KQ1717587-01	J:\MS26\DATA\112817\1128F007.D\	11/28/17 17:50	
IMW-1-112017	KQ1717587-02	J:\MS26\DATA\112817\1128F008.D\	11/28/17 18:09	
IMW-1-112017	K1712610-001	J:\MS26\DATA\112817\1128F009.D\	11/28/17 18:28	
IMW-2-112017	K1712610-002	J:\MS26\DATA\112817\1128F010.D\	11/28/17 18:47	
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112817\1128F011.D\	11/28/17 19:06	
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112817\1128F012.D\	11/28/17 19:26	
IP-5-112017	K1712610-005	J:\MS26\DATA\112817\1128F013.D\	11/28/17 19:45	
IP-6-112017	K1712610-006	J:\MS26\DATA\112817\1128F014.D\	11/28/17 20:04	
IP-7-112017	K1712610-007	J:\MS26\DATA\112817\1128F015.D\	11/28/17 20:23	
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112817\1128F016.D\	11/28/17 20:42	
FB1-112017	K1712610-009	J:\MS26\DATA\112817\1128F017.D\	11/28/17 21:01	

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QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/29/17 13:22

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\112917\1129F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 571985

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	23.15	774287	Pass
68	69	0	2	1.15	9887	Pass
69	198	0	100	25.80	862909	Pass
70	69	0	2	0.49	4252	Pass
127	198	10	80	38.73	1295609	Pass
197	198	0	2	0.29	9778	Pass
198	442	30	100	80.97	3344913	Pass
199	198	5	9	6.83	228567	Pass
275	198	10	60	30.08	1006181	Pass
365	442	1	50	3.07	126738	Pass
441	443	0.01	100	75.94	610453	Pass
442	442	100	100	100.00	4130858	Pass
443	442	15	24	19.46	803840	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1717721-02	J:\MS26\DATA\112917\1129F004.D\	11/29/17 13:41	
IMW-1-112017	K1712610-001	J:\MS26\DATA\112917\1129F006.D\	11/29/17 16:18	
IMW-2-112017	K1712610-002	J:\MS26\DATA\112917\1129F007.D\	11/29/17 16:37	
CG-122-60-112017	K1712610-003	J:\MS26\DATA\112917\1129F008.D\	11/29/17 16:57	
CG-9-122-60-112017	K1712610-004	J:\MS26\DATA\112917\1129F009.D\	11/29/17 17:16	
IP-5-112017	K1712610-005	J:\MS26\DATA\112917\1129F010.D\	11/29/17 17:35	
IP-6-112017	K1712610-006	J:\MS26\DATA\112917\1129F011.D\	11/29/17 17:54	
CG-122-75-112017	K1712610-008	J:\MS26\DATA\112917\1129F012.D\	11/29/17 18:13	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1712610  
**Calibration Date:** 10/12/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1700243  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	KC1700243-01	1,4 DX ICAL 2.0ng/mL SVM56-51D	J:\MS26\DATA\101217\1012F005.D	10/12/2017 10:44
02	KC1700243-02	1,4 DX ICAL 4.0ng/mL SVM56-51E	J:\MS26\DATA\101217\1012F006.D	10/12/2017 11:02
03	KC1700243-03	1,4 DX ICAL 10ng/mL SVM56-51F	J:\MS26\DATA\101217\1012F007.D	10/12/2017 11:20
04	KC1700243-04	1,4 DX ICAL 20ng/mL SVM56-51G	J:\MS26\DATA\101217\1012F008.D	10/12/2017 11:38
05	KC1700243-05	1,4 DX ICAL 50ng/mL SVM56-51H	J:\MS26\DATA\101217\1012F009.D	10/12/2017 11:56
06	KC1700243-06	1,4 DX ICAL 100ng/mL SVM56-51I	J:\MS26\DATA\101217\1012F010.D	10/12/2017 12:14
07	KC1700243-07	1,4 DX ICAL 200ng/mL SVM56-51J	J:\MS26\DATA\101217\1012F011.D	10/12/2017 12:32

**Analyte**

1,4-Dioxane											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.4723	02	4.000	0.4605	03	10.000	0.5185	04	20.000	0.5256
05	50.000	0.4469	06	100.000	0.3679	07	200.000	0.5163			

1,4-Dioxane-d8											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.4877	02	4.000	0.4595	03	10.000	0.5062	04	20.000	0.5252
05	50.000	0.4463	06	100.000	0.366	07	200.000	0.5152			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1712610  
**Calibration Date:** 10/12/2017

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1700243  
**Instrument ID:** K-MS-26

**Signal ID:** 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
1,4-Dioxane	TRG	Average RF	% RSD	11.8	20	0.4726	0.01
1,4-Dioxane-d8	SURR	Average RF	% RSD	11.6	20	0.4723	0.01

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1712610  
**Calibration Date:** 10/12/2017

**Initial Calibration Verification Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1700243  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Aquisition Date
08	KC1700243-08	1,4 DX ICV 20ng/mL SVM56-49H	J:\MS26\DATA\101217\1012F012.D	10/12/2017 12:50

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane	20.0	19.1	4.726E-1	4.504E-1	-4.693	±30	Average RF
1,4-Dioxane-d8	20.0	19.6	4.723E-1	4.625E-1	-2.071	±30	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/28/17 16:52

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\112817\1128F004.D\

**Calibration Date:** 10/12/2017  
**Calibration ID:** KC1700243  
**Analysis Lot:** 571750  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	19.4	0.4726	0.4572	-3.3	NA	±20	Average RF
1,4-Dioxane-d8	20.0	20.0	0.4723	0.4714	-0.2	NA	±20	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:** K1712610  
**Date Analyzed:** 11/29/17 13:41

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\112917\1129F004.D\

**Calibration Date:** 10/12/2017  
**Calibration ID:** KC1700243  
**Analysis Lot:** 571985  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	21.0	0.4726	0.4951	4.8	NA	±20	Average RF
1,4-Dioxane-d8	20.0	22.4	0.4723	0.5282	11.8	NA	±20	Average RF

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: Stericycle Georgetown/375.08

Service Request:K1712610

Analysis Run Log  
1,4-Dioxane by GC/MS

Analysis Method: 8270D

Analysis Lot:571750  
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\MS26\DATA\112817\1128F003.D\	ZZZZZZZ	ZZZZZZZ	11/28/2017	16:33:00	
J:\MS26\DATA\112817\1128F004.D\	Continuing Calibration Verification	KQ1717643-02	11/28/2017	16:52:00	
J:\MS26\DATA\112817\1128F005.D\	Method Blank	KQ1717587-04	11/28/2017	17:12:00	
J:\MS26\DATA\112817\1128F006.D\	Lab Control Sample	KQ1717587-03	11/28/2017	17:31:00	
J:\MS26\DATA\112817\1128F007.D\	IMW-1-112017 MS	KQ1717587-01	11/28/2017	17:50:00	
J:\MS26\DATA\112817\1128F008.D\	IMW-1-112017 DMS	KQ1717587-02	11/28/2017	18:09:00	
J:\MS26\DATA\112817\1128F009.D\	IMW-1-112017	K1712610-001	11/28/2017	18:28:00	
J:\MS26\DATA\112817\1128F010.D\	IMW-2-112017	K1712610-002	11/28/2017	18:47:00	
J:\MS26\DATA\112817\1128F011.D\	CG-122-60-112017	K1712610-003	11/28/2017	19:06:00	
J:\MS26\DATA\112817\1128F012.D\	CG-9-122-60-112017	K1712610-004	11/28/2017	19:26:00	
J:\MS26\DATA\112817\1128F013.D\	IP-5-112017	K1712610-005	11/28/2017	19:45:00	
J:\MS26\DATA\112817\1128F014.D\	IP-6-112017	K1712610-006	11/28/2017	20:04:00	
J:\MS26\DATA\112817\1128F015.D\	IP-7-112017	K1712610-007	11/28/2017	20:23:00	
J:\MS26\DATA\112817\1128F016.D\	CG-122-75-112017	K1712610-008	11/28/2017	20:42:00	
J:\MS26\DATA\112817\1128F017.D\	FB1-112017	K1712610-009	11/28/2017	21:01:00	
J:\MS26\DATA\112817\1128F018.D\	ZZZZZZZ	ZZZZZZZ	11/28/2017	21:21:00	
J:\MS26\DATA\112817\1128F019.D\	ZZZZZZZ	ZZZZZZZ	11/28/2017	21:40:00	
J:\MS26\DATA\112817\1128F020.D\	ZZZZZZZ	ZZZZZZZ	11/28/2017	21:59:00	
J:\MS26\DATA\112817\1128F021.D\	ZZZZZZZ	ZZZZZZZ	11/28/2017	22:18:00	
J:\MS26\DATA\112917\1129F003.D\	ZZZZZZZ	ZZZZZZZ	11/29/2017	13:22:00	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08

**Service Request:**K1712610

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D

**Analysis Lot:**571985

**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\112917\1129F004.D\	Continuing Calibration Verification	KQ1717721-02	11/29/2017	13:41:00	
J:\MS26\DATA\112917\1129F006.D\	IMW-1-112017	K1712610-001	11/29/2017	16:18:00	
J:\MS26\DATA\112917\1129F007.D\	IMW-2-112017	K1712610-002	11/29/2017	16:37:00	
J:\MS26\DATA\112917\1129F008.D\	CG-122-60-112017	K1712610-003	11/29/2017	16:57:00	
J:\MS26\DATA\112917\1129F009.D\	CG-9-122-60-112017	K1712610-004	11/29/2017	17:16:00	
J:\MS26\DATA\112917\1129F010.D\	IP-5-112017	K1712610-005	11/29/2017	17:35:00	
J:\MS26\DATA\112917\1129F011.D\	IP-6-112017	K1712610-006	11/29/2017	17:54:00	
J:\MS26\DATA\112917\1129F012.D\	CG-122-75-112017	K1712610-008	11/29/2017	18:13:00	

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Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:**K1712610

1,4-Dioxane by GC/MS

**Prep Method:** EPA 3535A  
**Analytical Method:** 8270D

**Extraction Lot:**303741

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-112017	K1712610-001	11/20/17	11/21/17	10 mL	2 mL	
IMW-1-112017	K1712610-001	11/20/17	11/21/17	10 mL	2 mL	
IMW-2-112017	K1712610-002	11/20/17	11/21/17	10 mL	2 mL	
IMW-2-112017	K1712610-002	11/20/17	11/21/17	10 mL	2 mL	
CG-122-60-112017	K1712610-003	11/20/17	11/21/17	10 mL	2 mL	
CG-122-60-112017	K1712610-003	11/20/17	11/21/17	10 mL	2 mL	
CG-9-122-60-112017	K1712610-004	11/20/17	11/21/17	10 mL	2 mL	
CG-9-122-60-112017	K1712610-004	11/20/17	11/21/17	10 mL	2 mL	
IP-5-112017	K1712610-005	11/20/17	11/21/17	10 mL	2 mL	
IP-5-112017	K1712610-005	11/20/17	11/21/17	10 mL	2 mL	
IP-6-112017	K1712610-006	11/20/17	11/21/17	10 mL	2 mL	
IP-6-112017	K1712610-006	11/20/17	11/21/17	10 mL	2 mL	
IP-7-112017	K1712610-007	11/20/17	11/21/17	10 mL	2 mL	
CG-122-75-112017	K1712610-008	11/20/17	11/21/17	10 mL	2 mL	
CG-122-75-112017	K1712610-008	11/20/17	11/21/17	10 mL	2 mL	
FB1-112017	K1712610-009	11/20/17	11/21/17	10 mL	2 mL	
Matrix Spike	KQ1717587-01MS	11/20/17	11/21/17	10 mL	2 mL	
Duplicate Matrix Spike	KQ1717587-02DMS	11/20/17	11/21/17	10 mL	2 mL	
Lab Control Sample	KQ1717587-03LCS	NA	NA	10 mL	2 mL	
Method Blank	KQ1717587-04MB	NA	NA	10 mL	2 mL	





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January 12, 2018

**Analytical Report for Service Request No: K1713453**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown Dalton Olmsted / 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory December 14, 2017  
For your reference, these analyses have been assigned our service request number **K1713453**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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    Metals

    1,4-Dioxane by GC/MS

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Received:** 12/14/2017

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt:

Six water samples were received for analysis at ALS Environmental on 12/14/2017. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Semivolatiles by GC/MS:

Method 8270D, 01/03/2018: The control criteria for matrix spike recovery of 1,4-Dioxane for sample CG-127-75-121317 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

#### Metals:

No significant anomalies were noted with this analysis.

#### General Chemistry:

Method 353.2, 12/20/2017: The matrix spike recoveries of Nitrate + Nitrite as Nitrogen for sample CG-127-75-121317 were outside control criteria because of suspected matrix interference. As a result of the interference, the results for this analyte contained a potential low bias. No further corrective action was taken.

Method ApplEnvMic7-87-1536-1540, 12/14/2017: All samples were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

Approved by  Date 01/11/2018



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)



# Chain of Custody Record & Laboratory Analysis Request



2173453  
**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)  
 www.arilabs.com

ARI Assigned Number:		Turn-around Requested: <b>STANDARD</b>		Page: _____ of _____										
ARI Client Company: <b>Dalton District &amp; Englewood (DOF)</b>		Phone: <b>206-375-0211</b>		Date:	Ice Present?									
Client Contact: <b>Tasha Gray</b>		Email: <b>NGRAX@DOENV.COM</b>		No. of Coolers:	Cooler Temps:									
Client Project Name: <b>GEORGETOWN STERICYCLE</b>		Analysis Requested												
Client Project #: <b>375.08</b>		Notes/Comments												
Samplers: <b>L. Kern</b>														
Sampler #: <b>208-316-7223</b>														
Sample ID	Date	Time	Matrix	No. Containers	Nitrate/Nitrite	Ferrous/Ferric	Total Fe	1,4-Dioxane						
CG-127-40-1G-121317	12/13/17	1140	Water	4	Y	X	X	X						
CG-127-40-121317	↓	1205	↓	4	X	X	X	X						
CG-9-127-40-121317	↓	1210	↓	4	X	X	X	X						
CG-127-75-1G-121317	↓	1235	↓	4	X	X	X	X						
CG-127-75-121317	↓	1305	↓	12	X	X	X	X					Perform MS/MSD	
FB-01	↓	1250	↓	4	X	X	X	X						
<i>[Handwritten signature]</i>														
Comments/Special Instructions <b>Bill to: Bill Beel; Stericycle</b>		Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <b>FEDER UNDER</b>		Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>							
		Printed Name: <b>Lube Kern</b>	Printed Name: <b>CUSTODY SEAL</b>		Printed Name: <b>ALS</b>		Printed Name: <b>ALS</b>							
		Company: <b>DOF</b>	Company:		Company:		Company: <b>ALS</b>							
		Date & Time: <b>12-13-17 1450</b>	Date & Time: <b>12-13-17 1450</b>		Date & Time:		Date & Time: <b>12/14/17</b>							

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



PC MH

### Cooler Receipt and Preservation Form

Client ARI Service Request K17 13453  
 Received: 12/14/17 Opened: 12/14/17 By: [Signature] Unloaded: 12/14/17 By: [Signature]

- Samples were received via?  USPS  FedEx  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other NA
- Were custody seals on coolers?  NA  Y  N If yes, how many and where? 1 Front  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.1	-0.2			-0.1	349		7889 2236 0581	

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.* NA  Y  N
- Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

**SHORT HOLD TIME**



# General Chemistry

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Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** None

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Units:** mg/L  
**Basis:** NA

**Nitrate+Nitrite as Nitrogen**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-1G-121317	K1713453-001	ND U	0.050	0.020	1	12/20/17 17:04	
CG-127-40-121317	K1713453-002	<b>0.031 J</b>	0.050	0.020	1	12/20/17 17:04	
CG-9-127-40-121317	K1713453-003	<b>0.033 J</b>	0.050	0.020	1	12/20/17 17:04	
CG-127-75-1G-121317	K1713453-004	<b>0.020 J</b>	0.050	0.020	1	12/20/17 17:04	
CG-127-75-121317	K1713453-005	<b>0.026 J</b>	0.050	0.020	1	12/20/17 17:04	
FB-01	K1713453-006	ND U	0.050	0.020	1	12/20/17 17:04	
Method Blank	K1713453-MB1	ND U	0.050	0.020	1	12/20/17 17:04	
Method Blank	K1713453-MB2	ND U	0.050	0.020	1	12/20/17 17:04	
Method Blank	K1713453-MB3	ND U	0.050	0.020	1	12/20/17 17:04	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 353.2  
**Prep Method:** None

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17

**Units:** mg/L  
**Basis:** NA

Replicate Sample Summary

Nitrate+Nitrite as Nitrogen

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1713435-004DUP	0.050	0.020	1.22	1.23	1.23	<1	20	12/20/17
Batch QC	K1713435-011DUP	0.050	0.020	0.525	0.530	0.528	<1	20	12/20/17
Batch QC	K1713436-001DUP	0.050	0.020	ND U	ND U	NC	NC	20	12/20/17
CG-127-75-121317	K1713453-005DUP	0.050	0.020	0.026 J	ND U	NC	NC	20	12/20/17
Batch QC	K1713624-001DUP	0.050	0.020	ND U	0.040 J	NC	NC	20	12/20/17

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1713435-004 **Basis:** NA  
**Analysis Method:** 353.2  
**Prep Method:** None

Analyte Name	Sample Result	Matrix Spike K1713435-004MS			Duplicate Matrix Spike K1713435-004DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	1.22	6.22	5.00	100	6.19	5.00	99	90-110	1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1713435-011 **Basis:** NA  
**Analysis Method:** 353.2  
**Prep Method:** None

Analyte Name	Sample Result	Matrix Spike K1713435-011MS			Duplicate Matrix Spike K1713435-011DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	0.525	1.52	1.00	99	1.56	1.00	104	90-110	5	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC  
**Lab Code:** K1713436-001  
**Analysis Method:** 353.2  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1713436-001MS			Duplicate Matrix Spike K1713436-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	1.01	1.00	101	1.05	1.00	105	90-110	4	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

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ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005  
**Analysis Method:** 353.2  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1713453-005MS			Duplicate Matrix Spike K1713453-005DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	0.026 J	0.908	1.00	88 *	0.891	1.00	87 *	90-110	1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Nitrate+Nitrite as Nitrogen**

**Sample Name:** Batch QC **Units:** mg/L  
**Lab Code:** K1713624-001 **Basis:** NA  
**Analysis Method:** 353.2  
**Prep Method:** None

Analyte Name	Sample Result	Matrix Spike K1713624-001MS			Duplicate Matrix Spike K1713624-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Nitrate+Nitrite as Nitrogen	ND U	1.06	1.00	106	1.04	1.00	104	90-110	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Analyzed:** 12/20/17  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 574608

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1713453-LCS1	9.78	10.9	90	90-110
Lab Control Sample	K1713453-LCS2	10.3	10.9	94	90-110
Lab Control Sample	K1713453-LCS3	10.5	10.9	96	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

### Continuing Calibration Verification (CCV) Summary

#### Nitrate+Nitrite as Nitrogen

**Analysis Method:** 353.2

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	574608	KQ1718812-22	12/20/17 17:04	1.00	1.04	104	90-110
CCV2	574608	KQ1718812-23	12/20/17 17:04	1.00	1.03	103	90-110
CCV3	574608	KQ1718812-24	12/20/17 17:04	1.00	1.02	102	90-110
CCV4	574608	KQ1718812-25	12/20/17 17:04	1.00	1.02	102	90-110
CCV5	574608	KQ1718812-26	12/20/17 17:04	1.00	1.01	101	90-110
CCV6	574608	KQ1718812-27	12/20/17 17:04	1.00	1.01	101	90-110
CCV7	574608	KQ1718812-28	12/20/17 17:04	1.00	0.958	96	90-110
CCV8	574608	KQ1718812-29	12/20/17 17:04	1.00	0.997	100	90-110
CCV9	574608	KQ1718812-30	12/20/17 17:04	1.00	1.05	105	90-110
CCV10	574608	KQ1718812-31	12/20/17 17:04	1.00	1.03	103	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1713453

**Continuing Calibration Blank (CCB) Summary**  
**Nitrate+Nitrite as Nitrogen**

**Analysis Method:** 353.2

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	574608	KQ1718812-32	12/20/17 17:04	0.050	0.020	ND	U
CCB2	574608	KQ1718812-33	12/20/17 17:04	0.050	0.020	ND	U
CCB3	574608	KQ1718812-34	12/20/17 17:04	0.050	0.020	ND	U
CCB4	574608	KQ1718812-35	12/20/17 17:04	0.050	0.020	ND	U
CCB5	574608	KQ1718812-36	12/20/17 17:04	0.050	0.020	ND	U
CCB6	574608	KQ1718812-37	12/20/17 17:04	0.050	0.020	ND	U
CCB7	574608	KQ1718812-38	12/20/17 17:04	0.050	0.020	ND	U
CCB8	574608	KQ1718812-39	12/20/17 17:04	0.050	0.020	ND	U
CCB9	574608	KQ1718812-40	12/20/17 17:04	0.050	0.020	ND	U
CCB10	574608	KQ1718812-41	12/20/17 17:04	0.050	0.020	ND	U

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17

**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-1G-121317	K1713453-001	6.8	1.0	0.3	5	12/14/17 14:45	*
CG-127-40-121317	K1713453-002	10.6	1.0	0.3	5	12/14/17 14:45	*
CG-9-127-40-121317	K1713453-003	12.9	1.0	0.3	5	12/14/17 14:45	*
CG-127-75-1G-121317	K1713453-004	0.80	0.20	0.05	1	12/14/17 14:45	*
CG-127-75-121317	K1713453-005	0.13 J	0.20	0.05	1	12/14/17 14:45	*
FB-01	K1713453-006	0.06 J	0.20	0.05	1	12/14/17 14:45	*
Method Blank	K1713453-MB1	0.06 J	0.20	0.05	1	12/14/17 14:45	*

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Date Analyzed:** 12/14/17

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1713453-005DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	0.13 J	0.13 J	0.132	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Date Analyzed:** 12/14/17  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1713453-005MS			Duplicate Matrix Spike K1713453-005DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Iron, Divalent (Ferrous Iron)	0.13 J	2.29	2.00	108	2.29	2.00	108	75-125	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	573800	KQ1718371-04	12/14/17 14:45	4.00	4.07	102	90-110
CCV2	573800	KQ1718371-05	12/14/17 14:45	4.00	4.07	102	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1713453

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	573800	KQ1718371-02	12/14/17 14:45	0.20	0.05	0.07	J
CCB2	573800	KQ1718371-03	12/14/17 14:45	0.20	0.05	0.07	J



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-1G-121317  
**Lab Code:** K1713453-001

**Service Request:** K1713453  
**Date Collected:** 12/13/17 11:40  
**Date Received:** 12/14/17 10:10  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	13.2	mg/L	0.0020	0.0003	1	01/02/18 11:37	12/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-40-121317  
**Lab Code:** K1713453-002

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:05  
**Date Received:** 12/14/17 10:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	13.7	mg/L	0.0020	0.0003	1	01/02/18 11:38	12/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-127-40-121317  
**Lab Code:** K1713453-003

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:10  
**Date Received:** 12/14/17 10:10

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	13.4	mg/L	0.0020	0.0003	1	01/02/18 11:40	12/28/17	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-1G-121317  
**Lab Code:** K1713453-004

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:35  
**Date Received:** 12/14/17 10:10  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	4.13	mg/L	0.0020	0.0003	1	01/02/18 11:41	12/28/17	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005

**Service Request:** K1713453  
**Date Collected:** 12/13/17 13:05  
**Date Received:** 12/14/17 10:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	4.12	mg/L	0.0020	0.0003	1	01/02/18 11:42	12/28/17	



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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** FB-01  
**Lab Code:** K1713453-006

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:50  
**Date Received:** 12/14/17 10:10  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0056</b>	mg/L	0.0020	0.0003	1	01/02/18 11:52	12/28/17	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1718978-01

**Service Request:** K1713453  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0012 J</b>	mg/L	0.0020	0.0003	1	01/02/18 11:35	12/28/17	

ALS Group USA, Corp.

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: PSC Georgetown Dalton Olmsted/375.08  
Sample Matrix: Water

Service Request: K1713453  
Date Collected: 12/13/17  
Date Received: 12/14/17  
Date Analyzed: 01/02/18

Replicate Sample Summary

Total Metals

Sample Name: CG-127-75-121317  
Lab Code: K1713453-005

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1718978-03 Result			
Iron	6020A	0.0020	0.0003	4.12	3.97	4.05	4	20

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Date Analyzed:** 01/2/18  
**Date Extracted:** 12/28/17

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1718978-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	4.12	4.16	0.0500	90 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Analyzed:** 01/02/18

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1718978-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0539	0.0500	108	80-120

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Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:**K1713453

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:**305822

<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Collected</b>	<b>Date Received</b>	<b>Sample Amount</b>	<b>Final Amount</b>	<b>Percent Solids</b>
CG-127-40-1G-121317	K1713453-001	12/13/17	12/14/17	10 mL	10 mL	
CG-127-40-121317	K1713453-002	12/13/17	12/14/17	10 mL	10 mL	
CG-9-127-40-121317	K1713453-003	12/13/17	12/14/17	10 mL	10 mL	
CG-127-75-1G-121317	K1713453-004	12/13/17	12/14/17	10 mL	10 mL	
CG-127-75-121317	K1713453-005	12/13/17	12/14/17	10 mL	10 mL	
FB-01	K1713453-006	12/13/17	12/14/17	10 mL	10 mL	
Method Blank	KQ1718978-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1718978-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1718978-03DUP	12/13/17	12/14/17	10 mL	10 mL	
Matrix Spike	KQ1718978-04MS	12/13/17	12/14/17	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	575631	50.0	51.7	103	250	250	100	250	246	99

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	575631				250	252	101	250	250	100



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration</b>			<b>Continuing Calibration</b>			<b>Continuing Calibration</b>		
			<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>	<b>True</b>	<b>Found</b>	<b>%R (1)</b>
Iron	6020A	575631				250	255	102	250	250	100

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank		Continuing Calibration Blank	
			Result	C	Result	C	Result	C	Result	C
Iron	6020A	575631	0.3	U	0.3	U	0.7	J	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**INITIAL AND CONTINUING CALIBRATION BLANK**

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch</b>	<b>Initial Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>		<b>Continuing Calibration Blank</b>	
			<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>	<b>Result</b>	<b>C</b>
Iron	6020A	575631	0.3	U	0.5	J	0.3	U		

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	575631	2.4	2.0	120	70-130	01/02/18 10:58
LLCCV	Iron	6020A	575631	2.4	2.0	121	70-130	01/02/18 11:34
LLCCV	Iron	6020A	575631	2.5	2.0	123	70-130	01/02/18 11:55

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	575631	48400	-	-	-	01/02/18 11:00

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	575631	50600	-	-	-	01/02/18 11:01

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1713453-005SDL	Iron	6020A	575631	4120	4090	1	10	01/02/18 11:44

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A



**ALS Group USA, Corp.**  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-06

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	45000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 575631

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	01/02/18 10:51	
ZZZZZZ	1	01/02/18 10:52	
ICV	1	01/02/18 10:53	X
CCV	1	01/02/18 10:55	X
ICB	1	01/02/18 10:56	X
CCB	1	01/02/18 10:57	X
LLICVW	1	01/02/18 10:58	X
ICSA	1	01/02/18 11:00	X
ICSAB	1	01/02/18 11:01	X
ZZZZZZ	1	01/02/18 11:02	
ZZZZZZ	1	01/02/18 11:03	
ZZZZZZ	1	01/02/18 11:04	
ZZZZZZ	1	01/02/18 11:06	
ZZZZZZ	1	01/02/18 11:07	
ZZZZZZ	1	01/02/18 11:08	
CCV	1	01/02/18 11:09	X
CCB	1	01/02/18 11:10	X
ZZZZZZ	1	01/02/18 11:12	
ZZZZZZ	1	01/02/18 11:13	
ZZZZZZ	1	01/02/18 11:14	
ZZZZZZ	1	01/02/18 11:15	
ZZZZZZ	5	01/02/18 11:16	
ZZZZZZ	1	01/02/18 11:18	
ZZZZZZ	1	01/02/18 11:19	
ZZZZZZ	1	01/02/18 11:20	
ZZZZZZ	1	01/02/18 11:21	
ZZZZZZ	1	01/02/18 11:22	
CCV	1	01/02/18 11:24	X
CCB	1	01/02/18 11:25	X
ZZZZZZ	1	01/02/18 11:26	
ZZZZZZ	1	01/02/18 11:27	
ZZZZZZ	1	01/02/18 11:29	
ZZZZZZ	1	01/02/18 11:30	
CCV	1	01/02/18 11:31	X
CCB	1	01/02/18 11:32	X
LLCCV	1	01/02/18 11:34	X
KQ1718978-01MB	1	01/02/18 11:35	X

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 575631

<b>Sample</b>	<b>Dilution Factor</b>	<b>Date/Time</b>	<b>F e</b>
KQ1718978-02LCS	1	01/02/18 11:36	X
K1713453-001	1	01/02/18 11:37	X
K1713453-002	1	01/02/18 11:38	X
K1713453-003	1	01/02/18 11:40	X
K1713453-004	1	01/02/18 11:41	X
K1713453-005	1	01/02/18 11:42	X
K1713453-005DUP	1	01/02/18 11:43	X
K1713453-005SDL	5	01/02/18 11:44	X
ZZZZZZ	1	01/02/18 11:46	
CCV	1	01/02/18 11:47	X
CCB	1	01/02/18 11:48	X
ZZZZZZ	1	01/02/18 11:49	
K1713453-005MS	1	01/02/18 11:50	X
K1713453-006	1	01/02/18 11:52	X
CCV	1	01/02/18 11:53	X
CCB	1	01/02/18 11:54	X
LLCCV	1	01/02/18 11:55	X

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 575631

Sample	Date/Time	Sc45He	Ge72He
ZZZZZZ	01/02/18 10:51		
ZZZZZZ	01/02/18 10:52		
ICV	01/02/18 10:53	100	98
CCV	01/02/18 10:55	100	98
ICB	01/02/18 10:56	98	99
CCB	01/02/18 10:57	96	95
LLICVW	01/02/18 10:58	98	96
ICSA	01/02/18 11:00	92	93
ICSAB	01/02/18 11:01	90	88
ZZZZZZ	01/02/18 11:02		
ZZZZZZ	01/02/18 11:03		
ZZZZZZ	01/02/18 11:04		
ZZZZZZ	01/02/18 11:06		
ZZZZZZ	01/02/18 11:07		
ZZZZZZ	01/02/18 11:08		
CCV	01/02/18 11:09	94	95
CCB	01/02/18 11:10	95	96
ZZZZZZ	01/02/18 11:12		
ZZZZZZ	01/02/18 11:13		
ZZZZZZ	01/02/18 11:14		
ZZZZZZ	01/02/18 11:15		
ZZZZZZ	01/02/18 11:16		
ZZZZZZ	01/02/18 11:18		
ZZZZZZ	01/02/18 11:19		
ZZZZZZ	01/02/18 11:20		
ZZZZZZ	01/02/18 11:21		
ZZZZZZ	01/02/18 11:22		
CCV	01/02/18 11:24	102	99
CCB	01/02/18 11:25	102	102
ZZZZZZ	01/02/18 11:26		
ZZZZZZ	01/02/18 11:27		
ZZZZZZ	01/02/18 11:29		
ZZZZZZ	01/02/18 11:30		
CCV	01/02/18 11:31	100	98
CCB	01/02/18 11:32	102	98
LLCCV	01/02/18 11:34	104	99
KQ1718978-01MB	01/02/18 11:35	103	101

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 575631

Sample	Date/Time	Sc45He	Ge72He
KQ1718978-02LCS	01/02/18 11:36	105	102
K1713453-001	01/02/18 11:37	96	94
K1713453-002	01/02/18 11:38	97	94
K1713453-003	01/02/18 11:40	96	94
K1713453-004	01/02/18 11:41	96	92
K1713453-005	01/02/18 11:42	99	91
K1713453-005DUP	01/02/18 11:43	99	96
K1713453-005SDL	01/02/18 11:44	101	98
ZZZZZZ	01/02/18 11:46		
CCV	01/02/18 11:47	100	99
CCB	01/02/18 11:48	106	102
ZZZZZZ	01/02/18 11:49		
K1713453-005MS	01/02/18 11:50	102	96
K1713453-006	01/02/18 11:52	102	103
CCV	01/02/18 11:53	106	102
CCB	01/02/18 11:54	105	104
LLCCV	01/02/18 11:55	106	103



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 11:40  
**Date Received:** 12/14/17 10:10

**Sample Name:** CG-127-40-1G-121317  
**Lab Code:** K1713453-001

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	360	8.0	3.2	20	01/04/18 18:42	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	96	48 - 118	01/03/18 22:43	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:05  
**Date Received:** 12/14/17 10:10

**Sample Name:** CG-127-40-121317  
**Lab Code:** K1713453-002

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	340	8.0	3.2	20	01/04/18 19:00	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	88	48 - 118	01/03/18 23:01	



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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:10  
**Date Received:** 12/14/17 10:10

**Sample Name:** CG-9-127-40-121317  
**Lab Code:** K1713453-003

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	280	8.0	3.2	20	01/04/18 19:18	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	88	48 - 118	01/03/18 23:20	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:35  
**Date Received:** 12/14/17 10:10

**Sample Name:** CG-127-75-1G-121317  
**Lab Code:** K1713453-004

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	610	8.0	3.2	20	01/04/18 19:37	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	86	48 - 118	01/03/18 23:38	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 13:05  
**Date Received:** 12/14/17 10:10

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	660	8.0	3.2	20	01/04/18 19:55	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	81	48 - 118	01/03/18 22:25	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17 12:50  
**Date Received:** 12/14/17 10:10

**Sample Name:** FB-01  
**Lab Code:** K1713453-006

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	01/03/18 23:56	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	76	48 - 118	01/03/18 23:56	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** KQ1718625-04

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	01/03/18 21:12	12/20/17	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	94	48 - 118	01/03/18 21:12	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453

**SURROGATE RECOVERY SUMMARY**

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Extraction Method:** EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		48 - 118
Method Blank	KQ1718625-04	94
Lab Control Sample	KQ1718625-03	92
CG-127-75-121317 MS	KQ1718625-01	84
CG-127-75-121317 DMS	KQ1718625-02	83
CG-127-75-121317	K1713453-005	81
CG-127-40-1G-121317	K1713453-001	96
CG-127-40-121317	K1713453-002	88
CG-9-127-40-121317	K1713453-003	88
CG-127-75-1G-121317	K1713453-004	86
FB-01	K1713453-006	76

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18 20:53

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\010318\0103F039.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1800087-02  
**Analysis Lot:** 575849  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	65,258	5.25
<b>Upper Limit ==&gt;</b>	130,516	5.75
<b>Lower Limit ==&gt;</b>	32,629	4.75

**Associated Analyses**

Method Blank	KQ1718625-04	59431	5.25
Lab Control Sample	KQ1718625-03	64927	5.25
CG-127-75-121317	KQ1718625-01	63015	5.24
CG-127-75-121317	KQ1718625-02	68307	5.25
CG-127-75-121317	K1713453-005.R01	63609	5.25
CG-127-40-1G-121317	K1713453-001.R01	73500	5.25
CG-127-40-121317	K1713453-002.R01	66257	5.24
CG-9-127-40-121317	K1713453-003.R01	63939	5.24
CG-127-75-1G-121317	K1713453-004.R01	64170	5.25
FB-01	K1713453-006	76079	5.25

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/04/18 09:31

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\010418\0104F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1800309-03  
**Analysis Lot:** 576488  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	75,830	5.25
<b>Upper Limit ==&gt;</b>	151,660	5.75
<b>Lower Limit ==&gt;</b>	37,915	4.75

**Associated Analyses**

CG-127-40-1G-121317	K1713453-001	74313	5.24
CG-127-40-121317	K1713453-002	66699	5.25
CG-9-127-40-121317	K1713453-003	74998	5.24
CG-127-75-1G-121317	K1713453-004	81931	5.25
CG-127-75-121317	K1713453-005	81235	5.25



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Collected:** 12/13/17  
**Date Received:** 12/14/17  
**Date Analyzed:** 01/3/18  
**Date Extracted:** 12/20/17

**Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** CG-127-75-121317  
**Lab Code:** K1713453-005  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1718625-01		Duplicate Matrix Spike KQ1718625-02		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
1,4-Dioxane	660	666 E	10.0	33 #	645 E	10.0	-174 #	33-127	3	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18  
**Date Extracted:** 12/20/17

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA  
**Analysis Lot:** 575849

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	KQ1718625-03	9.19	10.0	92	52-111

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18 21:12  
**Date Extracted:** 12/20/17

**Method Blank Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Method Blank  
**Lab Code:** KQ1718625-04  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Instrument ID:** K-MS-26  
**File ID:** J:\MS26\DATA\010318\0103F040.D\  
**Analysis Lot:** 575849  
**Extraction Lot:** 305374

This Method Blank applies to the following analyses.

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>
Lab Control Sample	KQ1718625-03	J:\MS26\DATA\010318\0103F041.D\	01/03/18 21:30
CG-127-75-121317	KQ1718625-01	J:\MS26\DATA\010318\0103F042.D\	01/03/18 21:48
CG-127-75-121317	KQ1718625-02	J:\MS26\DATA\010318\0103F043.D\	01/03/18 22:07
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010318\0103F044.D\	01/03/18 22:25
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010318\0103F045.D\	01/03/18 22:43
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010318\0103F046.D\	01/03/18 23:01
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010318\0103F047.D\	01/03/18 23:20
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010318\0103F048.D\	01/03/18 23:38
FB-01	K1713453-006	J:\MS26\DATA\010318\0103F049.D\	01/03/18 23:56
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010418\0104F032.D\	01/04/18 18:42
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010418\0104F033.D\	01/04/18 19:00
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010418\0104F034.D\	01/04/18 19:18
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010418\0104F035.D\	01/04/18 19:37
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010418\0104F036.D\	01/04/18 19:55

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18 21:30  
**Date Extracted:** 12/20/17

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Lab Control Sample      **Instrument ID:** K-MS-26  
**Lab Code:** KQ1718625-03      **File ID:** J:\MS26\DATA\010318\0103F041.D\  
**Analysis Method:** 8270D      **Analysis Lot:** 575849  
**Prep Method:** EPA 3535A      **Extraction Lot:** 305374

This Lab Control Sample applies to the following analyses.

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>
Method Blank	KQ1718625-04	J:\MS26\DATA\010318\0103F040.D\	01/03/18 21:12
CG-127-75-121317	KQ1718625-01	J:\MS26\DATA\010318\0103F042.D\	01/03/18 21:48
CG-127-75-121317	KQ1718625-02	J:\MS26\DATA\010318\0103F043.D\	01/03/18 22:07
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010318\0103F044.D\	01/03/18 22:25
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010318\0103F045.D\	01/03/18 22:43
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010318\0103F046.D\	01/03/18 23:01
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010318\0103F047.D\	01/03/18 23:20
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010318\0103F048.D\	01/03/18 23:38
FB-01	K1713453-006	J:\MS26\DATA\010318\0103F049.D\	01/03/18 23:56
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010418\0104F032.D\	01/04/18 18:42
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010418\0104F033.D\	01/04/18 19:00
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010418\0104F034.D\	01/04/18 19:18
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010418\0104F035.D\	01/04/18 19:37
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010418\0104F036.D\	01/04/18 19:55

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18 20:35

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\010318\0103F038.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 575849

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.61	497582	Pass
68	69	0	2	1.76	10685	Pass
69	198	0	100	20.27	607233	Pass
70	69	0	2	0.47	2824	Pass
127	198	10	80	35.34	1058294	Pass
197	198	0	2	0.54	16159	Pass
198	442	30	100	51.90	2995008	Pass
199	198	5	9	6.58	196962	Pass
275	198	10	60	33.15	992832	Pass
365	442	1	50	2.42	139504	Pass
441	443	0.01	100	78.09	848640	Pass
442	442	100	100	100.00	5770922	Pass
443	442	15	24	18.83	1086762	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1800087-02	J:\MS26\DATA\010318\0103F039.D\	01/03/18 20:53	
Method Blank	KQ1718625-04	J:\MS26\DATA\010318\0103F040.D\	01/03/18 21:12	
Lab Control Sample	KQ1718625-03	J:\MS26\DATA\010318\0103F041.D\	01/03/18 21:30	
CG-127-75-121317	KQ1718625-01	J:\MS26\DATA\010318\0103F042.D\	01/03/18 21:48	
CG-127-75-121317	KQ1718625-02	J:\MS26\DATA\010318\0103F043.D\	01/03/18 22:07	
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010318\0103F044.D\	01/03/18 22:25	
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010318\0103F045.D\	01/03/18 22:43	
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010318\0103F046.D\	01/03/18 23:01	
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010318\0103F047.D\	01/03/18 23:20	
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010318\0103F048.D\	01/03/18 23:38	
FB-01	K1713453-006	J:\MS26\DATA\010318\0103F049.D\	01/03/18 23:56	

**ALS Group USA, Corp.**  
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QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/04/18 09:13

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\010418\0104F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 576488

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	18.51	625758	Pass
68	69	0	2	1.55	11784	Pass
69	198	0	100	22.53	761415	Pass
70	69	0	2	0.52	3938	Pass
127	198	10	80	37.86	1279541	Pass
197	198	0	2	0.47	15731	Pass
198	442	30	100	70.34	3380053	Pass
199	198	5	9	6.65	224768	Pass
275	198	10	60	30.64	1035797	Pass
365	442	1	50	2.76	132658	Pass
441	443	0.01	100	76.81	709354	Pass
442	442	100	100	100.00	4805120	Pass
443	442	15	24	19.22	923520	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1800309-03	J:\MS26\DATA\010418\0104F004.D\	01/04/18 09:31	
CG-127-40-1G-121317	K1713453-001	J:\MS26\DATA\010418\0104F032.D\	01/04/18 18:42	
CG-127-40-121317	K1713453-002	J:\MS26\DATA\010418\0104F033.D\	01/04/18 19:00	
CG-9-127-40-121317	K1713453-003	J:\MS26\DATA\010418\0104F034.D\	01/04/18 19:18	
CG-127-75-1G-121317	K1713453-004	J:\MS26\DATA\010418\0104F035.D\	01/04/18 19:37	
CG-127-75-121317	K1713453-005	J:\MS26\DATA\010418\0104F036.D\	01/04/18 19:55	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1713453  
**Calibration Date:** 1/2/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Aquisition Date
01	KC1800002-01	1,4DX ICAL 2.0ng/mL SVM57-79A	J:\MS26\DATA\010218\0102F010.D	01/02/2018 15:42
02	KC1800002-02	1,4DX ICAL 4.0ng/mL SVM57-79B	J:\MS26\DATA\010218\0102F011.D	01/02/2018 16:00
03	KC1800002-03	1,4DX ICAL 10ng/mL SVM57-79C	J:\MS26\DATA\010218\0102F012.D	01/02/2018 16:18
04	KC1800002-04	1,4DX ICAL 20ng/mL SVM57-79D	J:\MS26\DATA\010218\0102F013.D	01/02/2018 16:36
05	KC1800002-05	1,4DX ICAL 50ng/mL SVM57-79E	J:\MS26\DATA\010218\0102F014.D	01/02/2018 16:55
06	KC1800002-06	1,4DX ICAL 100ng/mL SVM57-79F	J:\MS26\DATA\010218\0102F015.D	01/02/2018 17:13
07	KC1800002-07	1,4DX ICAL 200ng/mL SVM57-79G	J:\MS26\DATA\010218\0102F016.D	01/02/2018 17:31

**Analyte**

1,4-Dioxane											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3773	02	4.000	0.3703	03	10.000	0.3742	04	20.000	0.3958
05	50.000	0.4139	06	100.000	0.405	07	200.000	0.4094			

1,4-Dioxane-d8											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3187	02	4.000	0.3889	03	10.000	0.384	04	20.000	0.3974
05	50.000	0.4192	06	100.000	0.4045	07	200.000	0.4116			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1713453  
**Calibration Date:** 1/2/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002

**Signal ID:** 1

**Instrument ID:** K-MS-26

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
1,4-Dioxane	TRG	Average RF	% RSD	4.6	20	0.3923	0.01
1,4-Dioxane-d8	SURR	Average RF	% RSD	8.6	20	0.3892	0.01



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1713453  
**Calibration Date:** 1/2/2018

**Initial Calibration Verification Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Aquisition Date
08	KC1800002-08	1,4DX ICV 20ng/mL SVM57-79H	J:\MS26\DATA\010218\0102F017.D	01/02/2018 17:49

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane	20.0	18.7	3.923E-1	3.659E-1	-6.736	±30	Average RF
1,4-Dioxane-d8	20.0	19.2	3.892E-1	3.744E-1	-3.799	±30	Average RF

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/03/18 20:53

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\010318\0103F039.D\

**Calibration Date:** 1/2/2018  
**Calibration ID:** KC1800002  
**Analysis Lot:** 575849  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	21.4	0.3923	0.42	7.1	NA	±20	Average RF
1,4-Dioxane-d8	20.0	21.5	0.3892	0.4185	7.5	NA	±20	Average RF

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453  
**Date Analyzed:** 01/04/18 09:31

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\010418\0104F004.D\

**Calibration Date:** 1/2/2018  
**Calibration ID:** KC1800002  
**Analysis Lot:** 576488  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	19.7	0.3923	0.3869	-1.4	NA	±20	Average RF
1,4-Dioxane-d8	20.0	20.2	0.3892	0.393	1.0	NA	±20	Average RF

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1713453

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D

**Analysis Lot:** 575849

**Instrument ID:** K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\MS26\DATA\010318\0103F038.D\	ZZZZZZZ	ZZZZZZZ	1/3/2018	20:35:00	
J:\MS26\DATA\010318\0103F039.D\	Continuing Calibration Verification	KQ1800087-02	1/3/2018	20:53:00	
J:\MS26\DATA\010318\0103F040.D\	Method Blank	KQ1718625-04	1/3/2018	21:12:00	
J:\MS26\DATA\010318\0103F041.D\	Lab Control Sample	KQ1718625-03	1/3/2018	21:30:00	
J:\MS26\DATA\010318\0103F042.D\	CG-127-75-121317 MS	KQ1718625-01	1/3/2018	21:48:00	
J:\MS26\DATA\010318\0103F043.D\	CG-127-75-121317 DMS	KQ1718625-02	1/3/2018	22:07:00	
J:\MS26\DATA\010318\0103F044.D\	CG-127-75-121317	K1713453-005	1/3/2018	22:25:00	
J:\MS26\DATA\010318\0103F045.D\	CG-127-40-1G-121317	K1713453-001	1/3/2018	22:43:00	
J:\MS26\DATA\010318\0103F046.D\	CG-127-40-121317	K1713453-002	1/3/2018	23:01:00	
J:\MS26\DATA\010318\0103F047.D\	CG-9-127-40-121317	K1713453-003	1/3/2018	23:20:00	
J:\MS26\DATA\010318\0103F048.D\	CG-127-75-1G-121317	K1713453-004	1/3/2018	23:38:00	
J:\MS26\DATA\010318\0103F049.D\	FB-01	K1713453-006	1/3/2018	23:56:00	
J:\MS26\DATA\010318\0103F050.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	00:15:00	
J:\MS26\DATA\010318\0103F051.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	00:33:00	
J:\MS26\DATA\010318\0103F052.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	00:51:00	
J:\MS26\DATA\010318\0103F053.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	01:09:00	
J:\MS26\DATA\010318\0103F054.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	01:28:00	
J:\MS26\DATA\010318\0103F055.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	01:46:00	
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J:\MS26\DATA\010318\0103F057.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	02:23:00	
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J:\MS26\DATA\010318\0103F061.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	03:36:00	
J:\MS26\DATA\010318\0103F062.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	03:54:00	
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J:\MS26\DATA\010418\0104F010.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	12:00:00	
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J:\MS26\DATA\010418\0104F012.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	12:36:00	
J:\MS26\DATA\010418\0104F013.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	12:55:00	
J:\MS26\DATA\010418\0104F014.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	13:13:00	
J:\MS26\DATA\010418\0104F015.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	13:31:00	
J:\MS26\DATA\010418\0104F016.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	13:49:00	
J:\MS26\DATA\010418\0104F017.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	14:08:00	
J:\MS26\DATA\010418\0104F018.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	14:26:00	
J:\MS26\DATA\010418\0104F019.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	14:44:00	
J:\MS26\DATA\010418\0104F020.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	15:02:00	
J:\MS26\DATA\010418\0104F021.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	15:21:00	
J:\MS26\DATA\010418\0104F022.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	15:39:00	
J:\MS26\DATA\010418\0104F023.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	15:57:00	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1713453

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D

**Analysis Lot:**575849  
**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\010418\0104F024.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	16:16:00	
J:\MS26\DATA\010418\0104F025.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	16:34:00	
J:\MS26\DATA\010418\0104F026.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	16:52:00	
J:\MS26\DATA\010418\0104F027.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	17:10:00	
J:\MS26\DATA\010418\0104F028.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	17:29:00	
J:\MS26\DATA\010418\0104F029.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	17:47:00	
J:\MS26\DATA\010418\0104F030.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	18:05:00	
J:\MS26\DATA\010418\0104F031.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	18:23:00	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1713453

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D

**Analysis Lot:**576488

**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\010418\0104F004.D\	Continuing Calibration Verification	KQ1800309-03	1/4/2018	09:31:00	
J:\MS26\DATA\010418\0104F032.D\	CG-127-40-1G-121317	K1713453-001	1/4/2018	18:42:00	
J:\MS26\DATA\010418\0104F033.D\	CG-127-40-121317	K1713453-002	1/4/2018	19:00:00	
J:\MS26\DATA\010418\0104F034.D\	CG-9-127-40-121317	K1713453-003	1/4/2018	19:18:00	
J:\MS26\DATA\010418\0104F035.D\	CG-127-75-1G-121317	K1713453-004	1/4/2018	19:37:00	
J:\MS26\DATA\010418\0104F036.D\	CG-127-75-121317	K1713453-005	1/4/2018	19:55:00	

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Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:**K1713453

1,4-Dioxane by GC/MS

**Prep Method:** EPA 3535A  
**Analytical Method:** 8270D

**Extraction Lot:**305374

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
CG-127-40-1G-121317	K1713453-001	12/13/17	12/14/17	10 mL	2 mL	
CG-127-40-1G-121317	K1713453-001	12/13/17	12/14/17	10 mL	2 mL	
CG-127-40-121317	K1713453-002	12/13/17	12/14/17	10 mL	2 mL	
CG-127-40-121317	K1713453-002	12/13/17	12/14/17	10 mL	2 mL	
CG-9-127-40-121317	K1713453-003	12/13/17	12/14/17	10 mL	2 mL	
CG-9-127-40-121317	K1713453-003	12/13/17	12/14/17	10 mL	2 mL	
CG-127-75-1G-121317	K1713453-004	12/13/17	12/14/17	10 mL	2 mL	
CG-127-75-1G-121317	K1713453-004	12/13/17	12/14/17	10 mL	2 mL	
CG-127-75-121317	K1713453-005	12/13/17	12/14/17	10 mL	2 mL	
CG-127-75-121317	K1713453-005	12/13/17	12/14/17	10 mL	2 mL	
FB-01	K1713453-006	12/13/17	12/14/17	10 mL	2 mL	
Matrix Spike	KQ1718625-01MS	12/13/17	12/14/17	10 mL	2 mL	
Duplicate Matrix Spike	KQ1718625-02DMS	12/13/17	12/14/17	10 mL	2 mL	
Lab Control Sample	KQ1718625-03LCS	NA	NA	10 mL	2 mL	
Method Blank	KQ1718625-04MB	NA	NA	10 mL	2 mL	



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March 21, 2018

**Analytical Report for Service Request No: K1801813**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Kent, WA 98032

**RE: PSC Georgetown Dalton Olmsted / 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory February 27, 2018  
For your reference, these analyses have been assigned our service request number **K1801813**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager





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Raw Data

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    Metals

    1,4-Dioxane by GCMS

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Received:** 02/27/2018

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt:

Nine water samples were received for analysis at ALS Environmental on 02/27/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Semivolatiles by GC/MS:

Method 8270D, 03/08/2018: All samples except sample FB-1-022618 required dilution due to the presence of elevated levels of 1,4-Dioxane. The reporting limits are adjusted to reflect the dilution.

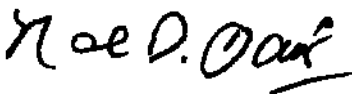
Method 8270D, 03/08/2018: The control criteria for matrix spike recovery of 1,4-Dioxane for sample IMW-1-022618 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

#### Metals:

No significant anomalies were noted with this analysis.

#### General Chemistry:

Method ApplEnvMic7-87-1536-1540, 02/27/2018: The matrix spike recoveries of Divalent Iron (Ferrous Iron) for sample IP-5-022618 were outside control criteria because of suspected matrix interference. As a result of the interference, the results for this analyte contained a potential low bias. No further corrective action was taken.



Approved by \_\_\_\_\_

Date 03/20/2018



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



86975

CHAIN OF CUSTODY

86975

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SR# K1801813  
 COC Set \_\_\_ of \_\_\_  
 COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
 www.alsglobal.com

Project Name <b>Stierade Georgetown</b>		Project Number <b>375.08</b>		NUMBER OF CONTAINERS <b>4</b>	24H	7D	28D	180D							
Project Manager <b>Tanya Gray</b>					8270D / 1,4-Dioxane										
Company <b>Pallco, Diverted, G. Englewood (DOF)</b>					300.0 / SO4										
Address <b>1001 SW Klickitat Way, Suite 200B, Seattle, WA</b>					8020A / Metals T										
Phone # <b>206-375-0211</b>		Email <b>NGRAY@DOFW.COM</b>		1 Ferrous / Ferric Fe											
Sampler Signature		Sampler Printed Name <b>L. Kerner</b>		2											
CLIENT SAMPLE ID		LABID	SAMPLING Date Time	Matrix										Remarks	
1. <b>IMU-1-022618</b>			<b>07/24/18 1320</b>	<b>Water</b>	<b>12</b>	X	X	X	X					<b>MS/MSD</b>	
2. <b>IMU-2-022618</b>			<b>1405</b>		<b>4</b>	X	X	X	X						
3. <b>IP-5-022618</b>			<b>1545</b>		<b>4</b>	X	X	X	X					<b>*</b>	
4. <b>IP-6-022618</b>			<b>1440</b>		<b>4</b>	X	X	X	X					<b>*</b>	
5. <b>IP-7-022618</b>			<b>1510</b>		<b>4</b>	X	X	X	X					<b>*</b>	
6. <b>CG-122-60-022618</b>			<b>1135</b>		<b>4</b>	X	X	X	X						
7. <b>CG-122-75-022618</b>			<b>1050</b>		<b>4</b>	X	X	X	X						
8. <b>CG-9-122-60-022618</b>			<b>1140</b>		<b>4</b>	X	X	X	X						
9. <b>FB-1022618</b>			<b>1040</b>		<b>4</b>	X	X	X	X						
10.															

<b>Report Requirements</b> <input checked="" type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input checked="" type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD	<b>Invoice Information</b> P.O.# <b>375.08</b> Bill To: <b>Bill Beck</b> <b>Stiercycle</b>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu <b>Fe</b> Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg			
	<b>Turnaround Requirements</b> <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> Standard	Special Instructions/Comments: <input type="checkbox"/> *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other ___ (Circle One) <b>* High concentrations of Sodium Persulphate</b> <b>- 1,4-Dioxane preserved w/ Ascorbic Acid</b> <b>Data to T. Gray, B. Beck, J. McAree</b>			
	Requested Report Date				
Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <b>LK</b>	Signature <b>Fedex</b>	Signature	Signature <b>Daniel Johnson</b>	Signature	Signature
Printed Name <b>Luke Kerner</b>	Printed Name <b>Custody Seal</b>	Printed Name	Printed Name <b>ALSK</b>	Printed Name	Printed Name
Firm <b>DOF</b>	Firm	Firm	Firm <b>2-27-18 0945</b>	Firm	Firm
Date/Time <b>07-26-18</b>	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time





PC MH

### Cooler Receipt and Preservation Form

01813

Client ALTAH - STEROCYCLE Service Request K18  
 Received: 2-27-18 Opened: 2-27-18 By: ASP Unloaded: 2-27-18 By: ASP

1. Samples were received via? **USPS** Fed Ex **UPS** **DHL** **PDX** **Courier** **Hand Delivered**
2. Samples were received in: (circle) Cooler **Box** **Envelope** **Other** NA
3. Were custody seals on coolers? **NA** Y **N** If yes, how many and where? 1 Top Front  
 If present, were custody seals intact? Y **N** If present, were they signed and dated? Y **N**

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.0	1.2	5.8	6.0	10.2	386		7115 9456 5710		

4. Packing material: **Inserts** **Baggies** Bubble Wrap Gel Packs **Wet Ice** **Dry Ice** **Sleeves**
5. Were custody papers properly filled out (ink, signed, etc.)? **NA** Y **N**
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* **NA** Y **N**  
 If applicable, tissue samples were received: **Frozen** **Partially Thawed** **Thawed**
7. Were all sample labels complete (i.e analysis, preservation, etc.)? **NA** Y **N**
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* **NA** Y **N**
9. Were appropriate bottles/containers and volumes received for the tests indicated? **NA** Y **N**
10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? *Indicate in the table below* **NA** Y **N**
11. Were VOA vials received without headspace? *Indicate in the table below.* NA **Y** **N**
12. Was C12/Res negative? NA **Y** **N**

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

**SHORT HOLD TIME**



# General Chemistry

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**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** None

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-022618	K1801813-001	<b>662</b>	20	2	200	03/11/18 03:23	
IMW-2-022618	K1801813-002	<b>396</b>	10	1	100	03/11/18 04:07	
IP-5-022618	K1801813-003	<b>253</b>	10	1	100	03/11/18 04:17	
IP-6-022618	K1801813-004	<b>137</b>	10	1	100	03/11/18 04:28	
IP-7-022618	K1801813-005	<b>181</b>	5.0	0.5	50	03/11/18 09:39	
CG-122-60-022618	K1801813-006	<b>363</b>	5.0	0.5	50	03/11/18 05:11	
CG-122-75-022618	K1801813-007	<b>0.07 J</b>	0.20	0.02	2	03/11/18 09:50	
CG-9-122-60-022618	K1801813-008	<b>383</b>	10	1	100	03/11/18 10:02	
FB-1-022618	K1801813-009	ND U	0.10	0.01	1	03/11/18 10:13	
Method Blank	K1801813-MB1	ND U	0.10	0.01	1	03/10/18 08:06	
Method Blank	K1801813-MB2	ND U	0.10	0.01	1	03/10/18 15:02	
Method Blank	K1801813-MB3	ND U	0.10	0.01	1	03/11/18 03:01	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 03/11/18

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-022618 **Units:** mg/L  
**Lab Code:** K1801813-001 **Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1801813-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Sulfate	300.0	20	2	662	656	659	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 03/11/18  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001  
**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike		Duplicate Matrix Spike		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	662	1460	800	99	1470	800	101	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

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ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Analyzed:** 03/10/18  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 583176

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1801813-LCS1	4.89	5.00	98	90-110
Lab Control Sample	K1801813-LCS2	4.96	5.00	99	90-110
Lab Control Sample	K1801813-LCS3	4.99	5.00	100	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	583176	KQ1803351-22	03/10/18 08:16	5.00	4.95	99	90-110
CCV2	583176	KQ1803351-23	03/10/18 10:24	5.00	4.91	98	90-110
CCV3	583176	KQ1803351-24	03/10/18 13:25	5.00	4.95	99	90-110
CCV4	583176	KQ1803351-25	03/10/18 15:56	5.00	5.06	101	90-110
CCV5	583176	KQ1803351-26	03/10/18 18:15	5.00	4.95	99	90-110
CCV6	583176	KQ1803351-27	03/10/18 20:36	5.00	5.00	100	90-110
CCV7	583176	KQ1803351-28	03/11/18 01:11	5.00	4.97	99	90-110
CCV8	583176	KQ1803351-29	03/11/18 04:50	5.00	4.89	98	90-110
CCV9	583176	KQ1803351-30	03/11/18 05:55	5.00	4.94	99	90-110
CCV10	583176	KQ1803351-31	03/11/18 10:24	5.00	4.88	98	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**Continuing Calibration Blank (CCB) Summary**  
**Sulfate**

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	583176	KQ1803351-32	03/10/18 08:27	0.10	0.01	ND	U
CCB2	583176	KQ1803351-33	03/10/18 10:57	0.10	0.01	ND	U
CCB3	583176	KQ1803351-34	03/10/18 13:36	0.10	0.01	ND	U
CCB4	583176	KQ1803351-35	03/10/18 16:07	0.10	0.01	0.05	J
CCB5	583176	KQ1803351-36	03/10/18 18:26	0.10	0.01	ND	U
CCB6	583176	KQ1803351-37	03/10/18 20:47	0.10	0.01	ND	U
CCB7	583176	KQ1803351-38	03/11/18 01:27	0.10	0.01	ND	U
CCB8	583176	KQ1803351-39	03/11/18 05:01	0.10	0.01	ND	U
CCB9	583176	KQ1803351-40	03/11/18 06:06	0.10	0.01	ND	U
CCB10	583176	KQ1803351-41	03/11/18 10:36	0.10	0.01	ND	U



**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-022618	K1801813-001	<b>0.77</b>	0.20	0.05	1	02/27/18 10:44	
IMW-2-022618	K1801813-002	<b>2.31</b>	0.20	0.05	1	02/27/18 10:44	
IP-5-022618	K1801813-003	<b>5.00</b>	0.20	0.05	1	02/27/18 10:44	
IP-6-022618	K1801813-004	<b>2.45</b>	0.20	0.05	1	02/27/18 10:44	
IP-7-022618	K1801813-005	<b>2.10</b>	0.20	0.05	1	02/27/18 10:44	
CG-122-60-022618	K1801813-006	<b>1.85</b>	0.20	0.05	1	02/27/18 10:44	
CG-122-75-022618	K1801813-007	ND U	0.20	0.05	1	02/27/18 10:44	
CG-9-122-60-022618	K1801813-008	<b>1.54</b>	0.20	0.05	1	02/27/18 10:44	
FB-1-022618	K1801813-009	ND U	0.20	0.05	1	02/27/18 10:44	
Method Blank	K1801813-MB1	ND U	0.20	0.05	1	02/27/18 10:44	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18

**Units:** mg/L  
**Basis:** NA

**Replicate Sample Summary**  
**Iron, Divalent (Ferrous Iron)**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
IMW-1-022618	K1801813-001DUP	0.20	0.05	0.77	0.78	0.775	1	20	02/27/18
IP-5-022618	K1801813-003DUP	0.20	0.05	5.00	5.15	5.08	3	20	02/27/18

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 02/27/18  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1801813-001MS			Duplicate Matrix Spike K1801813-001DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Iron, Divalent (Ferrous Iron)	0.77	2.66	2.00	95	2.60	2.00	92	75-125	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 02/27/18  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** IP-5-022618  
**Lab Code:** K1801813-003  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Matrix Spike K1801813-003MS				Duplicate Matrix Spike K1801813-003DMS				RPD	RPD Limit
	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec	% Rec Limits		
Iron, Divalent (Ferrous Iron)	5.00	4.90	10.0	-1 *	4.80	10.0	-2 *	75-125	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	581808	KQ1802541-01	02/27/18 10:44	4.00	4.06	102	90-110
CCV2	581808	KQ1802541-02	02/27/18 10:44	4.00	3.89	97	90-110
CCV3	581808	KQ1802541-03	02/27/18 10:44	4.00	4.04	101	90-110
CCV4	581808	KQ1802541-04	02/27/18 10:44	4.00	4.05	101	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1801813

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	581808	KQ1802541-05	02/27/18 10:44	0.20	0.05	ND	U
CCB2	581808	KQ1802541-06	02/27/18 10:44	0.20	0.05	ND	U
CCB3	581808	KQ1802541-07	02/27/18 10:44	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001

**Service Request:** K1801813  
**Date Collected:** 02/26/18 13:20  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>6.91</b>	mg/L	0.0020	0.0003	1	03/09/18 15:55	03/08/18	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-022618  
**Lab Code:** K1801813-002

**Service Request:** K1801813  
**Date Collected:** 02/26/18 14:05  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	10.5	mg/L	0.0020	0.0003	1	03/09/18 16:10	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-5-022618  
**Lab Code:** K1801813-003

**Service Request:** K1801813  
**Date Collected:** 02/26/18 15:45  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	10.0	mg/L	0.0080	0.0012	1	03/09/18 16:19	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-022618  
**Lab Code:** K1801813-004

**Service Request:** K1801813  
**Date Collected:** 02/26/18 14:40  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	<b>0.729</b>	mg/L	0.0080	0.0012	1	03/09/18 16:23	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-7-022618  
**Lab Code:** K1801813-005

**Service Request:** K1801813  
**Date Collected:** 02/26/18 15:15  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.0734	mg/L	0.0080	0.0012	1	03/09/18 16:26	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-022618  
**Lab Code:** K1801813-006

**Service Request:** K1801813  
**Date Collected:** 02/26/18 11:35  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	5.41	mg/L	0.0020	0.0003	1	03/09/18 16:29	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-022618  
**Lab Code:** K1801813-007

**Service Request:** K1801813  
**Date Collected:** 02/26/18 10:50  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	2.26	mg/L	0.0020	0.0003	1	03/09/18 16:32	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-60-022618  
**Lab Code:** K1801813-008

**Service Request:** K1801813  
**Date Collected:** 02/26/18 11:40  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	5.34	mg/L	0.0020	0.0003	1	03/09/18 16:35	03/08/18	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** FB-1-022618  
**Lab Code:** K1801813-009

**Service Request:** K1801813  
**Date Collected:** 02/26/18 10:45  
**Date Received:** 02/27/18 09:45  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0026</b>	mg/L	0.0020	0.0003	1	03/09/18 16:38	03/08/18	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1802994-01

**Service Request:** K1801813  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	ND U	mg/L	0.0020	0.0003	1	03/09/18 17:50	03/08/18	

ALS Group USA, Corp.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 03/09/18

Replicate Sample Summary

Total Metals

**Sample Name:** IMW-1-022618 **Units:** mg/L  
**Lab Code:** K1801813-001 **Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate	Average	RPD	RPD Limit
					Sample KQ1802994-03 Result			
Iron	6020A	0.0020	0.0003	6.91	6.93	6.92	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 03/9/18  
**Date Extracted:** 03/8/18

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP-METALS ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1802994-04

<b>Analyte Name</b>	<b>Sample Result</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6.91	6.84	0.0500	-138 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Analyzed:** 03/09/18

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1802994-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0535	0.0500	107	80-120

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dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:** 309581  
**Extraction Date:** 03/08/18 12:34

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-022618	K1801813-001	2/26/18	2/27/18	10 mL	10 mL	
IMW-2-022618	K1801813-002	2/26/18	2/27/18	10 mL	10 mL	
IP-5-022618	K1801813-003	2/26/18	2/27/18	2.5 mL	10 mL	
IP-6-022618	K1801813-004	2/26/18	2/27/18	2.5 mL	10 mL	
IP-7-022618	K1801813-005	2/26/18	2/27/18	2.5 mL	10 mL	
CG-122-60-022618	K1801813-006	2/26/18	2/27/18	10 mL	10 mL	
CG-122-75-022618	K1801813-007	2/26/18	2/27/18	10 mL	10 mL	
CG-9-122-60-022618	K1801813-008	2/26/18	2/27/18	10 mL	10 mL	
FB-1-022618	K1801813-009	2/26/18	2/27/18	10 mL	10 mL	
Method Blank	KQ1802994-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1802994-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1802994-03DUP	2/26/18	2/27/18	10 mL	10 mL	
Matrix Spike	KQ1802994-04MS	2/26/18	2/27/18	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits
CCV 03/09/18 15:27	Iron	6020A	583135	250	250	100	90-110
CCV 03/09/18 16:13	Iron	6020A	583135	248	250	99	90-110
CCV 03/09/18 16:50	Iron	6020A	583135	248	250	99	90-110
CCV 03/09/18 17:34	Iron	6020A	583135	246	250	98	90-110
CCV 03/09/18 18:14	Iron	6020A	583135	250	250	100	90-110
ICV 03/09/18 15:24	Iron	6020A	583135	51.8	50.0	104	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**INITIAL AND CONTINUING CALIBRATION BLANKS**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>C</b>
CCB 03/09/18 15:33	Iron	6020A	583135	0.3	U
CCB 03/09/18 16:16	Iron	6020A	583135	1.3	J
CCB 03/09/18 16:53	Iron	6020A	583135	0.3	U
CCB 03/09/18 17:37	Iron	6020A	583135	0.3	U
CCB 03/09/18 18:17	Iron	6020A	583135	0.3	U
ICB 03/09/18 15:30	Iron	6020A	583135	0.3	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLCCV	Iron	6020A	583135	2.2	2.0	111	70-130	03/09/18 17:00
LLCCV	Iron	6020A	583135	1.7	2.0	85	70-130	03/09/18 18:24
LLICV	Iron	6020A	583135	2.0	2.0	98	70-130	03/09/18 15:37



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	583135	56100	-	-	-	03/09/18 15:40

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	583135	56300	-	-	-	03/09/18 15:43

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**ICP SERIAL DILUTIONS**

Concentration Units: ppb

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1801813-001SDL	Iron	6020A	583135	6910	6370	8	10	03/09/18 16:01

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**Detection Limits**

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	2.0	0.3	6020A

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-04

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	50000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-04

**Analytical BatchID:** 583135

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	03/09/18 15:18	
ZZZZZZ	1	03/09/18 15:21	
ICV	1	03/09/18 15:24	X
CCV	1	03/09/18 15:27	X
ICB	1	03/09/18 15:30	X
CCB	1	03/09/18 15:33	X
LLICVW	1	03/09/18 15:37	X
ICSA	1	03/09/18 15:40	X
ICSAB	1	03/09/18 15:43	X
ZZZZZZ	1	03/09/18 15:46	
ZZZZZZ	1	03/09/18 15:49	
KQ1802994-02LCS	1	03/09/18 15:52	X
K1801813-001	1	03/09/18 15:55	X
K1801813-001DUP	1	03/09/18 15:58	X
K1801813-001SDL	5	03/09/18 16:01	X
ZZZZZZ	1	03/09/18 16:04	
K1801813-001MS	1	03/09/18 16:07	X
K1801813-002	1	03/09/18 16:10	X
CCV	1	03/09/18 16:13	X
CCB	1	03/09/18 16:16	X
K1801813-003	1	03/09/18 16:19	X
K1801813-004	1	03/09/18 16:23	X
K1801813-005	1	03/09/18 16:26	X
K1801813-006	1	03/09/18 16:29	X
K1801813-007	1	03/09/18 16:32	X
K1801813-008	1	03/09/18 16:35	X
K1801813-009	1	03/09/18 16:38	X
ZZZZZZ	1	03/09/18 16:41	
ZZZZZZ	1	03/09/18 16:44	
ZZZZZZ	5	03/09/18 16:47	
CCV	1	03/09/18 16:50	X
CCB	1	03/09/18 16:53	X
ZZZZZZ	1	03/09/18 16:56	
LLCCVW	1	03/09/18 17:00	X
ZZZZZZ	1	03/09/18 17:04	
ZZZZZZ	1	03/09/18 17:07	
ZZZZZZ	1	03/09/18 17:10	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-04

**Analytical BatchID:** 583135

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	03/09/18 17:13	
ZZZZZZ	1	03/09/18 17:16	
ZZZZZZ	1	03/09/18 17:19	
ZZZZZZ	1	03/09/18 17:22	
ZZZZZZ	1	03/09/18 17:25	
ZZZZZZ	1	03/09/18 17:28	
ZZZZZZ	1	03/09/18 17:31	
CCV	1	03/09/18 17:34	X
CCB	1	03/09/18 17:37	X
ZZZZZZ	1	03/09/18 17:40	
ZZZZZZ	1	03/09/18 17:43	
ZZZZZZ	1	03/09/18 17:47	
KQ1802994-01MB	1	03/09/18 17:50	X
ZZZZZZ	1	03/09/18 17:53	
ZZZZZZ	1	03/09/18 17:56	
ZZZZZZ	1	03/09/18 17:59	
ZZZZZZ	5	03/09/18 18:02	
ZZZZZZ	1	03/09/18 18:05	
ZZZZZZ	1	03/09/18 18:11	
CCV	1	03/09/18 18:14	X
CCB	1	03/09/18 18:17	X
ZZZZZZ	1	03/09/18 18:20	
LLCCVW	1	03/09/18 18:24	X
ZZZZZZ	1	03/09/18 18:27	

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-04

**Analytical BatchID:** 583135

Sample	Date/Time	GeSTD	GeKED3	GeKED2	GeKED1	RhKED2	LuKED2
ZZZZZZ	03/09/18 15:18						
ZZZZZZ	03/09/18 15:21						
ICV	03/09/18 15:24	95	99	99	90	98	99
CCV	03/09/18 15:27	99	99	101	91	99	99
ICB	03/09/18 15:30	98	100	100	93	100	98
CCB	03/09/18 15:33	96	102	100	92	98	98
LLICVW	03/09/18 15:37	93	100	102	92	99	99
ICSA	03/09/18 15:40	87	88	89	82	84	95
ICSAB	03/09/18 15:43	93	89	88	80	84	96
ZZZZZZ	03/09/18 15:46						
ZZZZZZ	03/09/18 15:49						
KQ1802994-02LCS	03/09/18 15:52	98	99	100	90	99	100
K1801813-001	03/09/18 15:55	83	80	82	73	77	91
K1801813-001DUP	03/09/18 15:58	83	82	83	74	78	92
K1801813-001SDL	03/09/18 16:01	97	94	97	88	92	101
ZZZZZZ	03/09/18 16:04						
K1801813-001MS	03/09/18 16:07	84	82	83	74	79	92
K1801813-002	03/09/18 16:10	85	83	85	76	79	94
CCV	03/09/18 16:13	102	100	102	91	100	102
CCB	03/09/18 16:16	101	99	101	94	99	101
K1801813-003	03/09/18 16:19	97	95	96	87	89	97
K1801813-004	03/09/18 16:23	93	95	97	86	92	100
K1801813-005	03/09/18 16:26	97	98	99	91	93	99
K1801813-006	03/09/18 16:29	90	85	86	79	81	94
K1801813-007	03/09/18 16:32	94	91	93	83	89	99
K1801813-008	03/09/18 16:35	89	85	85	78	80	92
K1801813-009	03/09/18 16:38	103	97	101	92	99	102
ZZZZZZ	03/09/18 16:41						
ZZZZZZ	03/09/18 16:44						
ZZZZZZ	03/09/18 16:47						
CCV	03/09/18 16:50	103	97	99	93	98	101
CCB	03/09/18 16:53	100	97	101	92	100	101
ZZZZZZ	03/09/18 16:56						
LLCCVW	03/09/18 17:00	101	97	102	91	101	102
ZZZZZZ	03/09/18 17:04						
ZZZZZZ	03/09/18 17:07						
ZZZZZZ	03/09/18 17:10						



**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-04

**Analytical BatchID:** 583135

Sample	Date/Time	GeSTD	GeKED3	GeKED2	GeKED1	RhKED2	LuKED2
ZZZZZZ	03/09/18 17:13						
ZZZZZZ	03/09/18 17:16						
ZZZZZZ	03/09/18 17:19						
ZZZZZZ	03/09/18 17:22						
ZZZZZZ	03/09/18 17:25						
ZZZZZZ	03/09/18 17:28						
ZZZZZZ	03/09/18 17:31						
CCV	03/09/18 17:34	99	93	95	87	94	98
CCB	03/09/18 17:37	97	95	97	90	97	98
ZZZZZZ	03/09/18 17:40						
ZZZZZZ	03/09/18 17:43						
ZZZZZZ	03/09/18 17:47						
KQ1802994-01MB	03/09/18 17:50	96	94	96	88	96	97
ZZZZZZ	03/09/18 17:53						
ZZZZZZ	03/09/18 17:56						
ZZZZZZ	03/09/18 17:59						
ZZZZZZ	03/09/18 18:02						
ZZZZZZ	03/09/18 18:05						
ZZZZZZ	03/09/18 18:11						
CCV	03/09/18 18:14	94	93	92	85	94	98
CCB	03/09/18 18:17	94	93	94	86	95	97
ZZZZZZ	03/09/18 18:20						
LLCCVW	03/09/18 18:24	94	95	96	86	96	97
ZZZZZZ	03/09/18 18:27						



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 13:20  
**Date Received:** 02/27/18 09:45

**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	200	4.0	1.6	10	03/14/18 17:30	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	101	48 - 118	03/08/18 15:50	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 14:05  
**Date Received:** 02/27/18 09:45

**Sample Name:** IMW-2-022618  
**Lab Code:** K1801813-002

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	470	8.0	3.2	20	03/14/18 17:49	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	99	48 - 118	03/08/18 16:08	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 15:45  
**Date Received:** 02/27/18 09:45

**Sample Name:** IP-5-022618  
**Lab Code:** K1801813-003

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	330	4.0	1.6	10	03/14/18 18:07	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	93	48 - 118	03/08/18 16:26	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 14:40  
**Date Received:** 02/27/18 09:45

**Sample Name:** IP-6-022618  
**Lab Code:** K1801813-004

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	230	4.0	1.6	10	03/14/18 18:26	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	92	48 - 118	03/08/18 16:45	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 15:15  
**Date Received:** 02/27/18 09:45

**Sample Name:** IP-7-022618  
**Lab Code:** K1801813-005

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	180	4.0	1.6	10	03/14/18 18:44	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	103	48 - 118	03/08/18 17:03	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 11:35  
**Date Received:** 02/27/18 09:45

**Sample Name:** CG-122-60-022618  
**Lab Code:** K1801813-006

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	280	4.0	1.6	10	03/14/18 19:02	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	92	48 - 118	03/08/18 17:21	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 10:50  
**Date Received:** 02/27/18 09:45

**Sample Name:** CG-122-75-022618  
**Lab Code:** K1801813-007

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	240	4.0	1.6	10	03/14/18 19:21	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	93	48 - 118	03/08/18 17:40	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 11:40  
**Date Received:** 02/27/18 09:45

**Sample Name:** CG-9-122-60-022618  
**Lab Code:** K1801813-008

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	280	4.0	1.6	10	03/14/18 19:39	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	94	48 - 118	03/08/18 17:58	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18 10:45  
**Date Received:** 02/27/18 09:45

**Sample Name:** FB-1-022618  
**Lab Code:** K1801813-009

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	0.27 J	0.40	0.16	1	03/08/18 18:16	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	97	48 - 118	03/08/18 18:16	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** KQ1802820-06

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	03/08/18 13:59	3/5/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	89	48 - 118	03/08/18 13:59	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813

**SURROGATE RECOVERY SUMMARY**

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Extraction Method:** EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		48 - 118
IMW-1-022618	K1801813-001	101
IMW-2-022618	K1801813-002	99
IP-5-022618	K1801813-003	93
IP-6-022618	K1801813-004	92
IP-7-022618	K1801813-005	103
CG-122-60-022618	K1801813-006	92
CG-122-75-022618	K1801813-007	93
CG-9-122-60-022618	K1801813-008	94
FB-1-022618	K1801813-009	97
IMW-1-022618 MS	KQ1802820-01	99
IMW-1-022618 DMS	KQ1802820-02	99
Lab Control Sample	KQ1802820-05	99
Method Blank	KQ1802820-06	89

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18 12:58

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\030818\0308F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1803199-02  
**Analysis Lot:** 583441  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	55,063	5.25
<b>Upper Limit ==&gt;</b>	110,126	5.75
<b>Lower Limit ==&gt;</b>	27,532	4.75

**Associated Analyses**

Method Blank	KQ1802820-06	55438	5.24
Lab Control Sample	KQ1802820-05	49305	5.25
IMW-1-022618	KQ1802820-01	53402	5.24
IMW-1-022618	KQ1802820-02	49937	5.24
IMW-1-022618	K1801813-001.R01	53703	5.24
IMW-2-022618	K1801813-002.R01	51666	5.24
IP-5-022618	K1801813-003.R01	51894	5.24
IP-6-022618	K1801813-004.R01	48512	5.24
IP-7-022618	K1801813-005.R01	50845	5.24
CG-122-60-022618	K1801813-006.R01	49140	5.24
CG-122-75-022618	K1801813-007.R01	51939	5.24
CG-9-122-60-022618	K1801813-008.R01	49611	5.25
FB-1-022618	K1801813-009	49089	5.24

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/14/18 11:42

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\031418\0314F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D

**Lab Code:** KQ1803319-02  
**Analysis Lot:** 583787  
**Signal ID:**

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	60,190	5.24
<b>Upper Limit ==&gt;</b>	120,380	5.74
<b>Lower Limit ==&gt;</b>	30,095	4.74

**Associated Analyses**

IMW-1-022618	K1801813-001	55985	5.23
IMW-2-022618	K1801813-002	56505	5.24
IP-5-022618	K1801813-003	56568	5.24
IP-6-022618	K1801813-004	54948	5.23
IP-7-022618	K1801813-005	58836	5.24
CG-122-60-022618	K1801813-006	54739	5.23
CG-122-75-022618	K1801813-007	53648	5.23
CG-9-122-60-022618	K1801813-008	58908	5.24

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Collected:** 02/26/18  
**Date Received:** 02/27/18  
**Date Analyzed:** 03/8/18  
**Date Extracted:** 03/5/18

**Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** IMW-1-022618  
**Lab Code:** K1801813-001  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1802820-01		Duplicate Matrix Spike KQ1802820-02		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
I,4-Dioxane	200	186 E	10.0	-94 #	190 E	10.0	-52 #	33-127	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18  
**Date Extracted:** 03/05/18

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA  
**Analysis Lot:** 583441

**Lab Control Sample**  
**KQ1802820-05**

<b>Analyte Name</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
1,4-Dioxane	9.99	10.0	100	52-111

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18 13:59  
**Date Extracted:** 03/05/18

**Method Blank Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Method Blank  
**Lab Code:** KQ1802820-06  
**Analysis Method:** 8270D  
**Prep Method:** EPA 3535A

**Instrument ID:** K-MS-26  
**File ID:** J:\MS26\DATA\030818\0308F005.D\  
**Analysis Lot:** 583441  
**Extraction Lot:** 309366

This Method Blank applies to the following analyses.

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>
Lab Control Sample	KQ1802820-05	J:\MS26\DATA\030818\0308F006.D\	03/08/18 14:18
IMW-1-022618	KQ1802820-01	J:\MS26\DATA\030818\0308F007.D\	03/08/18 14:36
IMW-1-022618	KQ1802820-02	J:\MS26\DATA\030818\0308F008.D\	03/08/18 14:55
IMW-1-022618	K1801813-001	J:\MS26\DATA\030818\0308F011.D\	03/08/18 15:50
IMW-2-022618	K1801813-002	J:\MS26\DATA\030818\0308F012.D\	03/08/18 16:08
IP-5-022618	K1801813-003	J:\MS26\DATA\030818\0308F013.D\	03/08/18 16:26
IP-6-022618	K1801813-004	J:\MS26\DATA\030818\0308F014.D\	03/08/18 16:45
IP-7-022618	K1801813-005	J:\MS26\DATA\030818\0308F015.D\	03/08/18 17:03
CG-122-60-022618	K1801813-006	J:\MS26\DATA\030818\0308F016.D\	03/08/18 17:21
CG-122-75-022618	K1801813-007	J:\MS26\DATA\030818\0308F017.D\	03/08/18 17:40
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\030818\0308F018.D\	03/08/18 17:58
FB-1-022618	K1801813-009	J:\MS26\DATA\030818\0308F019.D\	03/08/18 18:16
IMW-1-022618	K1801813-001	J:\MS26\DATA\031418\0314F019.D\	03/14/18 17:30
IMW-2-022618	K1801813-002	J:\MS26\DATA\031418\0314F020.D\	03/14/18 17:49
IP-5-022618	K1801813-003	J:\MS26\DATA\031418\0314F021.D\	03/14/18 18:07
IP-6-022618	K1801813-004	J:\MS26\DATA\031418\0314F022.D\	03/14/18 18:26
IP-7-022618	K1801813-005	J:\MS26\DATA\031418\0314F023.D\	03/14/18 18:44
CG-122-60-022618	K1801813-006	J:\MS26\DATA\031418\0314F024.D\	03/14/18 19:02
CG-122-75-022618	K1801813-007	J:\MS26\DATA\031418\0314F025.D\	03/14/18 19:21
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\031418\0314F026.D\	03/14/18 19:39

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18 14:18  
**Date Extracted:** 03/05/18

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Lab Control Sample      **Instrument ID:** K-MS-26  
**Lab Code:** KQ1802820-05      **File ID:** J:\MS26\DATA\030818\0308F006.D\  
**Analysis Method:** 8270D      **Analysis Lot:** 583441  
**Prep Method:** EPA 3535A      **Extraction Lot:** 309366

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1802820-06	J:\MS26\DATA\030818\0308F005.D\	03/08/18 13:59
IMW-1-022618	KQ1802820-01	J:\MS26\DATA\030818\0308F007.D\	03/08/18 14:36
IMW-1-022618	KQ1802820-02	J:\MS26\DATA\030818\0308F008.D\	03/08/18 14:55
IMW-1-022618	K1801813-001	J:\MS26\DATA\030818\0308F011.D\	03/08/18 15:50
IMW-2-022618	K1801813-002	J:\MS26\DATA\030818\0308F012.D\	03/08/18 16:08
IP-5-022618	K1801813-003	J:\MS26\DATA\030818\0308F013.D\	03/08/18 16:26
IP-6-022618	K1801813-004	J:\MS26\DATA\030818\0308F014.D\	03/08/18 16:45
IP-7-022618	K1801813-005	J:\MS26\DATA\030818\0308F015.D\	03/08/18 17:03
CG-122-60-022618	K1801813-006	J:\MS26\DATA\030818\0308F016.D\	03/08/18 17:21
CG-122-75-022618	K1801813-007	J:\MS26\DATA\030818\0308F017.D\	03/08/18 17:40
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\030818\0308F018.D\	03/08/18 17:58
FB-1-022618	K1801813-009	J:\MS26\DATA\030818\0308F019.D\	03/08/18 18:16
IMW-1-022618	K1801813-001	J:\MS26\DATA\031418\0314F019.D\	03/14/18 17:30
IMW-2-022618	K1801813-002	J:\MS26\DATA\031418\0314F020.D\	03/14/18 17:49
IP-5-022618	K1801813-003	J:\MS26\DATA\031418\0314F021.D\	03/14/18 18:07
IP-6-022618	K1801813-004	J:\MS26\DATA\031418\0314F022.D\	03/14/18 18:26
IP-7-022618	K1801813-005	J:\MS26\DATA\031418\0314F023.D\	03/14/18 18:44
CG-122-60-022618	K1801813-006	J:\MS26\DATA\031418\0314F024.D\	03/14/18 19:02
CG-122-75-022618	K1801813-007	J:\MS26\DATA\031418\0314F025.D\	03/14/18 19:21
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\031418\0314F026.D\	03/14/18 19:39

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18 12:40

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\030818\0308F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 583441

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.04	474410	Pass
68	69	0	2	1.74	10089	Pass
69	198	0	100	19.66	581417	Pass
70	69	0	2	0.52	3033	Pass
127	198	10	80	34.88	1031436	Pass
197	198	0	2	0.28	8304	Pass
198	442	30	100	55.90	2957482	Pass
199	198	5	9	6.66	197064	Pass
275	198	10	60	33.83	1000597	Pass
365	442	1	50	2.58	136688	Pass
441	443	0.01	100	77.82	781824	Pass
442	442	100	100	100.00	5291008	Pass
443	442	15	24	18.99	1004608	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1803199-02	J:\MS26\DATA\030818\0308F004.D\	03/08/18 12:58	
Method Blank	KQ1802820-06	J:\MS26\DATA\030818\0308F005.D\	03/08/18 13:59	
Lab Control Sample	KQ1802820-05	J:\MS26\DATA\030818\0308F006.D\	03/08/18 14:18	
IMW-1-022618	KQ1802820-01	J:\MS26\DATA\030818\0308F007.D\	03/08/18 14:36	
IMW-1-022618	KQ1802820-02	J:\MS26\DATA\030818\0308F008.D\	03/08/18 14:55	
IMW-1-022618	K1801813-001	J:\MS26\DATA\030818\0308F011.D\	03/08/18 15:50	
IMW-2-022618	K1801813-002	J:\MS26\DATA\030818\0308F012.D\	03/08/18 16:08	
IP-5-022618	K1801813-003	J:\MS26\DATA\030818\0308F013.D\	03/08/18 16:26	
IP-6-022618	K1801813-004	J:\MS26\DATA\030818\0308F014.D\	03/08/18 16:45	
IP-7-022618	K1801813-005	J:\MS26\DATA\030818\0308F015.D\	03/08/18 17:03	
CG-122-60-022618	K1801813-006	J:\MS26\DATA\030818\0308F016.D\	03/08/18 17:21	
CG-122-75-022618	K1801813-007	J:\MS26\DATA\030818\0308F017.D\	03/08/18 17:40	
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\030818\0308F018.D\	03/08/18 17:58	
FB-1-022618	K1801813-009	J:\MS26\DATA\030818\0308F019.D\	03/08/18 18:16	

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/14/18 11:23

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\031418\0314F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D  
**Analysis Lot:** 583787

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.44	441461	Pass
68	69	0	2	1.71	9222	Pass
69	198	0	100	20.05	538369	Pass
70	69	0	2	0.50	2710	Pass
127	198	10	80	35.00	939648	Pass
197	198	0	2	0.21	5749	Pass
198	442	30	100	49.10	2684928	Pass
199	198	5	9	6.62	177848	Pass
275	198	10	60	34.70	931690	Pass
365	442	1	50	2.49	136253	Pass
441	443	0.01	100	77.62	809237	Pass
442	442	100	100	100.00	5468672	Pass
443	442	15	24	19.06	1042602	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1803319-02	J:\MS26\DATA\031418\0314F004.D\	03/14/18 11:42	
IMW-1-022618	K1801813-001	J:\MS26\DATA\031418\0314F019.D\	03/14/18 17:30	
IMW-2-022618	K1801813-002	J:\MS26\DATA\031418\0314F020.D\	03/14/18 17:49	
IP-5-022618	K1801813-003	J:\MS26\DATA\031418\0314F021.D\	03/14/18 18:07	
IP-6-022618	K1801813-004	J:\MS26\DATA\031418\0314F022.D\	03/14/18 18:26	
IP-7-022618	K1801813-005	J:\MS26\DATA\031418\0314F023.D\	03/14/18 18:44	
CG-122-60-022618	K1801813-006	J:\MS26\DATA\031418\0314F024.D\	03/14/18 19:02	
CG-122-75-022618	K1801813-007	J:\MS26\DATA\031418\0314F025.D\	03/14/18 19:21	
CG-9-122-60-022618	K1801813-008	J:\MS26\DATA\031418\0314F026.D\	03/14/18 19:39	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1801813  
**Calibration Date:** 1/2/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800002-01	1,4DX ICAL 2.0ng/mL SVM57-79A	J:\MS26\DATA\010218\0102F010.D	01/02/2018 15:42
02	KC1800002-02	1,4DX ICAL 4.0ng/mL SVM57-79B	J:\MS26\DATA\010218\0102F011.D	01/02/2018 16:00
03	KC1800002-03	1,4DX ICAL 10ng/mL SVM57-79C	J:\MS26\DATA\010218\0102F012.D	01/02/2018 16:18
04	KC1800002-04	1,4DX ICAL 20ng/mL SVM57-79D	J:\MS26\DATA\010218\0102F013.D	01/02/2018 16:36
05	KC1800002-05	1,4DX ICAL 50ng/mL SVM57-79E	J:\MS26\DATA\010218\0102F014.D	01/02/2018 16:55
06	KC1800002-06	1,4DX ICAL 100ng/mL SVM57-79F	J:\MS26\DATA\010218\0102F015.D	01/02/2018 17:13
07	KC1800002-07	1,4DX ICAL 200ng/mL SVM57-79G	J:\MS26\DATA\010218\0102F016.D	01/02/2018 17:31

**Analyte**

1,4-Dioxane											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3773	02	4.000	0.3703	03	10.000	0.3742	04	20.000	0.3958
05	50.000	0.4139	06	100.000	0.405	07	200.000	0.4094			

1,4-Dioxane-d8											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3187	02	4.000	0.3889	03	10.000	0.384	04	20.000	0.3974
05	50.000	0.4192	06	100.000	0.4045	07	200.000	0.4116			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1801813  
**Calibration Date:** 1/2/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002  
**Instrument ID:** K-MS-26

**Signal ID:** 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
1,4-Dioxane	TRG	Average RF	% RSD	4.6	20	0.3923	0.01
1,4-Dioxane-d8	SURR	Average RF	% RSD	8.6	20	0.3892	0.01

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted

**Service Request:** K1801813  
**Calibration Date:** 1/2/2018

**Initial Calibration Verification Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800002  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800002-08	1,4DX ICV 20ng/mL SVM57-79H	J:\MS26\DATA\010218\0102F017.D	01/02/2018 17:49

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane	20.0	18.7	3.923E-1	3.659E-1	-6.736	±30	Average RF
1,4-Dioxane-d8	20.0	19.2	3.892E-1	3.744E-1	-3.799	±30	Average RF



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/08/18 12:58

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\030818\0308F004.D\  
**Signal ID:** 1

**Calibration Date:** 1/2/2018  
**Calibration ID:** KC1800002  
**Analysis Lot:** 583441  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	22.1	0.3923	0.4335	10.5	NA	±20	Average RF
1,4-Dioxane-d8	20.0	22.6	0.3892	0.4395	12.9	NA	±20	Average RF

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813  
**Date Analyzed:** 03/14/18 11:42

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D  
**File ID:** J:\MS26\DATA\031418\0314F004.D\  
**Signal ID:** 1

**Calibration Date:** 1/2/2018  
**Calibration ID:** KC1800002  
**Analysis Lot:** 583787  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	23.2	0.3923	0.4549	16.0	NA	±20	Average RF
1,4-Dioxane-d8	20.0	22.9	0.3892	0.4463	14.7	NA	±20	Average RF

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:**K1801813

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:**583441  
**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\030818\0308F003.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	12:40:00	
J:\MS26\DATA\030818\0308F004.D\	Continuing Calibration Verification	KQ1803199-02	3/8/2018	12:58:00	
J:\MS26\DATA\030818\0308F005.D\	Method Blank	KQ1802820-06	3/8/2018	13:59:00	
J:\MS26\DATA\030818\0308F006.D\	Lab Control Sample	KQ1802820-05	3/8/2018	14:18:00	
J:\MS26\DATA\030818\0308F007.D\	IMW-1-022618 MS	KQ1802820-01	3/8/2018	14:36:00	
J:\MS26\DATA\030818\0308F008.D\	IMW-1-022618 DMS	KQ1802820-02	3/8/2018	14:55:00	
J:\MS26\DATA\030818\0308F009.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	15:13:00	
J:\MS26\DATA\030818\0308F010.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	15:31:00	
J:\MS26\DATA\030818\0308F011.D\	IMW-1-022618	K1801813-001	3/8/2018	15:50:00	
J:\MS26\DATA\030818\0308F012.D\	IMW-2-022618	K1801813-002	3/8/2018	16:08:00	
J:\MS26\DATA\030818\0308F013.D\	IP-5-022618	K1801813-003	3/8/2018	16:26:00	
J:\MS26\DATA\030818\0308F014.D\	IP-6-022618	K1801813-004	3/8/2018	16:45:00	
J:\MS26\DATA\030818\0308F015.D\	IP-7-022618	K1801813-005	3/8/2018	17:03:00	
J:\MS26\DATA\030818\0308F016.D\	CG-122-60-022618	K1801813-006	3/8/2018	17:21:00	
J:\MS26\DATA\030818\0308F017.D\	CG-122-75-022618	K1801813-007	3/8/2018	17:40:00	
J:\MS26\DATA\030818\0308F018.D\	CG-9-122-60-022618	K1801813-008	3/8/2018	17:58:00	
J:\MS26\DATA\030818\0308F019.D\	FB-1-022618	K1801813-009	3/8/2018	18:16:00	
J:\MS26\DATA\030818\0308F020.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	18:35:00	
J:\MS26\DATA\030818\0308F021.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	18:53:00	
J:\MS26\DATA\030818\0308F022.D\	ZZZZZZZ	ZZZZZZZ	3/8/2018	19:11:00	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08

**Service Request:** K1801813

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:** 583787  
**Instrument ID:** K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\MS26\DATA\031418\0314F003.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	11:23:00	
J:\MS26\DATA\031418\0314F004.D\	Continuing Calibration Verification	KQ1803319-02	3/14/2018	11:42:00	
J:\MS26\DATA\031418\0314F005.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	13:14:00	
J:\MS26\DATA\031418\0314F006.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	13:32:00	
J:\MS26\DATA\031418\0314F007.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	13:50:00	
J:\MS26\DATA\031418\0314F008.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	14:09:00	
J:\MS26\DATA\031418\0314F009.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	14:27:00	
J:\MS26\DATA\031418\0314F010.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	14:45:00	
J:\MS26\DATA\031418\0314F011.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	15:04:00	
J:\MS26\DATA\031418\0314F012.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	15:22:00	
J:\MS26\DATA\031418\0314F013.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	15:40:00	
J:\MS26\DATA\031418\0314F014.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	15:59:00	
J:\MS26\DATA\031418\0314F015.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	16:17:00	
J:\MS26\DATA\031418\0314F016.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	16:35:00	
J:\MS26\DATA\031418\0314F017.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	16:54:00	
J:\MS26\DATA\031418\0314F018.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	17:12:00	
J:\MS26\DATA\031418\0314F019.D\	IMW-1-022618	K1801813-001	3/14/2018	17:30:00	
J:\MS26\DATA\031418\0314F020.D\	IMW-2-022618	K1801813-002	3/14/2018	17:49:00	
J:\MS26\DATA\031418\0314F021.D\	IP-5-022618	K1801813-003	3/14/2018	18:07:00	
J:\MS26\DATA\031418\0314F022.D\	IP-6-022618	K1801813-004	3/14/2018	18:26:00	
J:\MS26\DATA\031418\0314F023.D\	IP-7-022618	K1801813-005	3/14/2018	18:44:00	
J:\MS26\DATA\031418\0314F024.D\	CG-122-60-022618	K1801813-006	3/14/2018	19:02:00	
J:\MS26\DATA\031418\0314F025.D\	CG-122-75-022618	K1801813-007	3/14/2018	19:21:00	
J:\MS26\DATA\031418\0314F026.D\	CG-9-122-60-022618	K1801813-008	3/14/2018	19:39:00	
J:\MS26\DATA\031418\0314F027.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	19:57:00	
J:\MS26\DATA\031418\0314F028.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	20:16:00	
J:\MS26\DATA\031418\0314F029.D\	ZZZZZZZ	ZZZZZZZ	3/14/2018	20:34:00	

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** PSC Georgetown Dalton Olmsted/375.08  
**Sample Matrix:** Water

**Service Request:** K1801813

1,4-Dioxane by GC/MS

**Prep Method:** EPA 3535A  
**Analytical Method:** 8270D

**Extraction Lot:** 309366  
**Extraction Date:** 03/05/18 09:28

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-022618	K1801813-001	2/26/18	2/27/18	10 mL	2 mL	
IMW-1-022618	K1801813-001	2/26/18	2/27/18	10 mL	2 mL	
IMW-2-022618	K1801813-002	2/26/18	2/27/18	10 mL	2 mL	
IMW-2-022618	K1801813-002	2/26/18	2/27/18	10 mL	2 mL	
IP-5-022618	K1801813-003	2/26/18	2/27/18	10 mL	2 mL	
IP-5-022618	K1801813-003	2/26/18	2/27/18	10 mL	2 mL	
IP-6-022618	K1801813-004	2/26/18	2/27/18	10 mL	2 mL	
IP-6-022618	K1801813-004	2/26/18	2/27/18	10 mL	2 mL	
IP-7-022618	K1801813-005	2/26/18	2/27/18	10 mL	2 mL	
IP-7-022618	K1801813-005	2/26/18	2/27/18	10 mL	2 mL	
CG-122-60-022618	K1801813-006	2/26/18	2/27/18	10 mL	2 mL	
CG-122-60-022618	K1801813-006	2/26/18	2/27/18	10 mL	2 mL	
CG-122-75-022618	K1801813-007	2/26/18	2/27/18	10 mL	2 mL	
CG-122-75-022618	K1801813-007	2/26/18	2/27/18	10 mL	2 mL	
CG-9-122-60-022618	K1801813-008	2/26/18	2/27/18	10 mL	2 mL	
CG-9-122-60-022618	K1801813-008	2/26/18	2/27/18	10 mL	2 mL	
FB-1-022618	K1801813-009	2/26/18	2/27/18	10 mL	2 mL	
Matrix Spike	KQ1802820-01MS	2/26/18	2/27/18	10 mL	2 mL	
Duplicate Matrix Spike	KQ1802820-02DMS	2/26/18	2/27/18	10 mL	2 mL	
Lab Control Sample	KQ1802820-05LCS	NA	NA	10 mL	2 mL	
Method Blank	KQ1802820-06MB	NA	NA	10 mL	2 mL	



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June 26, 2018

**Analytical Report for Service Request No: K1804907**

Tasya Gray  
Dalton Olmsted & Fuglevand  
10827 NE 68th St., Suite B  
Kirkland, WA 98033

**RE: 1,4-Dioxane Pilot Study/Stericycle Georgetown / 375.08**

Dear Tasya,

Enclosed are the results of the sample(s) submitted to our laboratory May 24, 2018  
For your reference, these analyses have been assigned our service request number **K1804907**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.



### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Received:** 05/24/2018

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt:

Nine water samples were received for analysis at ALS Environmental on 05/24/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Semivolatiles by GC/MS:

No significant anomalies were noted with this analysis.

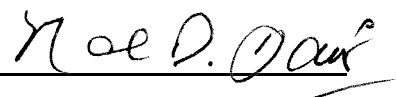
#### Metals:

No significant anomalies were noted with this analysis.

#### General Chemistry:

Divalent Iron by Method ApplEnvMic7-87-1536-1540, 05/24/2018: Samples IMW-1-052318, IMW-2-052318, CG-122-60-052318, and CG-9-122-60-052318 were received with insufficient holding time remaining. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

Approved by



Date

06/26/2018



# Chain of Custody

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# Chain of Custody Record & Laboratory Analysis Request

K1804907



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)  
 www.arilabs.com

ARI Assigned Number:	Turn-around Requested: <b>Standard</b>	Page: <b>1</b> of <b>2</b>
ARI Client Company: <b>STERICYCLE ATTN: Bill Beck</b>	Phone: <b>208-316-7223</b>	Date: <b>5/23/18</b> Ice Present?
Client Contact: <b>Tanya Gray / NGRAY@DOFNW.COM</b>	<b>DOF</b>	No. of Coolers: <b>2</b> Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested					Notes/Comments
					SD4/300.0 Total Metals UFe/6020A	Dissolved Metals Cr/As/Co	Formaldehyde Iron	1,4-Dioxane B270 D		
IMW-1-052318	5/23/18	1010	Water	15	X	X	X	X	X	MS/MSD
IMW-2-052318		1110		5						
CG-122-60-052318		1155		5						
CG-122-75-052318		1435		5						
Comments/Special Instructions					Relinquished by:	Received by:	Relinquished by:	Received by:		
- Dissolved Metals Field Es Hereal 0.45µm. (As/Cr)					(Signature) <i>[Signature]</i>	(Signature) <b>FEDEX</b>	(Signature) <i>[Signature]</i>	(Signature) <i>[Signature]</i>		
					Printed Name: <b>L. Keene</b>	Printed Name: <b>UNDER CUSTODY</b>	Printed Name:	Printed Name: <b>CODY GRAVES</b>		
					Company: <b>DOF</b>	Company: <b>FEAL</b>	Company:	Company: <b>ALS</b>		
					Date & Time: <b>5/23/18 1715</b>	Date & Time: <b>5/23/18 1715</b>	Date & Time:	Date & Time: <b>5/24/18 0945</b>		

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

# Chain of Custody Record & Laboratory Analysis Request

K1804907



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)  
 www.arilabs.com

ARI Assigned Number:	Turn-around Requested: <b>Standard</b>	Page: <b>2</b> of <b>2</b>
ARI Client Company: <b>STERICYCLE AFW: Bill Beck</b>	Phone: <b>206-316-7223</b>	Date: <b>5/23/18</b> Ice Present?
Client Contact: <b>Tasya Gray / NGRAY@DOFW.COM</b>	<b>DOF</b>	No. of Coolers: Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested						Notes/Comments	
					SO <sub>4</sub> /3000	Total Metals (Fe)/6020A	Dissolved Metals (Cr/As)/6020A	Formy/Forme Iron	1,4-Dioxane 8270D			
IP-5-052318	5/23/18	1520	WATER	5	X	X	X	X	X		* 1,4 Dioxane Preserved w/ Ascorbic Acid	
IP-6-052318		1550									*	
IP-7-052318		1620									*	
CG-9-122-60-052318		1200										
FB-01-052318		1440										
Comments/Special Instructions * High concentrations of cadmium persulfate - Dissolved metals Field Filtered 0.45µm. (As/Cr)					Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <b>FEDEx</b>		Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>	
					Printed Name: <b>L Kerwin</b>		Printed Name: <b>UNDER CUSTODY</b>		Printed Name:		Printed Name: <b>CODY GRAVES</b>	
					Company: <b>DOF</b>		Company: <b>SEAL</b>		Company:		Company: <b>ALS</b>	
					Date & Time: <b>5/23/18 1715</b>		Date & Time: <b>5/23/18 1715</b>		Date & Time:		Date & Time: <b>5/24/18 0945</b>	

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



### Cooler Receipt and Preservation Form

Client Stericycle GT Service Request K18 04907  
 Received: 5/24/18 Opened: 5/24/18 By: CG Unloaded: 5/24/18 By: CG

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- Were custody seals on coolers? NA  Y  N If yes, how many and where? 1 Front  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
-0.5	-0.5	3.8	3.8	0.0	384	1 of 2	7811 0550 3640		
0.4	0.4	4.6	4.6	0.0	325	2 of 2	7811 0550 3630		

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.* CG  NA  Y  N  
5/24  NA  Y  N
- Was C12/Res negative?  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
IMW-1-052318	6-250ml P				X	HNO3	0.5ml	RE1-46-M	CG	1240
IMW-2-052318	2-250ml P				X				CG	1240
CG-122-60-052318					X				CG	1240
CG-9-122-60-052318					X				CG	1240

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**SHORT HOLD TIME**  
**SHORT HOLD TIME**





# General Chemistry

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
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[www.alsglobal.com](http://www.alsglobal.com)

**ALS Group USA, Corp.**  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Analysis Method:** 300.0  
**Prep Method:** None

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Units:** mg/L  
**Basis:** NA

**Sulfate**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-052318	K1804907-001	<b>625</b>	20	2	200	06/18/18 18:24	
IMW-2-052318	K1804907-002	<b>340</b>	10	1	100	06/18/18 20:48	
CG-122-60-052318	K1804907-003	<b>200</b>	5.0	0.5	50	06/18/18 19:44	
CG-122-75-052318	K1804907-004	<b>0.08 J</b>	0.20	0.02	2	06/18/18 19:55	
IP-5-052318	K1804907-005	<b>137</b>	10	1	100	06/18/18 20:06	
IP-6-052318	K1804907-006	<b>172</b>	10	1	100	06/18/18 20:16	
IP-7-052318	K1804907-007	<b>129</b>	5.0	0.5	50	06/18/18 20:27	
CG-9-122-60-052318	K1804907-008	<b>199</b>	5.0	0.5	50	06/18/18 20:37	
FB-01-052318	K1804907-009	ND U	0.10	0.01	1	06/18/18 19:34	
Method Blank	K1804907-MB	ND U	0.10	0.01	1	06/18/18 11:40	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 06/18/18

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-052318 **Units:** mg/L  
**Lab Code:** K1804907-001 **Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1804907-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Sulfate	300.0	20	2	625	621	623	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 06/18/18  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Sulfate**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001  
**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike K1804907-001MS		Duplicate Matrix Spike K1804907-001DMS		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
Sulfate	625	1590	1000	96	1590	1000	97	90-110	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/18/18  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Sulfate**

**Analysis Method:** 300.0  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 595211

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1804907-LCS	4.85	5.00	97	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

### Continuing Calibration Verification (CCV) Summary

#### Sulfate

**Analysis Method:** 300.0

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	595211	KQ1808544-12	06/18/18 11:51	5.00	4.91	98	90-110
CCV2	595211	KQ1808544-13	06/18/18 14:51	5.00	4.85	97	90-110
CCV3	595211	KQ1808544-14	06/18/18 16:58	5.00	4.96	99	90-110
CCV4	595211	KQ1808544-15	06/18/18 19:12	5.00	4.94	99	90-110
CCV5	595211	KQ1808544-16	06/18/18 21:20	5.00	4.90	98	90-110
CCV6	595211	KQ1808544-17	06/18/18 22:26	5.00	4.93	99	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:**K1804907

**Continuing Calibration Blank (CCB) Summary**  
**Sulfate**

**Analysis Method:** 300.0

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	595211	KQ1808544-18	06/18/18 12:02	0.10	0.01	ND	U
CCB2	595211	KQ1808544-19	06/18/18 15:01	0.10	0.01	ND	U
CCB3	595211	KQ1808544-20	06/18/18 17:09	0.10	0.01	ND	U
CCB4	595211	KQ1808544-21	06/18/18 19:23	0.10	0.01	ND	U
CCB5	595211	KQ1808544-22	06/18/18 21:31	0.10	0.01	ND	U
CCB6	595211	KQ1808544-23	06/18/18 22:37	0.10	0.01	ND	U

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-052318	K1804907-001	<b>2.68</b>	0.40	0.10	2	05/24/18 13:45	*
IMW-2-052318	K1804907-002	<b>1.09</b>	0.20	0.05	1	05/24/18 13:45	*
CG-122-60-052318	K1804907-003	<b>1.10</b>	0.20	0.05	1	05/24/18 13:45	*
CG-122-75-052318	K1804907-004	<b>0.08 J</b>	0.20	0.05	1	05/24/18 13:45	
CG-9-122-60-052318	K1804907-008	<b>0.68</b>	0.20	0.05	1	05/24/18 13:45	*
FB-01-052318	K1804907-009	ND U	0.20	0.05	1	05/24/18 13:45	
Method Blank	K1804907-MB	ND U	0.20	0.05	1	05/24/18 13:45	



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 05/24/18

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** IMW-1-052318 **Units:** mg/L  
**Lab Code:** K1804907-001 **Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1804907-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.40	0.10	2.68	2.68	2.68	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 05/24/18  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Matrix Spike K1804907-001MS				Duplicate Matrix Spike K1804907-001DMS				% Rec Limits	RPD	RPD Limit
	Sample Result	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec				
Iron, Divalent (Ferrous Iron)	2.68	4.76	2.00	104	4.76	2.00	104	75-125	<1	20	

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	592341	KQ1806955-07	05/24/18 13:45	4.00	4.04	101	90-110
CCV2	592341	KQ1806955-08	05/24/18 13:45	4.00	4.04	101	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:**K1804907

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	592341	KQ1806955-05	05/24/18 13:45	0.20	0.05	ND	U
CCB2	592341	KQ1806955-06	05/24/18 13:45	0.20	0.05	ND	U



# Metals

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Service Request:** K1804907  
**Date Collected:** 05/23/18 10:10  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 08:04	06/05/18	
Chromium	6020A	<b>0.00045</b>	mg/L	0.00020	0.00003	1	06/12/18 08:04	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Service Request:** K1804907  
**Date Collected:** 05/23/18 10:10  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	5.99	mg/L	0.0020	0.0003	1	06/12/18 07:40	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-052318  
**Lab Code:** K1804907-002

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:10  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 08:13	06/05/18	
Chromium	6020A	<b>0.00035</b>	mg/L	0.00020	0.00003	1	06/12/18 08:13	06/05/18	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IMW-2-052318  
**Lab Code:** K1804907-002

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:10  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	6.87	mg/L	0.0020	0.0003	1	06/12/18 07:47	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-052318  
**Lab Code:** K1804907-003

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:55  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 08:15	06/05/18	
Chromium	6020A	<b>0.00037</b>	mg/L	0.00020	0.00003	1	06/12/18 08:15	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-60-052318  
**Lab Code:** K1804907-003

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:55  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	2.84	mg/L	0.0020	0.0003	1	06/12/18 07:48	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-052318  
**Lab Code:** K1804907-004

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:35  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	<b>0.00010 J</b>	mg/L	0.00050	0.00009	1	06/12/18 08:16	06/05/18	
Chromium	6020A	<b>0.00059</b>	mg/L	0.00020	0.00003	1	06/12/18 08:16	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-122-75-052318  
**Lab Code:** K1804907-004

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:35  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	2.82	mg/L	0.0020	0.0003	1	06/12/18 07:52	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-5-052318  
**Lab Code:** K1804907-005

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:20  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.010	0.002	5	06/12/18 08:17	06/05/18	
Chromium	6020A	<b>0.0597</b>	mg/L	0.0040	0.0006	5	06/12/18 08:17	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-5-052318  
**Lab Code:** K1804907-005

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:20  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.432	mg/L	0.040	0.006	5	06/12/18 07:53	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-052318  
**Lab Code:** K1804907-006

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:50  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.010	0.002	5	06/12/18 08:19	06/05/18	
Chromium	6020A	<b>0.0505</b>	mg/L	0.0040	0.0006	5	06/12/18 08:19	06/05/18	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-052318  
**Lab Code:** K1804907-006

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:50  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.088	mg/L	0.040	0.006	5	06/12/18 07:55	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-7-052318  
**Lab Code:** K1804907-007

**Service Request:** K1804907  
**Date Collected:** 05/23/18 16:20  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Arsenic	6020A	ND U	mg/L	0.010	0.002	5	06/12/18 08:20	06/05/18	
Chromium	6020A	<b>0.0025 J</b>	mg/L	0.0040	0.0006	5	06/12/18 08:20	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-7-052318  
**Lab Code:** K1804907-007

**Service Request:** K1804907  
**Date Collected:** 05/23/18 16:20  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.042	mg/L	0.040	0.006	5	06/12/18 07:56	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-60-052318  
**Lab Code:** K1804907-008

**Service Request:** K1804907  
**Date Collected:** 05/23/18 12:00  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 08:21	06/05/18	
Chromium	6020A	<b>0.00041</b>	mg/L	0.00020	0.00003	1	06/12/18 08:21	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** CG-9-122-60-052318  
**Lab Code:** K1804907-008

**Service Request:** K1804907  
**Date Collected:** 05/23/18 12:00  
**Date Received:** 05/24/18 09:45  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	2.89	mg/L	0.0020	0.0003	1	06/12/18 07:58	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** FB-01-052318  
**Lab Code:** K1804907-009

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:40  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 08:23	06/05/18	
Chromium	6020A	<b>0.00004 J</b>	mg/L	0.00020	0.00003	1	06/12/18 08:23	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** FB-01-052318  
**Lab Code:** K1804907-009

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:40  
**Date Received:** 05/24/18 09:45

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	<b>0.0016 J</b>	mg/L	0.0020	0.0003	1	06/12/18 08:03	06/05/18	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1807222-01

**Service Request:** K1804907  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	ND U	mg/L	0.00050	0.00009	1	06/12/18 07:37	06/05/18	
Chromium	6020A	ND U	mg/L	0.00020	0.00003	1	06/12/18 07:37	06/05/18	
Iron	6020A	<b>0.0007 J</b>	mg/L	0.0020	0.0003	1	06/12/18 07:37	06/05/18	



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QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
Sample Matrix: Water

Service Request: K1804907  
Date Collected: 05/23/18  
Date Received: 05/24/18  
Date Analyzed: 06/12/18

Replicate Sample Summary  
Dissolved Metals

Sample Name: IMW-1-052318  
Lab Code: K1804907-001

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1807222-05 Result			
Arsenic	6020A	0.00050	0.00009	ND U	ND U	ND	-	20
Chromium	6020A	0.00020	0.00003	0.00045	0.00042	0.00044	7	20
Iron	6020A	0.0020	0.0003	5.92	5.78	5.85	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**ALS Group USA, Corp.**

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 06/12/18

**Replicate Sample Summary**

**Total Metals**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1807222-03 Result			
Arsenic	6020A	0.00050	0.00009	ND U	ND U	ND	-	20
Chromium	6020A	0.00020	0.00003	0.00062	0.00064	0.00063	3	20
Iron	6020A	0.0020	0.0003	5.99	5.96	5.98	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 6/12/18

**Matrix Spike Summary**  
**Dissolved Metals**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1807222-06

<b>Analyte Name</b>	<b>Method</b>	<b>Sample Result</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Arsenic	6020A	ND U	0.0494	0.0500	99	75-125
Chromium	6020A	0.00045	0.00999	0.0100	95	75-125
Iron	6020A	5.92	6.14	0.0500	428 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 6/12/18

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1807222-04

<b>Analyte Name</b>	<b>Method</b>	<b>Sample Result</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Arsenic	6020A	ND U	0.0470	0.0500	94	75-125
Chromium	6020A	0.00062	0.00943	0.0100	88	75-125
Iron	6020A	5.99	5.84	0.0500	-284 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/12/18

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1807222-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0549	0.0500	110	80-120

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/12/18

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1807222-02

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Arsenic	6020A	0.0541	0.0500	108	80-120
Chromium	6020A	0.0106	0.0100	106	80-120

**ALS Group USA, Corp.**  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:**K1804907

**Metals**

**Prep Method:** EPA CLP-METALS ILM04.0

**Extraction Lot:** 314963

**Analytical Method:** 6020A

**Extraction Date:** 06/05/18 14:10

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-052318	K1804907-001	5/23/18	5/24/18	10 mL	10 mL	
IMW-2-052318	K1804907-002	5/23/18	5/24/18	10 mL	10 mL	
CG-122-60-052318	K1804907-003	5/23/18	5/24/18	10 mL	10 mL	
CG-122-75-052318	K1804907-004	5/23/18	5/24/18	10 mL	10 mL	
IP-5-052318	K1804907-005	5/23/18	5/24/18	2.5 mL	10 mL	
IP-6-052318	K1804907-006	5/23/18	5/24/18	2.5 mL	10 mL	
IP-7-052318	K1804907-007	5/23/18	5/24/18	2.5 mL	10 mL	
CG-9-122-60-052318	K1804907-008	5/23/18	5/24/18	10 mL	10 mL	
FB-01-052318	K1804907-009	5/23/18	5/24/18	10 mL	10 mL	
Duplicate	KQ1807222-05DUP	5/23/18	5/24/18	10 mL	10 mL	
Matrix Spike	KQ1807222-06MS	5/23/18	5/24/18	10 mL	10.3 mL	
IMW-1-052318	K1804907-001	5/23/18	5/24/18	10 mL	10 mL	
IMW-2-052318	K1804907-002	5/23/18	5/24/18	10 mL	10 mL	
CG-122-60-052318	K1804907-003	5/23/18	5/24/18	10 mL	10 mL	
CG-122-75-052318	K1804907-004	5/23/18	5/24/18	10 mL	10 mL	
IP-5-052318	K1804907-005	5/23/18	5/24/18	2.5 mL	10 mL	
IP-6-052318	K1804907-006	5/23/18	5/24/18	2.5 mL	10 mL	
IP-7-052318	K1804907-007	5/23/18	5/24/18	2.5 mL	10 mL	
CG-9-122-60-052318	K1804907-008	5/23/18	5/24/18	10 mL	10 mL	
FB-01-052318	K1804907-009	5/23/18	5/24/18	10 mL	10 mL	
Method Blank	KQ1807222-01MB	NA	NA	10 mL	10 mL	
Lab Control Sample	KQ1807222-02LCS	NA	NA	10 mL	10.3 mL	
Duplicate	KQ1807222-03DUP	5/23/18	5/24/18	10 mL	10 mL	
Matrix Spike	KQ1807222-04MS	5/23/18	5/24/18	10 mL	10.3 mL	

**ALS Group USA, Corp.**  
**dba ALS Environmental**

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>
CCV 06/12/18 06:45	Iron	6020A	594325	258	250	103	90-110
	Arsenic	6020A	594325	25.3	25.0	101	90-110
	Chromium	6020A	594325	25.4	25.0	102	90-110
CCV 06/12/18 07:15	Iron	6020A	594325	255	250	102	90-110
	Arsenic	6020A	594325	25.9	25.0	103	90-110
	Chromium	6020A	594325	25.2	25.0	101	90-110
CCV 06/12/18 07:27	Iron	6020A	594325	256	250	102	90-110
	Arsenic	6020A	594325	25.4	25.0	102	90-110
	Chromium	6020A	594325	24.9	25.0	100	90-110
CCV 06/12/18 07:50	Iron	6020A	594325	258	250	103	90-110
	Arsenic	6020A	594325	26.1	25.0	104	90-110
	Chromium	6020A	594325	25.3	25.0	101	90-110
CCV 06/12/18 08:08	Iron	6020A	594325	266	250	107	90-110
	Arsenic	6020A	594325	26.7	25.0	107	90-110
	Chromium	6020A	594325	26.5	25.0	106	90-110
CCV 06/12/18 08:24	Iron	6020A	594325	254	250	101	90-110
	Arsenic	6020A	594325	25.6	25.0	102	90-110
	Chromium	6020A	594325	25.0	25.0	100	90-110
ICV 06/12/18 06:44	Iron	6020A	594325	49.5	50.0	99	90-110
	Arsenic	6020A	594325	23.9	25.0	96	90-110
	Chromium	6020A	594325	9.53	10.0	95	90-110



**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**INITIAL AND CONTINUING CALIBRATION BLANKS**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>C</b>
CCB 06/12/18 06:47	Iron	6020A	594325	0.3	U
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
CCB 06/12/18 07:16	Iron	6020A	594325	0.4	J
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
CCB 06/12/18 07:28	Iron	6020A	594325	0.3	U
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
CCB 06/12/18 07:51	Iron	6020A	594325	0.3	J
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
CCB 06/12/18 08:10	Iron	6020A	594325	0.3	U
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
CCB 06/12/18 08:25	Iron	6020A	594325	0.3	U
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U
ICB 06/12/18 06:46	Iron	6020A	594325	0.3	U
	Arsenic	6020A	594325	0.09	U
	Chromium	6020A	594325	0.03	U

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
LLCCV								
	Iron	6020A	594325	2.2	2.0	112	70-130	06/12/18 07:36
	Arsenic	6020A	594325	0.51	0.5	101	70-130	06/12/18 07:36
	Chromium	6020A	594325	0.21	0.2	107	70-130	06/12/18 07:36
LLCCV								
	Iron	6020A	594325	2.3	2.0	114	70-130	06/12/18 08:27
	Arsenic	6020A	594325	0.52	0.5	104	70-130	06/12/18 08:27
	Chromium	6020A	594325	0.19	0.2	94	70-130	06/12/18 08:27
LLICV								
	Iron	6020A	594325	2.1	2.0	103	70-130	06/12/18 06:49
	Arsenic	6020A	594325	0.53	0.5	106	70-130	06/12/18 06:49
	Chromium	6020A	594325	0.20	0.2	102	70-130	06/12/18 06:49

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSA

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	594325	46100	-	-	-	06/12/18 06:50
Arsenic	6020A	594325	0.21	-	-	-	06/12/18 06:50
Chromium	6020A	594325	1.22	-	-	-	06/12/18 06:50

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**ICP INTERFERENCE CHECK SAMPLE**

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	594325	47300	-	-	-	06/12/18 06:51
Arsenic	6020A	594325	24.8	25.0	99	80-120	06/12/18 06:51
Chromium	6020A	594325	49.7	50.0	99	80-120	06/12/18 06:51

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1804907-001A	Arsenic	6020A	594325	0.09 U	50.0	50.0	100	80-120	06/12/18 07:44
	Chromium	6020A	594325	0.62	48.0	50.0	95	80-120	06/12/18 07:44

Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1804907-001SDL	Arsenic	6020A	594325	0.09 U	0.02 U	75	10	06/12/18 07:43
	Chromium	6020A	594325	0.6	0.7 J	6	10	06/12/18 07:43

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Detection Limits**

**Instrument:** K-ICP-MS-05

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Arsenic	75	ug/L	0.5	0.09	6020A
Chromium	52	ug/L	0.2	0.03	6020A
Iron	56	ug/L	2.0	0.3	6020A

ALS Group USA, Corp.  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.

**Service Request:** K1804907

**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-05

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Arsenic 75	3000	6020A
Chromium 52	3000	6020A
Iron 56	50000	6020A



**ALS Group USA, Corp.**  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 594325

Sample	Dilution Factor	Date/Time	A s	C r	F e
ZZZZZZ	1	06/12/18 06:41			
ZZZZZZ	1	06/12/18 06:42			
ICV	1	06/12/18 06:44	X	X	X
CCV	1	06/12/18 06:45	X	X	X
ICB	1	06/12/18 06:46	X	X	X
CCB	1	06/12/18 06:47	X	X	X
LLICVW	1	06/12/18 06:49	X	X	X
ICSA	1	06/12/18 06:50	X	X	X
ICSAB	1	06/12/18 06:51	X	X	X
ZZZZZZ	1	06/12/18 07:01			
ZZZZZZ	1	06/12/18 07:03			
ZZZZZZ	1	06/12/18 07:04			
ZZZZZZ	1	06/12/18 07:05			
ZZZZZZ	100	06/12/18 07:07			
ZZZZZZ	100	06/12/18 07:09			
ZZZZZZ	1	06/12/18 07:10			
ZZZZZZ	1	06/12/18 07:11			
ZZZZZZ	1	06/12/18 07:12			
ZZZZZZ	1	06/12/18 07:14			
CCV	1	06/12/18 07:15	X	X	X
CCB	1	06/12/18 07:16	X	X	X
ZZZZZZ	1	06/12/18 07:18			
ZZZZZZ	1	06/12/18 07:19			
ZZZZZZ	1	06/12/18 07:20			
ZZZZZZ	1	06/12/18 07:22			
ZZZZZZ	5	06/12/18 07:23			
ZZZZZZ	1	06/12/18 07:24			
ZZZZZZ	1	06/12/18 07:26			
CCV	1	06/12/18 07:27	X	X	X
CCB	1	06/12/18 07:28	X	X	X
ZZZZZZ	1	06/12/18 07:30			
LLCCVW	1	06/12/18 07:36	X	X	X
KQ1807222-01MB	1	06/12/18 07:37	X	X	X
KQ1807222-02LCS	1	06/12/18 07:39	X	X	X
K1804907-001	1	06/12/18 07:40			X
K1804907-001DUP	1	06/12/18 07:42	X	X	X
K1804907-001SDL	5	06/12/18 07:43	X	X	

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 594325

<b>Sample</b>	<b>Dilution Factor</b>	<b>Date/Time</b>	<b>A</b>	<b>C</b>	<b>F</b>
			<b>s</b>	<b>r</b>	<b>e</b>
K1804907-001PS	1	06/12/18 07:44	X	X	
K1804907-001MS	1	06/12/18 07:46	X	X	X
K1804907-002	1	06/12/18 07:47			X
K1804907-003	1	06/12/18 07:48			X
CCV	1	06/12/18 07:50	X	X	X
CCB	1	06/12/18 07:51	X	X	X
K1804907-004	1	06/12/18 07:52			X
K1804907-005	5	06/12/18 07:53			X
K1804907-006	5	06/12/18 07:55			X
K1804907-007	5	06/12/18 07:56			X
K1804907-008	1	06/12/18 07:58			X
K1804907-009	1	06/12/18 08:03			X
K1804907-001	1	06/12/18 08:04	X	X	
K1804907-001DUP	1	06/12/18 08:06	X	X	X
K1804907-001SDL	5	06/12/18 08:07	X	X	
CCV	1	06/12/18 08:08	X	X	X
CCB	1	06/12/18 08:10	X	X	X
K1804907-001PS	1	06/12/18 08:11	X	X	
K1804907-001MS	1	06/12/18 08:12	X	X	X
K1804907-002	1	06/12/18 08:13	X	X	
K1804907-003	1	06/12/18 08:15	X	X	
K1804907-004	1	06/12/18 08:16	X	X	
K1804907-005	5	06/12/18 08:17	X	X	
K1804907-006	5	06/12/18 08:19	X	X	
K1804907-007	5	06/12/18 08:20	X	X	
K1804907-008	1	06/12/18 08:21	X	X	
K1804907-009	1	06/12/18 08:23	X	X	
CCV	1	06/12/18 08:24	X	X	X
CCB	1	06/12/18 08:25	X	X	X
LLCCVW	1	06/12/18 08:27	X	X	X

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 594325

Sample	Date/Time	Ge72He	Lu175He
ZZZZZZ	06/12/18 06:41		
ZZZZZZ	06/12/18 06:42		
ICV	06/12/18 06:44	100	102
CCV	06/12/18 06:45	98	102
ICB	06/12/18 06:46	98	102
CCB	06/12/18 06:47	98	102
LLICVW	06/12/18 06:49	97	100
ICSA	06/12/18 06:50	92	99
ICSAB	06/12/18 06:51	90	98
ZZZZZZ	06/12/18 07:01		
ZZZZZZ	06/12/18 07:03		
ZZZZZZ	06/12/18 07:04		
ZZZZZZ	06/12/18 07:05		
ZZZZZZ	06/12/18 07:07		
ZZZZZZ	06/12/18 07:09		
ZZZZZZ	06/12/18 07:10		
ZZZZZZ	06/12/18 07:11		
ZZZZZZ	06/12/18 07:12		
ZZZZZZ	06/12/18 07:14		
CCV	06/12/18 07:15	108	111
CCB	06/12/18 07:16	108	112
ZZZZZZ	06/12/18 07:18		
ZZZZZZ	06/12/18 07:19		
ZZZZZZ	06/12/18 07:20		
ZZZZZZ	06/12/18 07:22		
ZZZZZZ	06/12/18 07:23		
ZZZZZZ	06/12/18 07:24		
ZZZZZZ	06/12/18 07:26		
CCV	06/12/18 07:27	103	110
CCB	06/12/18 07:28	106	110
ZZZZZZ	06/12/18 07:30		
LLCCVW	06/12/18 07:36	102	109
KQ1807222-01MB	06/12/18 07:37	104	114
KQ1807222-02LCS	06/12/18 07:39	99	106
K1804907-001	06/12/18 07:40	90	100
K1804907-001DUP	06/12/18 07:42	91	102
K1804907-001SDL	06/12/18 07:43	98	109

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-05

**Analytical BatchID:** 594325

Sample	Date/Time	Ge72He	Lu175He
K1804907-001PS	06/12/18 07:44	92	103
K1804907-001MS	06/12/18 07:46	96	106
K1804907-002	06/12/18 07:47	94	105
K1804907-003	06/12/18 07:48	93	103
CCV	06/12/18 07:50	101	109
CCB	06/12/18 07:51	103	110
K1804907-004	06/12/18 07:52	94	102
K1804907-005	06/12/18 07:53	101	108
K1804907-006	06/12/18 07:55	99	105
K1804907-007	06/12/18 07:56	103	110
K1804907-008	06/12/18 07:58	89	100
K1804907-009	06/12/18 08:03	102	108
K1804907-001	06/12/18 08:04	90	101
K1804907-001DUP	06/12/18 08:06	94	104
ZZZZZ	06/12/18 08:07		
CCV	06/12/18 08:08	99	107
CCB	06/12/18 08:10	98	102
ZZZZZ	06/12/18 08:11		
K1804907-001MS	06/12/18 08:12	91	102
K1804907-002	06/12/18 08:13	92	102
K1804907-003	06/12/18 08:15	94	103
K1804907-004	06/12/18 08:16	96	106
K1804907-005	06/12/18 08:17	104	110
K1804907-006	06/12/18 08:19	104	110
K1804907-007	06/12/18 08:20	101	107
K1804907-008	06/12/18 08:21	92	101
K1804907-009	06/12/18 08:23	104	111
CCV	06/12/18 08:24	102	109
CCB	06/12/18 08:25	101	109
LLCCVW	06/12/18 08:27	99	108



# 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 10:10  
**Date Received:** 05/24/18 09:45

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	150	2.0	0.80	5	06/08/18 16:04	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	84	48 - 118	06/07/18 06:03	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:10  
**Date Received:** 05/24/18 09:45

**Sample Name:** IMW-2-052318  
**Lab Code:** K1804907-002

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	400	4.0	1.6	10	06/08/18 18:31	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	86	48 - 118	06/07/18 06:22	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 11:55  
**Date Received:** 05/24/18 09:45

**Sample Name:** CG-122-60-052318  
**Lab Code:** K1804907-003

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	230	4.0	1.6	10	06/08/18 18:49	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	80	48 - 118	06/07/18 06:40	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:35  
**Date Received:** 05/24/18 09:45

**Sample Name:** CG-122-75-052318  
**Lab Code:** K1804907-004

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	110	2.0	0.80	5	06/08/18 16:22	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	83	48 - 118	06/07/18 06:59	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:20  
**Date Received:** 05/24/18 09:45

**Sample Name:** IP-5-052318  
**Lab Code:** K1804907-005

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	290	4.0	1.6	10	06/08/18 19:08	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	48 - 118	06/07/18 07:17	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** IP-6-052318  
**Lab Code:** K1804907-006

**Service Request:** K1804907  
**Date Collected:** 05/23/18 15:50  
**Date Received:** 05/24/18 09:45

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	180	2.0	0.80	5	06/08/18 16:40	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	87	48 - 118	06/07/18 07:35	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 16:20  
**Date Received:** 05/24/18 09:45

**Sample Name:** IP-7-052318  
**Lab Code:** K1804907-007

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	140	2.0	0.80	5	06/08/18 16:59	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	48 - 118	06/07/18 07:54	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 12:00  
**Date Received:** 05/24/18 09:45

**Sample Name:** CG-9-122-60-052318  
**Lab Code:** K1804907-008

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	230	4.0	1.6	10	06/08/18 19:26	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	48 - 118	06/07/18 08:12	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18 14:40  
**Date Received:** 05/24/18 09:45

**Sample Name:** FB-01-052318  
**Lab Code:** K1804907-009

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	06/07/18 08:31	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	84	48 - 118	06/07/18 08:31	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1807154-06

**Service Request:** K1804907  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	06/07/18 04:13	5/30/18	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	48 - 118	06/07/18 04:13	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907

**SURROGATE RECOVERY SUMMARY**

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM

**Extraction Method:** EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		48-118
IMW-1-052318	K1804907-001	84
IMW-2-052318	K1804907-002	86
CG-122-60-052318	K1804907-003	80
CG-122-75-052318	K1804907-004	83
IP-5-052318	K1804907-005	82
IP-6-052318	K1804907-006	87
IP-7-052318	K1804907-007	82
CG-9-122-60-052318	K1804907-008	82
FB-01-052318	K1804907-009	84
Method Blank	KQ1807154-06	82
Lab Control Sample	KQ1807154-05	79
IMW-1-052318	KQ1807154-01	86
IMW-1-052318	KQ1807154-02	83



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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18 03:55

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\060618\0606F058.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D SIM

**Lab Code:** KQ1807571-02  
**Analysis Lot:** 593769  
**Signal ID:** 1

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	44,528	5.21
<b>Upper Limit ==&gt;</b>	89,056	5.71
<b>Lower Limit ==&gt;</b>	22,264	4.71

**Associated Analyses**

		Area	RT
Continuing Calibration Verification	KQ1807571-02	44528	5.21
Method Blank	KQ1807154-06	42581	5.21
Lab Control Sample	KQ1807154-05	42739	5.21
IMW-1-052318MS	KQ1807154-01	42167	5.21
IMW-1-052318DMS	KQ1807154-02	42607	5.21
IMW-1-052318	K1804907-001	42469	5.21
IMW-2-052318	K1804907-002	42415	5.21
CG-122-60-052318	K1804907-003	43053	5.21
CG-122-75-052318	K1804907-004	42261	5.21
IP-5-052318	K1804907-005	43726	5.21
IP-6-052318	K1804907-006	43553	5.21
IP-7-052318	K1804907-007	42975	5.21
CG-9-122-60-052318	K1804907-008	43323	5.21
FB-01-052318	K1804907-009	41854	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:**K1804907  
**Date Analyzed:**06/08/18 13:55

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\060818\0608F004.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D SIM

**Lab Code:**KQ1807906-02  
**Analysis Lot:**594048  
**Signal ID:**1

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>ICAL Result ==&gt;</b>	47,002	5.21
<b>Upper Limit ==&gt;</b>	94,004	5.71
<b>Lower Limit ==&gt;</b>	23,501	4.71

**Associated Analyses**

		Area	RT
Continuing Calibration Verification	KQ1807906-02	47002	5.21
IMW-1-052318	K1804907-001	40677	5.21
CG-122-75-052318	K1804907-004	42646	5.21
IP-6-052318	K1804907-006	43359	5.21
IP-7-052318	K1804907-007	40981	5.21
IMW-2-052318	K1804907-002	42614	5.21
CG-122-60-052318	K1804907-003	42634	5.21
IP-5-052318	K1804907-005	41650	5.21
CG-9-122-60-052318	K1804907-008	43027	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Collected:** 05/23/18  
**Date Received:** 05/24/18  
**Date Analyzed:** 06/7/18  
**Date Extracted:** 05/30/18

**Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** IMW-1-052318  
**Lab Code:** K1804907-001  
**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1807154-01		Duplicate Matrix Spike KQ1807154-02		% Rec Limits	RPD	RPD Limit	
			Spike Amount	% Rec	Result	Spike Amount				% Rec
1,4-Dioxane	150	148 E	10.0	-18 #	140 E	10.0	-98 #	33-127	6	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18  
**Date Extracted:** 05/30/18

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA  
**Analysis Lot:** 593769

**Lab Control Sample**  
**KQ1807154-05**

<b>Analyte Name</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
1,4-Dioxane	8.15	10.0	82	52-111

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18 04:13  
**Date Extracted:** 05/30/18

**Method Blank Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Method Blank **Instrument ID:** K-MS-26  
**Lab Code:** KQ1807154-06 **File ID:** J:\MS26\DATA\060618\0606F059.D\  
**Analysis Method:** 8270D SIM **Analysis Lot:** 593769,594048  
**Prep Method:** EPA 3535A **Extraction Lot:** 314874

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1807154-05	J:\MS26\DATA\060618\0606F060.D\	06/07/18 04:31
IMW-1-052318MS	KQ1807154-01	J:\MS26\DATA\060618\0606F061.D\	06/07/18 04:50
IMW-1-052318DMS	KQ1807154-02	J:\MS26\DATA\060618\0606F062.D\	06/07/18 05:08
IMW-1-052318	K1804907-001	J:\MS26\DATA\060618\0606F065.D\	06/07/18 06:03
IMW-2-052318	K1804907-002	J:\MS26\DATA\060618\0606F066.D\	06/07/18 06:22
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060618\0606F067.D\	06/07/18 06:40
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060618\0606F068.D\	06/07/18 06:59
IP-5-052318	K1804907-005	J:\MS26\DATA\060618\0606F069.D\	06/07/18 07:17
IP-6-052318	K1804907-006	J:\MS26\DATA\060618\0606F070.D\	06/07/18 07:35
IP-7-052318	K1804907-007	J:\MS26\DATA\060618\0606F071.D\	06/07/18 07:54
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060618\0606F072.D\	06/07/18 08:12
FB-01-052318	K1804907-009	J:\MS26\DATA\060618\0606F073.D\	06/07/18 08:31
IMW-1-052318	K1804907-001	J:\MS26\DATA\060818\0608F011.D\	06/08/18 16:04
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060818\0608F012.D\	06/08/18 16:22
IP-6-052318	K1804907-006	J:\MS26\DATA\060818\0608F013.D\	06/08/18 16:40
IP-7-052318	K1804907-007	J:\MS26\DATA\060818\0608F014.D\	06/08/18 16:59
IMW-2-052318	K1804907-002	J:\MS26\DATA\060818\0608F019.D\	06/08/18 18:31
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060818\0608F020.D\	06/08/18 18:49
IP-5-052318	K1804907-005	J:\MS26\DATA\060818\0608F021.D\	06/08/18 19:08
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060818\0608F022.D\	06/08/18 19:26

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18 04:31  
**Date Extracted:** 05/30/18

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Lab Control Sample      **Instrument ID:** K-MS-26  
**Lab Code:** KQ1807154-05      **File ID:** J:\MS26\DATA\060618\0606F060.D\  
**Analysis Method:** 8270D SIM      **Analysis Lot:** 593769,594048  
**Prep Method:** EPA 3535A      **Extraction Lot:** 314874

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1807154-06	J:\MS26\DATA\060618\0606F059.D\	06/07/18 04:13
IMW-1-052318MS	KQ1807154-01	J:\MS26\DATA\060618\0606F061.D\	06/07/18 04:50
IMW-1-052318DMS	KQ1807154-02	J:\MS26\DATA\060618\0606F062.D\	06/07/18 05:08
IMW-1-052318	K1804907-001	J:\MS26\DATA\060618\0606F065.D\	06/07/18 06:03
IMW-2-052318	K1804907-002	J:\MS26\DATA\060618\0606F066.D\	06/07/18 06:22
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060618\0606F067.D\	06/07/18 06:40
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060618\0606F068.D\	06/07/18 06:59
IP-5-052318	K1804907-005	J:\MS26\DATA\060618\0606F069.D\	06/07/18 07:17
IP-6-052318	K1804907-006	J:\MS26\DATA\060618\0606F070.D\	06/07/18 07:35
IP-7-052318	K1804907-007	J:\MS26\DATA\060618\0606F071.D\	06/07/18 07:54
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060618\0606F072.D\	06/07/18 08:12
FB-01-052318	K1804907-009	J:\MS26\DATA\060618\0606F073.D\	06/07/18 08:31
IMW-1-052318	K1804907-001	J:\MS26\DATA\060818\0608F011.D\	06/08/18 16:04
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060818\0608F012.D\	06/08/18 16:22
IP-6-052318	K1804907-006	J:\MS26\DATA\060818\0608F013.D\	06/08/18 16:40
IP-7-052318	K1804907-007	J:\MS26\DATA\060818\0608F014.D\	06/08/18 16:59
IMW-2-052318	K1804907-002	J:\MS26\DATA\060818\0608F019.D\	06/08/18 18:31
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060818\0608F020.D\	06/08/18 18:49
IP-5-052318	K1804907-005	J:\MS26\DATA\060818\0608F021.D\	06/08/18 19:08
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060818\0608F022.D\	06/08/18 19:26

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18 03:36

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\060618\0606F057.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D SIM  
**Analysis Lot:** 593769

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	17.89	473325	Pass
68	69	0	2	1.74	10234	Pass
69	198	0	100	22.21	587707	Pass
70	69	0	2	0.45	2632	Pass
127	198	10	80	36.99	978681	Pass
197	198	0	2	0.33	8813	Pass
198	442	30	100	78.32	2646016	Pass
199	198	5	9	6.66	176149	Pass
275	198	10	60	30.97	819584	Pass
365	442	1	50	2.77	93685	Pass
441	443	0.01	100	76.85	499925	Pass
442	442	100	100	100.00	3378346	Pass
443	442	15	24	19.26	650517	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1807571-02	J:\MS26\DATA\060618\0606F058.D\	06/07/18 03:55	
Method Blank	KQ1807154-06	J:\MS26\DATA\060618\0606F059.D\	06/07/18 04:13	
Lab Control Sample	KQ1807154-05	J:\MS26\DATA\060618\0606F060.D\	06/07/18 04:31	
IMW-1-052318	KQ1807154-01	J:\MS26\DATA\060618\0606F061.D\	06/07/18 04:50	
IMW-1-052318	KQ1807154-02	J:\MS26\DATA\060618\0606F062.D\	06/07/18 05:08	
IMW-1-052318	K1804907-001	J:\MS26\DATA\060618\0606F065.D\	06/07/18 06:03	
IMW-2-052318	K1804907-002	J:\MS26\DATA\060618\0606F066.D\	06/07/18 06:22	
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060618\0606F067.D\	06/07/18 06:40	
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060618\0606F068.D\	06/07/18 06:59	
IP-5-052318	K1804907-005	J:\MS26\DATA\060618\0606F069.D\	06/07/18 07:17	
IP-6-052318	K1804907-006	J:\MS26\DATA\060618\0606F070.D\	06/07/18 07:35	
IP-7-052318	K1804907-007	J:\MS26\DATA\060618\0606F071.D\	06/07/18 07:54	
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060618\0606F072.D\	06/07/18 08:12	
FB-01-052318	K1804907-009	J:\MS26\DATA\060618\0606F073.D\	06/07/18 08:31	

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907  
**Date Analyzed:** 06/08/18 13:36

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\060818\0608F003.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D SIM  
**Analysis Lot:** 594048

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	18.05	473848	Pass
68	69	0	2	1.80	10521	Pass
69	198	0	100	22.21	583055	Pass
70	69	0	2	0.52	3050	Pass
127	198	10	80	36.97	970637	Pass
197	198	0	2	0.35	9240	Pass
198	442	30	100	78.45	2625706	Pass
199	198	5	9	6.64	174229	Pass
275	198	10	60	30.62	803882	Pass
365	442	1	50	2.76	92472	Pass
441	443	0.01	100	76.76	498432	Pass
442	442	100	100	100.00	3347114	Pass
443	442	15	24	19.40	649365	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1807906-02	J:\MS26\DATA\060818\0608F004.D\	06/08/18 13:55	
IMW-1-052318	K1804907-001	J:\MS26\DATA\060818\0608F011.D\	06/08/18 16:04	
CG-122-75-052318	K1804907-004	J:\MS26\DATA\060818\0608F012.D\	06/08/18 16:22	
IP-6-052318	K1804907-006	J:\MS26\DATA\060818\0608F013.D\	06/08/18 16:40	
IP-7-052318	K1804907-007	J:\MS26\DATA\060818\0608F014.D\	06/08/18 16:59	
IMW-2-052318	K1804907-002	J:\MS26\DATA\060818\0608F019.D\	06/08/18 18:31	
CG-122-60-052318	K1804907-003	J:\MS26\DATA\060818\0608F020.D\	06/08/18 18:49	
IP-5-052318	K1804907-005	J:\MS26\DATA\060818\0608F021.D\	06/08/18 19:08	
CG-9-122-60-052318	K1804907-008	J:\MS26\DATA\060818\0608F022.D\	06/08/18 19:26	



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown

**Service Request:** K1804907  
**Calibration Date:** 5/22/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800201  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800201-01	1,4 DX ICAL 2.0ng/mL SVM58-93B	J:\MS26\DATA\052218\0522F006.D	05/22/2018 12:04
02	KC1800201-02	1,4 DX ICAL 4.0ng/mL SVM58-93C	J:\MS26\DATA\052218\0522F007.D	05/22/2018 12:22
03	KC1800201-03	1,4 DX ICAL 10.0ng/mL SVM58-93D	J:\MS26\DATA\052218\0522F008.D	05/22/2018 12:40
04	KC1800201-04	1,4 DX ICAL 20.0ng/mL SVM58-93E	J:\MS26\DATA\052218\0522F009.D	05/22/2018 12:59
05	KC1800201-05	1,4 DX ICAL 50.0ng/mL SVM58-93F	J:\MS26\DATA\052218\0522F010.D	05/22/2018 13:17
06	KC1800201-06	1,4 DX ICAL 100ng/mL SVM58-93G	J:\MS26\DATA\052218\0522F011.D	05/22/2018 13:35
07	KC1800201-07	1,4 DX ICAL 200ng/mL SVM58-93H	J:\MS26\DATA\052218\0522F012.D	05/22/2018 13:54

**Analyte**

**1,4-Dioxane**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3912	02	4.000	0.3887	03	10.000	0.4019	04	20.000	0.4209
05	50.000	0.4071	06	100.000	0.4222	07	200.000	0.4119			

**1,4-Dioxane-d8**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.4527	02	4.000	0.4089	03	10.000	0.4073	04	20.000	0.4023
05	50.000	0.3955	06	100.000	0.3998	07	200.000	0.3955			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown

**Service Request:** K1804907  
**Calibration Date:** 5/22/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800201  
**Instrument ID:** K-MS-26

**Signal ID:** 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
1,4-Dioxane	TRG	Average RF	% RSD	3.3	20	0.4063	0.01
1,4-Dioxane-d8	SURR	Average RF	% RSD	4.9	20	0.4089	0.01

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown

**Service Request:** K1804907  
**Calibration Date:** 5/22/2018

**Initial Calibration Verification Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800201  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800201-08	1,4 DX ICV 20ng/mL SVM58-93I	J:\MS26\DATA\052218\0522F013.D	05/22/2018 14:12

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane	20.0	20.5	4.063E-1	4.167E-1	2.57	±30	Average RF

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	21.4	4.089E-1	4.372E-1	6.92	±30	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907  
**Date Analyzed:** 06/07/18 03:55

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**File ID:** J:\MS26\DATA\060618\0606F058.D\  
**Signal ID:** 1

**Calibration Date:** 5/22/2018  
**Calibration ID:** KC1800201  
**Analysis Lot:** 593769  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	20.3	0.4063	0.4121	1.4	NA	±20	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	19.1	0.4089	0.39	-4.6	NA	±20	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907  
**Date Analyzed:** 06/08/18 13:55

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**File ID:** J:\MS26\DATA\060818\0608F004.D\  
**Signal ID:** 1

**Calibration Date:** 5/22/2018  
**Calibration ID:** KC1800201  
**Analysis Lot:** 594048  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	19.8	0.4063	0.4027	-0.9	NA	±20	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	19.1	0.4089	0.3899	-4.6	NA	±20	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:** K1804907

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:** 593769  
**Instrument ID:** K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\MS26\DATA\060618\0606F057.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	03:36:00	
J:\MS26\DATA\060618\0606F058.D\	Continuing Calibration Verification	KQ1807571-02	6/7/2018	03:55:00	
J:\MS26\DATA\060618\0606F059.D\	Method Blank	KQ1807154-06	6/7/2018	04:13:00	
J:\MS26\DATA\060618\0606F060.D\	Lab Control Sample	KQ1807154-05	6/7/2018	04:31:00	
J:\MS26\DATA\060618\0606F061.D\	IMW-1-052318 MS	KQ1807154-01	6/7/2018	04:50:00	
J:\MS26\DATA\060618\0606F062.D\	IMW-1-052318 DMS	KQ1807154-02	6/7/2018	05:08:00	
J:\MS26\DATA\060618\0606F063.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	05:27:00	
J:\MS26\DATA\060618\0606F064.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	05:45:00	
J:\MS26\DATA\060618\0606F065.D\	IMW-1-052318	K1804907-001	6/7/2018	06:03:00	
J:\MS26\DATA\060618\0606F066.D\	IMW-2-052318	K1804907-002	6/7/2018	06:22:00	
J:\MS26\DATA\060618\0606F067.D\	CG-122-60-052318	K1804907-003	6/7/2018	06:40:00	
J:\MS26\DATA\060618\0606F068.D\	CG-122-75-052318	K1804907-004	6/7/2018	06:59:00	
J:\MS26\DATA\060618\0606F069.D\	IP-5-052318	K1804907-005	6/7/2018	07:17:00	
J:\MS26\DATA\060618\0606F070.D\	IP-6-052318	K1804907-006	6/7/2018	07:35:00	
J:\MS26\DATA\060618\0606F071.D\	IP-7-052318	K1804907-007	6/7/2018	07:54:00	
J:\MS26\DATA\060618\0606F072.D\	CG-9-122-60-052318	K1804907-008	6/7/2018	08:12:00	
J:\MS26\DATA\060618\0606F073.D\	FB-01-052318	K1804907-009	6/7/2018	08:31:00	
J:\MS26\DATA\060618\0606F074.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	08:49:00	
J:\MS26\DATA\060618\0606F075.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	09:07:00	
J:\MS26\DATA\060618\0606F076.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	09:26:00	
J:\MS26\DATA\060618\0606F077.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	09:44:00	
J:\MS26\DATA\060618\0606F078.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	10:03:00	
J:\MS26\DATA\060618\0606F079.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	10:21:00	
J:\MS26\DATA\060618\0606F080.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	10:40:00	
J:\MS26\DATA\060618\0606F081.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	10:58:00	
J:\MS26\DATA\060618\0606F082.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	11:16:00	
J:\MS26\DATA\060618\0606F083.D\	ZZZZZZZ	ZZZZZZZ	6/7/2018	11:35:00	

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

**Service Request:**K1804907

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:**594048  
**Instrument ID:**K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
J:\MS26\DATA\060818\0608F003.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	13:36:00	
J:\MS26\DATA\060818\0608F004.D\	Continuing Calibration Verification	KQ1807906-02	6/8/2018	13:55:00	
J:\MS26\DATA\060818\0608F006.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	14:32:00	
J:\MS26\DATA\060818\0608F007.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	14:50:00	
J:\MS26\DATA\060818\0608F008.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	15:08:00	
J:\MS26\DATA\060818\0608F009.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	15:27:00	
J:\MS26\DATA\060818\0608F010.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	15:45:00	
J:\MS26\DATA\060818\0608F011.D\	IMW-1-052318	K1804907-001	6/8/2018	16:04:00	
J:\MS26\DATA\060818\0608F012.D\	CG-122-75-052318	K1804907-004	6/8/2018	16:22:00	
J:\MS26\DATA\060818\0608F013.D\	IP-6-052318	K1804907-006	6/8/2018	16:40:00	
J:\MS26\DATA\060818\0608F014.D\	IP-7-052318	K1804907-007	6/8/2018	16:59:00	
J:\MS26\DATA\060818\0608F015.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	17:17:00	
J:\MS26\DATA\060818\0608F016.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	17:36:00	
J:\MS26\DATA\060818\0608F017.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	17:54:00	
J:\MS26\DATA\060818\0608F018.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	18:12:00	
J:\MS26\DATA\060818\0608F019.D\	IMW-2-052318	K1804907-002	6/8/2018	18:31:00	
J:\MS26\DATA\060818\0608F020.D\	CG-122-60-052318	K1804907-003	6/8/2018	18:49:00	
J:\MS26\DATA\060818\0608F021.D\	IP-5-052318	K1804907-005	6/8/2018	19:08:00	
J:\MS26\DATA\060818\0608F022.D\	CG-9-122-60-052318	K1804907-008	6/8/2018	19:26:00	
J:\MS26\DATA\060818\0608F023.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	19:44:00	
J:\MS26\DATA\060818\0608F026.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	20:40:00	
J:\MS26\DATA\060818\0608F027.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	20:58:00	
J:\MS26\DATA\060818\0608F028.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	21:17:00	
J:\MS26\DATA\060818\0608F029.D\	ZZZZZZZ	ZZZZZZZ	6/8/2018	21:35:00	

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08  
**Sample Matrix:** Water

**Service Request:** K1804907

1,4-Dioxane by GC/MS

**Prep Method:** EPA 3535A  
**Analytical Method:** 8270D SIM

**Extraction Lot:** 314874  
**Extraction Date:** 05/30/18 08:50

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
IMW-1-052318	K1804907-001	5/23/18	5/24/18	10 mL	2 mL	
IMW-2-052318	K1804907-002	5/23/18	5/24/18	10 mL	2 mL	
CG-122-60-052318	K1804907-003	5/23/18	5/24/18	10 mL	2 mL	
CG-122-75-052318	K1804907-004	5/23/18	5/24/18	10 mL	2 mL	
IP-5-052318	K1804907-005	5/23/18	5/24/18	10 mL	2 mL	
IP-6-052318	K1804907-006	5/23/18	5/24/18	10 mL	2 mL	
IP-7-052318	K1804907-007	5/23/18	5/24/18	10 mL	2 mL	
CG-9-122-60-052318	K1804907-008	5/23/18	5/24/18	10 mL	2 mL	
FB-01-052318	K1804907-009	5/23/18	5/24/18	10 mL	2 mL	
Matrix Spike	KQ1807154-01MS	5/23/18	5/24/18	10 mL	2 mL	
Duplicate Matrix Spike	KQ1807154-02DMS	5/23/18	5/24/18	10 mL	2 mL	
Lab Control Sample	KQ1807154-05LCS	NA	NA	10 mL	2 mL	
Method Blank	KQ1807154-06MB	NA	NA	10 mL	2 mL	



## Appendix B



PLOT TIME: 11/17/2016 12:22 PM MOD TIME: 11/17/2016 10:15 AM USER: Lee Barras DWG: D:\Projects\Stericycle\Georgetown\Figures\2016-11-17 GT\_2016 PSR 3 F3-F4 Pilot Study Areas.dwg

**1,4-Dioxane Well  
(ug/L)**

CG-122-75	
6/21/2016	160
6/30/2016	150
7/7/2016	150
7/14/2016	130
8/4/2016	110

IMW-1	
6/21/2016	210
6/30/2016	300
7/7/2016	290
7/14/2016	300
8/4/2016	240
9/29/2016	160

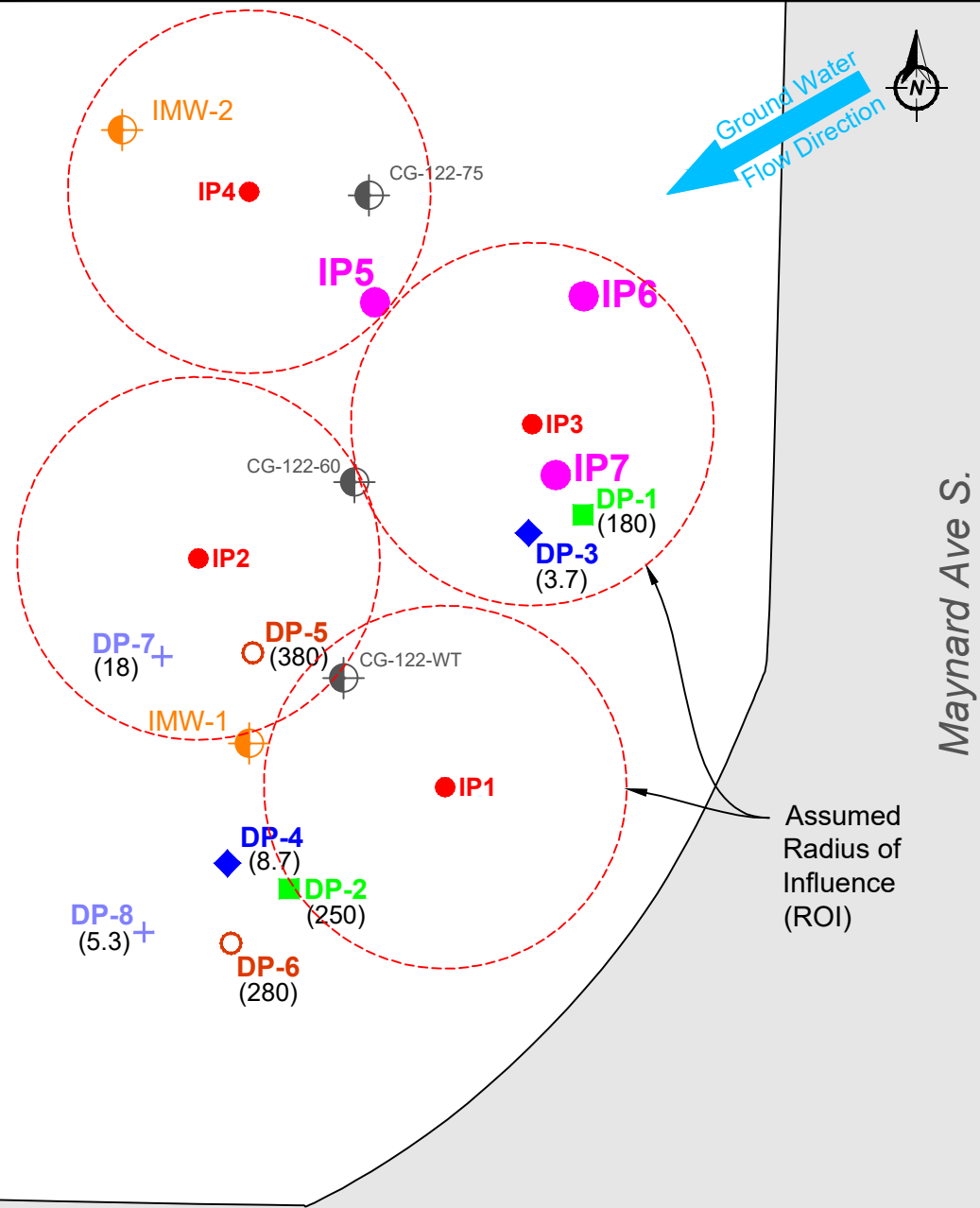
  

IMW-2	
6/21/2016	370
6/30/2016	330
7/7/2016	340
7/14/2016	380
8/4/2016	310
9/29/2016	220

CG-122-60	
6/21/2016	310
6/30/2016	310
7/7/2016	210
7/14/2016	360
8/4/2016	280/240
9/29/2016	240

Parcel Boundary

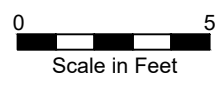


Assumed Radius of Influence (ROI)

*S. Lucile St.*

KEY

<b>IP7</b> ●	Proposed Slow Release Persulfate Well	<b>DP-2</b> ■	Direct Push Round 1 (7/1/16)
<b>IMW-1</b> ⊕	Pilot Study Monitoring Well	<b>DP-4</b> ◆	Direct Push Round 2 (7/8/16)
<b>IP1</b> ●	June 2016 ISCO Injection Point	<b>DP-6</b> ○	Direct Push Round 3 (7/15/16)
<b>CG-122-WT</b> ⊕	Long Term Monitoring Plan Well	<b>DP-7</b> +	Direct Push Round 4 (8/5/16)
---	Assumed Radius of Influence	(250)	Results in µg/L



**Stericycle**  
Georgetown Site Downgradient Area  
Seattle, Washington  
**Proposed Slow Release Persulfate Wells**



**Figure 1**

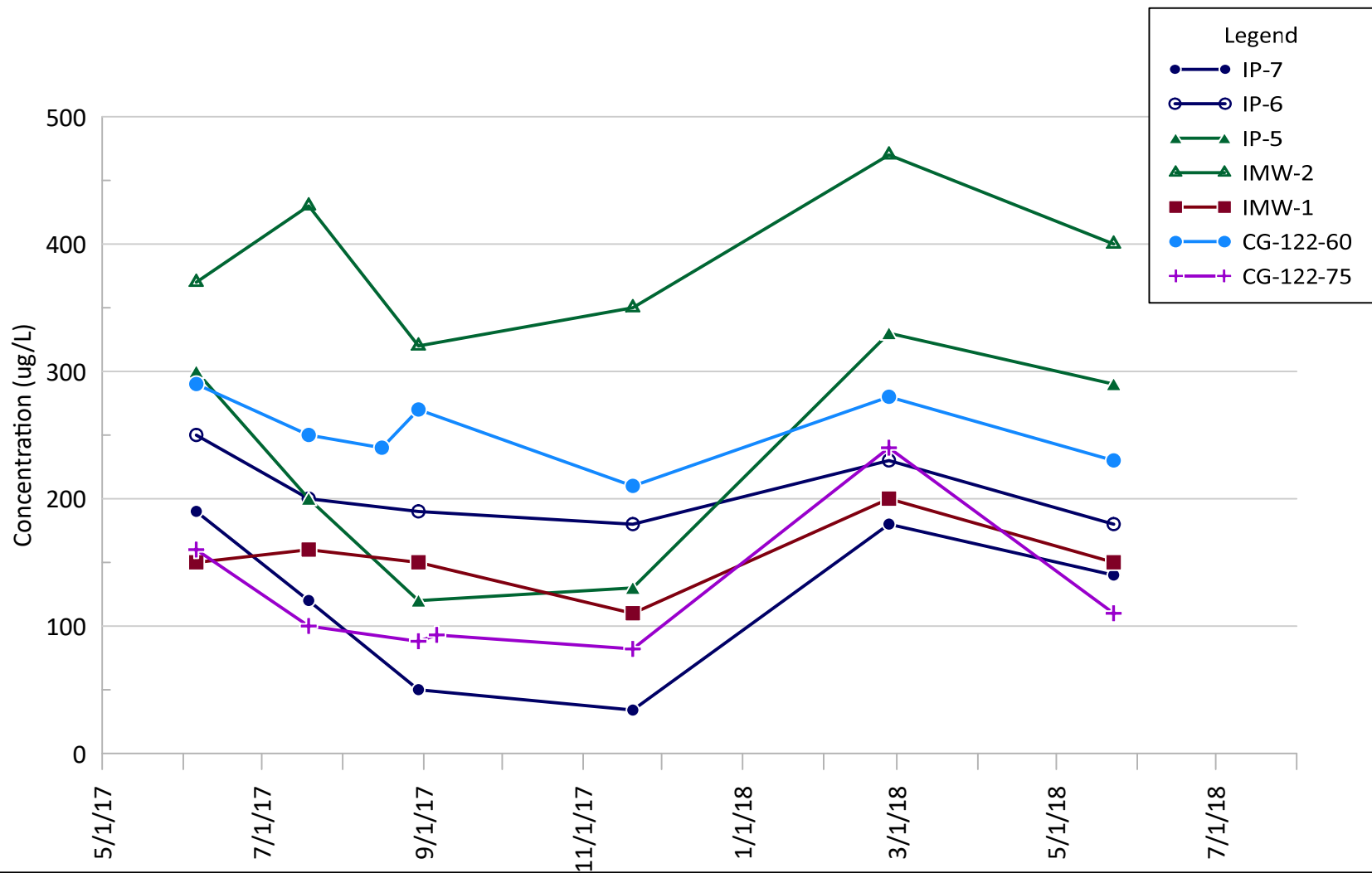
November 17, 2016

ATTACHMENT C  
PASSIVE IN-SITU CHEMICAL OXIDATION PILOT STUDY MONITORING RESULTS  
DRAFT FOR DISCUSSION - 7/27/18

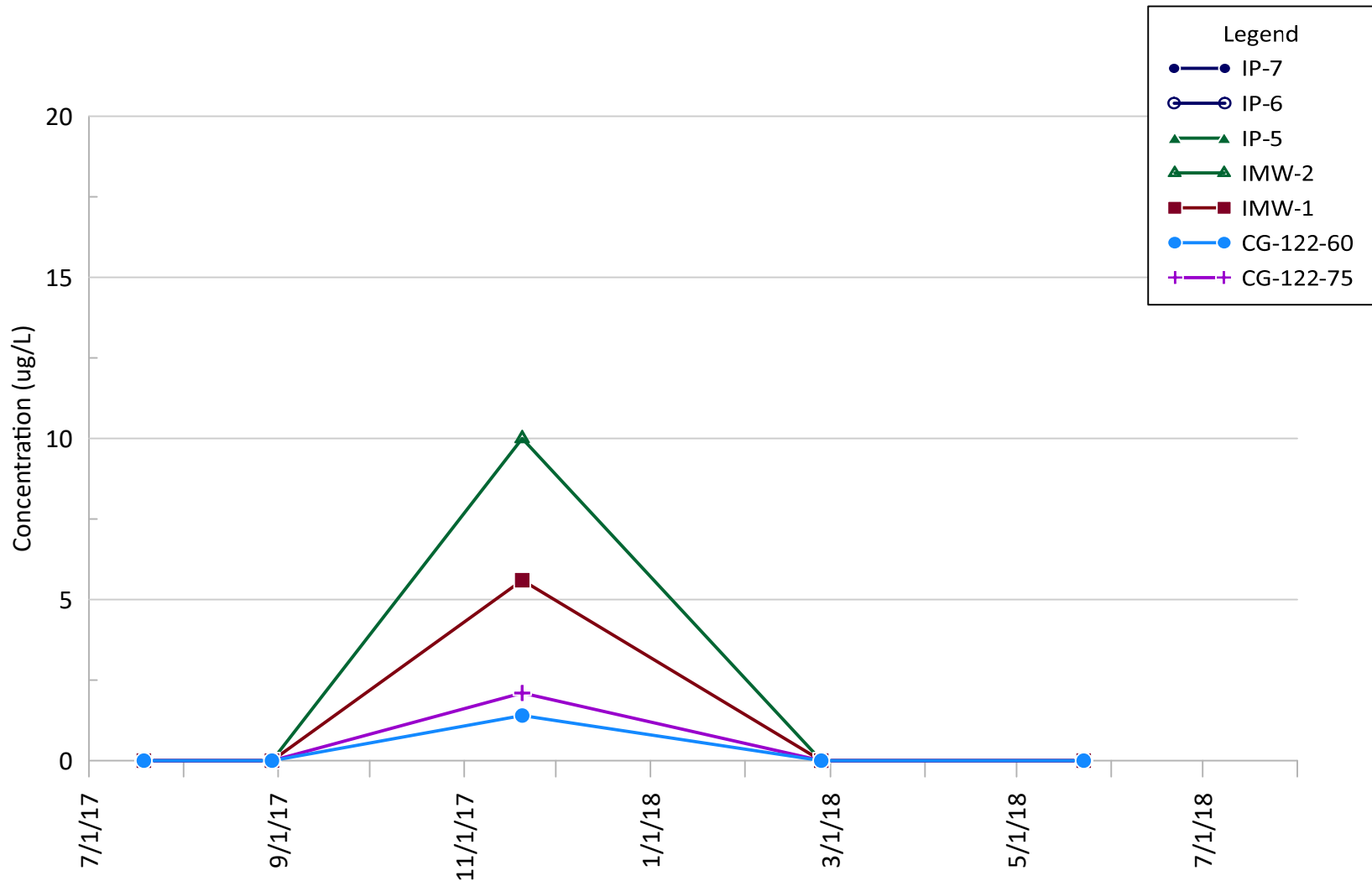
Well ID	Sampling Event	Date	Groundwater Elevation (feet)	Pumping rate	Volume Purged	pH	Conductivity	Temperature	Turbidity	Dissolved Oxygen	Redox Potential	Ferric Fe3+	Ferrous Fe2+	Total Fe	Sulfate	Arsenic Dissolved	Chromium Dissolved	Sodium Persulfate	1,4-Dioxane
				mL/min	Liters	standard	mS/cm	°C	NTU	mg/L	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ppm	µg/L
IMW-1	BL	6/6/2017	11.94			6.95	2.31	15.65	3.81	0.31	64.1	--	0.25	--	906	<0.00050 U	0.00043	--	150
	Event 1	7/19/2017	11.21	250	8	6.81	2.347	15.7	3.4	0.25	-2.4	6.93	0.84	7.77	1050	--	--	0	160
	Event 2	8/30/2017	10.54	450	12	6.82	2.167	15.01	4.23	0.18	67.9	6.26	1.96	8.22	811	--	--	0	150
	Event 3	11/20/2017	9.90	250	7	6.45	1.999	14.42	5.9	0.83	-95	--	9.6*	7.6	660	--	--	5.6	110
	Event 4	2/26/2018	11.39	200	8	7.02	2.0103	14.01	12.87	0.06	-215.8	6.14	0.77	6.91	662	--	--	0	200
	Event 5	5/23/2018	11.29	200	8	6.88	2.202	15.25	7.5	0.08	-147.2	3.31	2.68	5.99	625	<0.0005 U	0.00045	0	150
IMW-2	BL	6/6/2017	11.97			7	1.985	15.75	3.25	0.22	-63.1	--	<0.2	--	686	<0.00050	0.0004	--	370
	Event 1	7/19/2017	11.23	250	7	6.95	1.635	16.07	3.69	0.09	-29.5	10.03	1.87	11.9	496	--	--	0	430
	Event 2	8/30/2017	10.55	250	9	6.86	1.55	15.34	1.74	0.15	34.2	10.36	0.54	10.9	386	--	--	0	320
	Event 3	11/20/2017	10.03	250	6	6.65	1.501	14.43	2.01	0.47	-90	--	12.6*	10.1	374	--	--	10	350
	Event 4	2/26/2018	11.43	225	8	7.17	1.735	13.74	1.75	0.07	-235	8.19	2.31	10.5	396	--	--	0	470
	Event 5	5/23/2018	11.31	200	8	6.92	1.792	15.8	3.69	0.05	-170.5	5.78	1.09	6.87	340	<0.00050	0.00035	0	400
IP-5	BL	6/6/2017	-7.51			6.92	2.310	15.43	106	0.23	-40.6	--	1.3	--	1170	0.00065	0.00034	--	300
	Event 1	7/19/2017	-8.25	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.16	846	--	--	350	200
	Event 2	8/30/2017	-8.93	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.224	599	--	--	350	120
	Event 3	11/20/2017	-9.50	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	1.14	810	--	--	350	130
	Event 4	2/26/2018	-8.08	200	4	*..*	*..*	*..*	*..*	*..*	*..*	5	5	10	253	--	--	350	330
	Event 5	5/23/2018	-8.19	200	4.5	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.432	137	<0.010	0.0597	350	290
IP-6	BL	6/6/2017	-7.40			7.13	1.205	15.67	62	0.12	-73	--	<0.2	--	328	0.00043	0.00034	--	250
	Event 1	7/19/2017	-8.13	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.287	148	--	--	350	200
	Event 2	8/30/2017	-8.80	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.44	75	--	--	350	190
	Event 3	11/20/2017	-9.38	250	4	*..*	*..*	*..*	*..*	*..*	*..*	4.65	<0.2	4.65	136	--	--	350	180
	Event 4	2/26/2018	-7.91	200	4	*..*	*..*	*..*	*..*	*..*	*..*	--	2.45*	0.729	137	--	--	350	230
	Event 5	5/23/2018	-8.06	200	4.5	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.088	172	<0.010	0.0505	350	180
IP-7	BL	6/6/2017	-7.39			6.94	1.338	15.55	59.7	0.1	-61.1	--	<0.2	--	497	0.00082	0.00035	--	190
	Event 1	7/19/2017	-8.13	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.765	501	--	--	350	120
	Event 2	8/30/2017	-8.79	250	4	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.075	398	--	--	350	50
	Event 3	11/20/2017	-9.39	250	4	*..*	*..*	*..*	*..*	*..*	*..*	3.05	0.29	3.34	278	--	--	350	34
	Event 4	2/26/2018	-7.94	200	4	*..*	*..*	*..*	*..*	*..*	*..*	--	2.1*	0.0734	181	--	--	350	180
	Event 5	5/23/2018	-8.06	200	4.5	*..*	*..*	*..*	*..*	*..*	*..*	--	--	0.042	129	<0.010	0.0025 J	350	140
CG-122-60	BL	6/6/2017	11.95			7.18	0.932	14.93	2.29	0.03	-57.7	--	<0.2	--	167	<0.00050	0.00032	--	290
	Event 1	7/19/2017	11.14	500	12	7.12	0.985	14.65	4.03	0.21	-3	2.11	0.39	2.5	210	--	--	0	250
	Event 2	8/30/2017	10.69	500	12	7.13	1.058	14.58	1.18	0.25	60	2.68	<0.2	2.68	234	--	--	0	270
	Event 3	11/20/2017	10.04	500	14	6.61	1.42	14.26	1.35	0.44	-80.4	--	6.9*	5.1	457	--	--	1.4	210
	Event 4	2/26/2018	11.42	250	10	7.09	1.516	13.83	3.17	0.05	-143.2	3.56	1.85	5.41	363	--	--	0	280
	Event 5	5/23/2018	11.30	250	15	6.89	1.224	14.58	3.59	0.05	-123.4	1.74	1.1	2.84	200	<0.00050	0.00037	0	230
CG-122-75	BL	6/6/2017	12.02			7.32	0.566	14.62	207	0.15	-44	--	<0.2	--	<0.2	0.00017	0.00077	--	160
	Event 1	7/19/2017	11.30	500	12	7.19	0.56	14.65	4.4	0.35	9.2	1.39	<0.05	1.39	<0.05	--	--	0	100
	Event 2	8/30/2017	10.61	500	16	7.31	0.56	14.31	3.58	0.46	65.2	1.52	<0.2	1.52	<0.2	--	--	0	88
	Event 3	11/20/2017	10.01	500	12	6.86	0.531	14.18	1.46	0.86	-87.4	--	2*	1.6	0.26	--	--	2.1	82
	Event 4	2/26/2018	11.44	225	10	7.5	0.742	13.66	3.27	1.22	-159.5	2.26	<0.2	2.26	0.07	--	--	0	240
	Event 5	5/23/2018	11.33	225	10	7.18	0.632	15.12	15.9	0.1	-137	2.74	0.08 J	2.82	0.08 J	0.00010 J	0.00059	0	110

**Notes:**

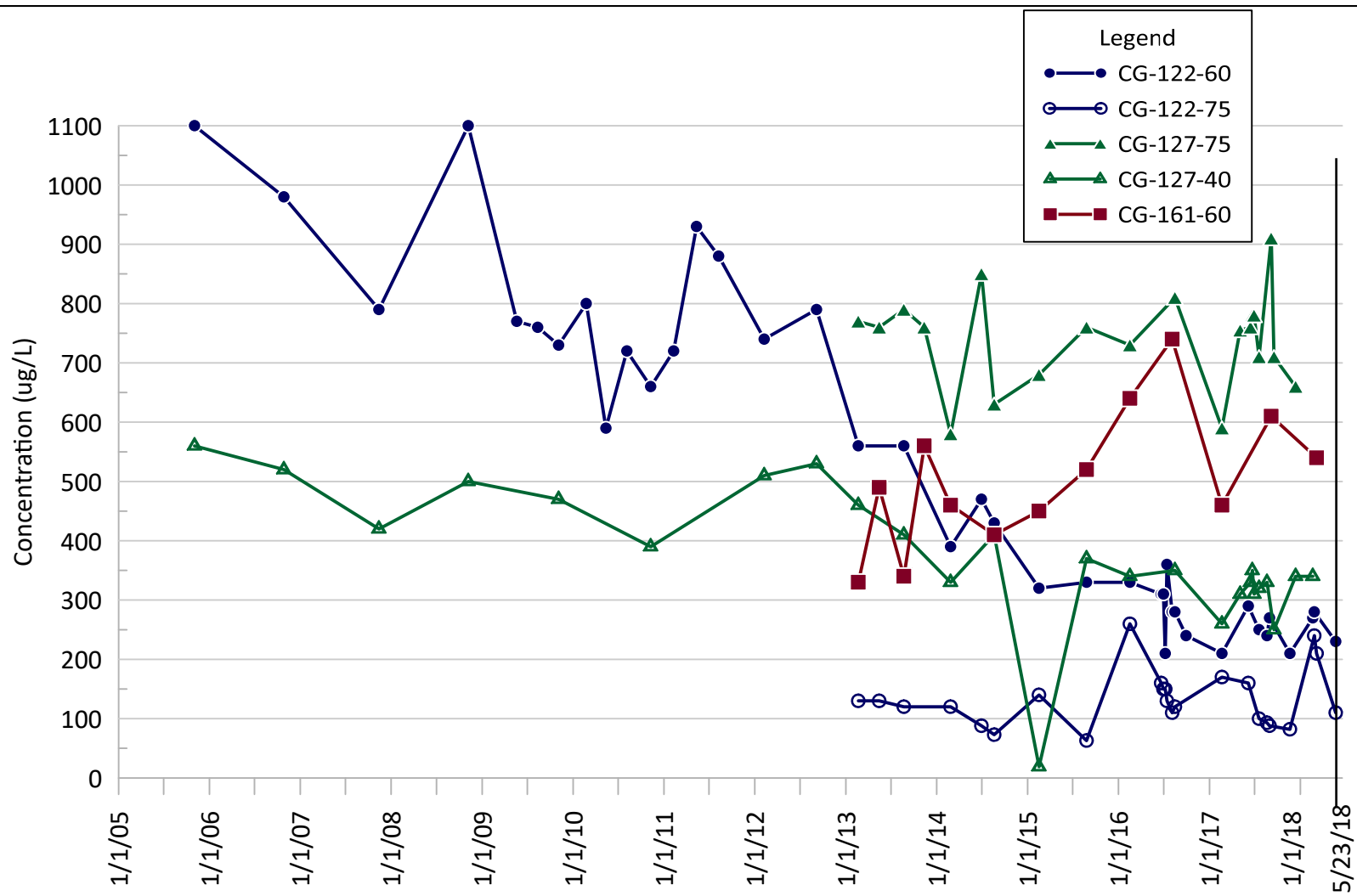
Candle installation = 06/21/2017  
 \* = holding time not met. Results unusually high  
 ug/L- micrograms per liter  
 mg/L- milliliters per liter  
 mL/min-milliliters per minute



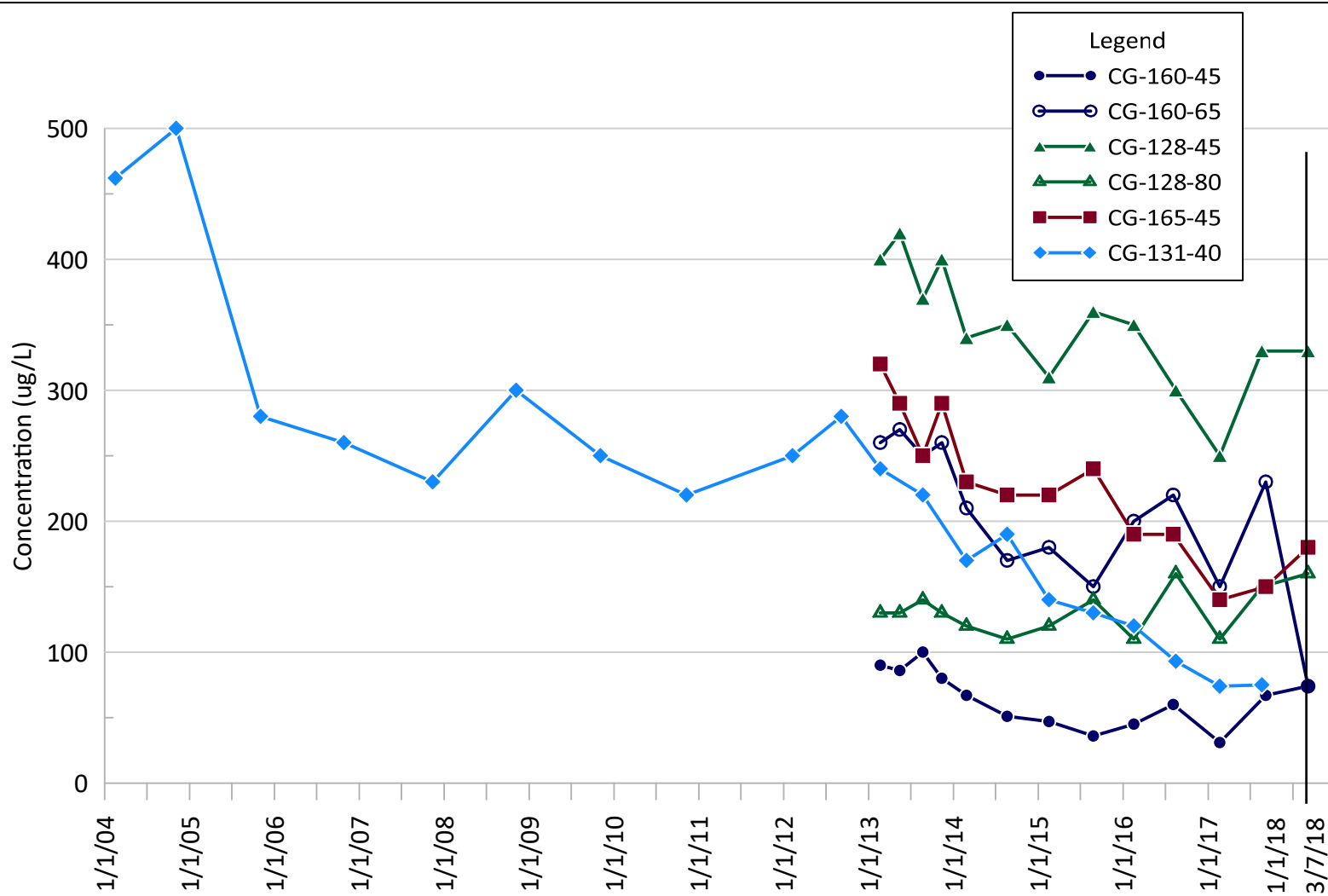
1,4-Dioxane Concentrations  
 Passive ISCO Pilot Study Results  
 DRAFT FOR DISCUSSION - 7/27/18



Sodium Persulfate Concentrations  
 Passive ISCO Pilot Study Results  
 DRAFT FOR DISCUSSION - 7/27/18



1,4-Dioxane Concentrations  
Highest Concentration Area



1,4-Dioxane Concentrations  
Highest Concentration Area



## Appendix C

PROJECT: STRCL-001 375.08 - 1,4 Dioxane Data Gaps and Bench Test	COORDINATES (US Survey Ft): N205297.3 E1271676.4 (NAD83)	
LOCATION: Seattle, WA	SURFACE ELEVATION (Ft): Approx 19.8 (NAVD88)	
DRILLING CONTRACTOR: Cascade Drilling	DATE: 1/22/2018	
DRILLING EQUIPMENT: Geoprobe 7822 DT	TOTAL DEPTH OF BORING: 80 ft.	ECOLOGY ID: N/A
DRILLING METHOD: Direct-Push	LOGGED BY: A. Cerruti	
SAMPLING METHOD: Closed tipped macro 1 in. x 5 ft.	RESPONSIBLE PROF.:	REG. NO.:

NOTES:

DEPTH (feet)	SAMPLES		VISUAL SOIL DESCRIPTION  Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors  Drilling tools Advanced directly to 40 ft bgs	TEMPORARY WELL CONSTRUCTION DETAILS  Note: Temporary well consisted of 3/4" Diameter SCH 40 PVC - 0.010" slot screen	
	Sample Recovery	Lab Sample		Temporary Well Screen interval	Groundwater Sample Number
41		DP-167-40-43.3-0119	80% fine sand 20% silt interbed		
42		0900			
43			POORLY GRADED SAND WITH TRACE SILT (SP): Gray (7.5YR 3/1), saturated, 95% fine sand with 5% silt		
44					
45					
46		DP-167-45-49-0119			
47		920	95% silt with 5% fine sand interbed POORLY GRADED SAND (SP): Gray 7.5YR 3/1, saturated, 100% fine sand with scattered organics		DP-167-43-48-0119 1000
48					
49			SILTY SAND stringers (mm scale)		
50		DP-167-50-54.5-0119			
51		940	POORLY GRADED SAND WITH TRACE SILT(SP): Gray 7.5YR 3/1, saturated, 95% fine to medium sand with 5% silt		
52					
53					
54			SILT with FINE SAND clasts (1/4" to 1" in size)		DP-167-52-57-0119 1045
55		DP-167-55-59.3-0119			
56		1000			
57					
58					
59					
60			log continued on next page		

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

PROJECT: STRCL-001 375.08 - 1,4 Dioxane Data Gaps and Bench Test	COORDINATES (US Survey Ft): N205297.3 E1271676.4 (NAD83)	
LOCATION: Seattle, WA	SURFACE ELEVATION (Ft): Approx 19.8 (NAVD88)	
DRILLING CONTRACTOR: Cascade Drilling	DATE: 1/22/2018	
DRILLING EQUIPMENT: Geoprobe 7822 DT	TOTAL DEPTH OF BORING: 80 ft.	ECOLOGY ID: N/A
DRILLING METHOD: Direct-Push	LOGGED BY: A. Cerruti	
SAMPLING METHOD: Closed tipped macro 1 in. x 5 ft.	RESPONSIBLE PROF.:	REG. NO.:

NOTES:

DEPTH (feet)	SAMPLES		VISUAL SOIL DESCRIPTION  Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors	TEMPORARY WELL CONSTRUCTION DETAILS	
	Sample Recovery	Lab Sample		Temporary Well Screen interval	Groundwater Sample Number
61			90% fine to medium sand 10% silt inclusion (~1")		
62		DP-60-65-0119 1100	occasional woody debris		
63					
64			90% fine to medium sand 10% silt interbed (1" thick)		DP-167-61-66-0119 1140
65					
66		DP-65-67.3-0119 1200	fine organics		
67			interbedded dark, woody debris		
68			90% fine to medium sand 10% silt stringers (mm scale)		
69			POORLY GRADED SAND WITH TRACE SILT (SP): Dark Gray 7.5YR 4/1, saturated, very loose, 95% fine sand with 5% silt		
70					
71			dense organics		
72		DP-167-70-75-0119 1300			DP-167-70-75-0119 1350
73					
74			85% sand 15% silt stringers oriented vertically (mm scale)		
75					
76			organic flecks		
77		DP-167-75-80-0119 1400			
78					
79					
80			silt increases to 10%		

**Abandonment Documentation:**  
 Surface to 2 ft bgs: Asphalt cold patch  
 2 ft to 10 ft bgs: Pure Gold medium 3/8" bentonite chips  
 10 ft to 80 ft bgs: Ben Grout 20% solids hydrated grout  
 Bottom of Boring = 80 ft. bgs

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.



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February 22, 2019

**Analytical Report for Service Request No: K1900739**

Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Ave SW  
Suite 201  
Kent, WA 98032

**RE: Stericycle Georgetown / STRCL-001 375.08**

Dear Duane,

Enclosed are the results of the sample(s) submitted to our laboratory January 25, 2019  
For your reference, these analyses have been assigned our service request number **K1900739**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at [Mark.Harris@alsglobal.com](mailto:Mark.Harris@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Mark Harris  
Project Manager



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    Metals

    1,4-Dioxane by GCMS

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.





## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Received:** 01/25/2019

### CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt:

Six water samples were received for analysis at ALS Environmental on 01/25/2019. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Semivolatiles by GC/MS:

Method 8270D SIM, 01/31/2019: Samples DP-167-43-48-0119, DP-167-52-57-0119, DP-9-167-52-57-0119, and DP-167-70-75-0119 required dilution due to the presence of elevated levels of 1,4-Dioxane. The reporting limits are adjusted to reflect the dilution.

Method 8270D SIM, 01/31/2019: The control criteria for matrix spike recovery of 1,4-Dioxane for sample DP-167-70-75-0119 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

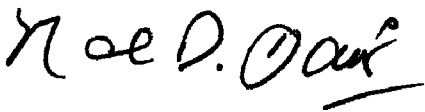
#### Metals:

No significant anomalies were noted with this analysis.

#### General Chemistry:

Method ApplEnvMic7-87-1536-1540, 01/25/2019: All samples in this delivery group were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

Approved by \_\_\_\_\_



Date \_\_\_\_\_

02/22/2019



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



96127

CHAIN OF CUSTODY

96127

004

SR# 4700739  
 COC Set \_\_\_\_\_ of \_\_\_\_\_  
 COC# \_\_\_\_\_

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068  
 www.alsglobal.com

Project Name: <u>STERICYCLE GEORGETOWN</u>		Project Number: <u>STRCL-001 375.08</u>		24H		7D		28D		180D				Remarks								
Project Manager: <u>TASYA GRAY</u>		Company: <u>DALTON OLMSTED &amp; FULLEBRAHD</u>		NUMBER OF CONTAINERS		ApplEnvMic7-87-1536-1540 /		8270D SIM / 1,4-Dioxane		416.1 / TOC T		8020A / Metals T			8020B / Metals D							
Address: <u>1601 SW KLUCKITAT WAY SUITE 200B SEATTLE, WA.</u>		Phone #: <u>(206) 502-1120</u>		email: <u>nggray@dcfnw.com</u>		Sampler Signature:		Sampler Printed Name: <u>ANTHONY CERUTTI</u>		1		2		3		4		5		6		
CLIENT SAMPLE ID	LABID	SAMPLING Date	Time	Matrix																		
1. DP-167-43-48-0119		1/23/19	1600	W	5	X	X	X	X	X												FIELD FILTERED (6020 B) TO 0.45 um)
2. DP-167-52-57-0119		1/23/19	1045	W	5	X	X	X	X	X												
3. DP-9-167-52-57-0119		1/23/19	1050	W	5	X	X	X	X	X												
4. DP-167-61-66-0119		1/23/19	1140	W	5	X	X	X	X	X												
5. EBC1-0119		1/23/19	1200	W	5	X	X	X	X	X												
6. DP-167-70-75-0119		1/23/19	1350	W	15	X	X	X	X	X												↓ + MS/MSD COLLECTED.
7.																						
8.																						
9.																						
10.																						

**Report Requirements**

I. Routine Report: Method Blank, Surrogate, as required

II. Report Dup., MS, MSD as required

III. CLP Like Summary (no raw data)

IV. Data Validation Report

V. EDD

**Invoice Information**

P.O.# STRCL-001 375.08

Bill To: BILL BECK & DWANE BEERY

**Turnaround Requirements**

24 hr.  48 hr.

5 Day Standard

Requested Report Date

**Circle which metals are to be analyzed**

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu  Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu  Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: \*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other \_\_\_\_\_ (Circle One)

\*Appl ENV MIC 7-87-1536-1540 FOR FERROUS IRON; BOTTLES CAN BE PRESERVED W/ ASCORBIC. CONSULTED W/ MARK HARRIS AND DETERMINED 3x-DI RINSE + 2x-SAMPLE 4W RINSE WOULD SUFFICE FOR UNPRESERVED SAMPLE REQ.

<b>Relinquished By:</b>	<b>Received By:</b>	<b>Relinquished By:</b>	<b>Received By:</b>	<b>Relinquished By:</b>	<b>Received By:</b>
Signature:	Signature: <u>FEDEX</u>	Signature: <u>FEDEX</u>	Signature: <u>Daniel P... ..</u>	Signature:	Signature:
Printed Name: <u>ANTHONY CERUTTI</u>	Printed Name:	Printed Name:	Printed Name: <u>21-25-19 0940</u>	Printed Name:	Printed Name:
Firm: <u>DOF</u>	Firm:	Firm:	Firm: <u>ARSN</u>	Firm:	Firm:
Date/Time: <u>1/24/19 1330</u>	Date/Time:	Date/Time:	Date/Time:	Date/Time:	Date/Time:



PC MH

### Cooler Receipt and Preservation Form

Client ALTON OLKSTED & FUGLEVANG Service Request K19 00739  
 Received: 1-25-19 Opened: 1-25-19 By: JSP Unloaded: 1-25-19 By: JSP

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number			NA	Filed
-0.2	-0.4	2.8	2.6	-0.2	356	96127	7851	2593	7831		

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves \_\_\_\_\_
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of	Head-	Broke	pH	Reagent	Volume	Reagent Lot	Initials	Time
	Bottle Type	Temp	space				added	Number		

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

# SHORT HOLD TIME



# General Chemistry

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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 415.1  
**Prep Method:** None

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Units:** mg/L  
**Basis:** NA

Carbon, Total Organic

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
DP-167-43-48-0119	K1900739-001	6.15	0.50	0.07	1	02/02/19 23:53	
DP-167-52-57-0119	K1900739-002	6.56	0.50	0.07	1	02/03/19 00:25	
DP-9-167-52-57-0119	K1900739-003	6.48	0.50	0.07	1	02/03/19 00:58	
DP-167-61-66-0119	K1900739-004	8.59	0.50	0.07	1	02/03/19 01:30	
EB01-0119	K1900739-005	ND U	0.50	0.07	1	02/03/19 02:02	
DP-167-70-75-0119	K1900739-006	5.21	0.50	0.07	1	02/03/19 02:34	
Method Blank	K1900739-MB	ND U	0.50	0.07	1	02/03/19 05:01	

**ALS Group USA, Corp.**  
**dba ALS Environmental**

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** 415.1  
**Prep Method:** None

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19

**Units:** mg/L  
**Basis:** NA

**Replicate Sample Summary**  
**Carbon, Total Organic**

<b>Sample Name:</b>	<b>Lab Code:</b>	<b>MRL</b>	<b>MDL</b>	<b>Sample Result</b>	<b>Duplicate Result</b>	<b>Average</b>	<b>RPD</b>	<b>RPD Limit</b>	<b>Date Analyzed</b>
DP-167-43-48-0119	K1900739-001DUP	0.50	0.07	6.15	5.75	5.95	7	20	02/02/19
DP-167-52-57-0119	K1900739-002DUP	0.50	0.07	6.56	6.33	6.45	4	20	02/03/19
DP-9-167-52-57-0119	K1900739-003DUP	0.50	0.07	6.48	6.56	6.52	1	20	02/03/19
DP-167-61-66-0119	K1900739-004DUP	0.50	0.07	8.59	8.81	8.70	3	20	02/03/19
EB01-0119	K1900739-005DUP	0.50	0.07	ND U	ND U	NC	NC	20	02/03/19
DP-167-70-75-0119	K1900739-006DUP	0.50	0.07	5.21	5.29	5.25	1	20	02/03/19

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 02/3/19  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Carbon, Total Organic**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006  
**Analysis Method:** 415.1  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1900739-006MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Carbon, Total Organic	5.21	30.4	25.0	101	83-117

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Analyzed:** 02/03/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** 415.1  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 624113

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1900739-LCS	24.6	25.0	99	83-117

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** 415.1

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	624113	KQ1901562-30	02/02/19 23:20	25.0	25.8	103	90-110
CCV2	624113	KQ1901562-31	02/03/19 04:28	25.0	24.8	99	90-110
CCV3	624113	KQ1901562-32	02/03/19 08:49	25.0	25.2	101	90-110
CCV4	624113	KQ1901562-33	02/03/19 13:26	25.0	25.5	102	90-110
CCV5	624113	KQ1901562-34	02/03/19 20:08	25.0	25.3	101	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:**K1900739

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** 415.1

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	624113	KQ1901562-35	02/02/19 23:37	0.50	0.07	ND	U
CCB2	624113	KQ1901562-36	02/03/19 04:44	0.50	0.07	ND	U
CCB3	624113	KQ1901562-37	02/03/19 09:05	0.50	0.07	ND	U
CCB4	624113	KQ1901562-38	02/03/19 13:42	0.50	0.07	ND	U
CCB5	624113	KQ1901562-39	02/03/19 20:25	0.50	0.07	0.19	J

**ALS Group USA, Corp.**  
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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19

**Units:** mg/L  
**Basis:** NA

**Iron, Divalent (Ferrous Iron)**

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
DP-167-43-48-0119	K1900739-001	<b>7.50</b>	0.40	0.10	2	01/25/19 13:45	*
DP-167-52-57-0119	K1900739-002	<b>0.40</b>	0.20	0.05	1	01/25/19 13:45	*
DP-9-167-52-57-0119	K1900739-003	<b>1.69</b>	0.20	0.05	1	01/25/19 13:45	*
DP-167-61-66-0119	K1900739-004	<b>0.30</b>	0.20	0.05	1	01/25/19 13:45	*
EB01-0119	K1900739-005	<b>0.15 J</b>	0.20	0.05	1	01/25/19 13:45	*
DP-167-70-75-0119	K1900739-006	<b>11.5</b>	1.0	0.3	5	01/25/19 13:45	*
Method Blank	K1900739-MB	<b>0.15 J</b>	0.20	0.05	1	01/25/19 13:45	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/25/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>MRL</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1900739-006DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	1.0	0.3	11.5	11.6	11.5	1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/25/19  
**Date Extracted:** NA

**Duplicate Matrix Spike Summary**  
**Iron, Divalent (Ferrous Iron)**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006  
**Analysis Method:** ApplEnvMic7-87-1536-1540  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

Analyte Name	Sample Result	Matrix Spike K1900739-006MS			Duplicate Matrix Spike K1900739-006DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Iron, Divalent (Ferrous Iron)	11.5	21.8	10.0	103	21.3	10.0	99	75-125	2	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

### Continuing Calibration Verification (CCV) Summary

#### Iron, Divalent (Ferrous Iron)

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	623564	KQ1901218-04	01/25/19 13:45	4.00	3.97	99	90-110
CCV2	623564	KQ1901218-05	01/25/19 13:45	4.00	3.84	96	90-110
CCV3	623564	KQ1901218-06	01/25/19 13:45	4.00	3.84	96	90-110
CCV4	623564	KQ1901218-07	01/25/19 13:45	4.00	3.85	96	90-110



**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:**K1900739

**Continuing Calibration Blank (CCB) Summary**  
**Iron, Divalent (Ferrous Iron)**

**Analysis Method:** ApplEnvMic7-87-1536-1540

**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>MRL</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	623564	KQ1901218-02	01/25/19 13:45	0.20	0.05	0.15	J
CCB2	623564	KQ1901218-03	01/25/19 13:45	0.20	0.05	0.15	J



# Metals

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ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-43-48-0119  
**Lab Code:** K1900739-001

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:00  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	8.30	mg/L	0.0080	0.0003	1	01/29/19 11:47	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-43-48-0119  
**Lab Code:** K1900739-001

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:00  
**Date Received:** 01/25/19 09:40

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	11.7	mg/L	0.0080	0.0003	1	01/29/19 11:10	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-52-57-0119  
**Lab Code:** K1900739-002

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:45  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	2.66	mg/L	0.0080	0.0003	1	01/29/19 11:49	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-52-57-0119  
**Lab Code:** K1900739-002

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:45  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	17.9	mg/L	0.0080	0.0003	1	01/29/19 11:11	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-9-167-52-57-0119  
**Lab Code:** K1900739-003

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:50  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	2.38	mg/L	0.0080	0.0003	1	01/29/19 11:50	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-9-167-52-57-0119  
**Lab Code:** K1900739-003

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:50  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	21.9	mg/L	0.0080	0.0003	1	01/29/19 11:13	01/28/19	



ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-61-66-0119  
**Lab Code:** K1900739-004

**Service Request:** K1900739  
**Date Collected:** 01/23/19 11:40  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	4.12	mg/L	0.0080	0.0003	1	01/29/19 11:52	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-61-66-0119  
**Lab Code:** K1900739-004

**Service Request:** K1900739  
**Date Collected:** 01/23/19 11:40  
**Date Received:** 01/25/19 09:40

**Basis:** NA

Total Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	8.31	mg/L	0.0080	0.0003	1	01/29/19 11:31	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** EB01-0119  
**Lab Code:** K1900739-005

**Service Request:** K1900739  
**Date Collected:** 01/23/19 12:00  
**Date Received:** 01/25/19 09:40

**Basis:** NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	0.0033 J	mg/L	0.0080	0.0003	1	01/29/19 11:46	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** EB01-0119  
**Lab Code:** K1900739-005

**Service Request:** K1900739  
**Date Collected:** 01/23/19 12:00  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	0.0043 J	mg/L	0.0080	0.0003	1	01/29/19 11:30	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006

**Service Request:** K1900739  
**Date Collected:** 01/23/19 13:50  
**Date Received:** 01/25/19 09:40

**Basis:** NA

Dissolved Metals

<b>Analyte Name</b>	<b>Analysis Method</b>	<b>Result</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Dil.</b>	<b>Date Analyzed</b>	<b>Date Extracted</b>	<b>Q</b>
Iron	6020A	7.76	mg/L	0.0080	0.0003	1	01/29/19 11:33	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006

**Service Request:** K1900739  
**Date Collected:** 01/23/19 13:50  
**Date Received:** 01/25/19 09:40  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	36.8	mg/L	0.0080	0.0003	1	01/29/19 11:03	01/28/19	

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** KQ1901096-02

**Service Request:** K1900739  
**Date Collected:** NA  
**Date Received:** NA  
**Basis:** NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Iron	6020A	ND U	mg/L	0.0080	0.0003	1	01/29/19 11:01	01/28/19	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/29/19

**Replicate Sample Summary**  
**Dissolved Metals**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate	Average	RPD	RPD Limit
					Sample KQ1901096-07 Result			
Iron	6020A	0.0080	0.0003	7.76	7.80	7.78	<1	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc.  
Project Stericycle Georgetown/STRCL-001 375.08  
Sample Matrix: Water

Service Request: K1900739  
Date Collected: 01/23/19  
Date Received: 01/25/19  
Date Analyzed: 01/29/19

Replicate Sample Summary

Total Metals

Sample Name: DP-167-70-75-0119  
Lab Code: K1900739-006

Units: mg/L  
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ1901096-03 Result			
Iron	6020A	0.0080	0.0003	36.8	42.7	39.8	15	20

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/29/19  
**Date Extracted:** 01/28/19

**Matrix Spike Summary**  
**Dissolved Metals**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1901096-08

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	7.76	7.92	0.0500	311 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/29/19  
**Date Extracted:** 01/28/19

**Matrix Spike Summary**  
**Total Metals**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006  
**Analysis Method:** 6020A  
**Prep Method:** EPA CLP ILM04.0

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
KQ1901096-04

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Iron	36.8	37.1	0.0500	496 #	75-125

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Analyzed:** 01/29/19

**Lab Control Sample Summary**  
**Total Metals**

**Units:**mg/L  
**Basis:**NA

**Lab Control Sample**  
KQ1901096-01

<b>Analyte Name</b>	<b>Analytical Method</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Iron	6020A	0.0473	0.0500	95	80-120

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dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:**K1900739

**Metals**

**Prep Method:** EPA CLP ILM04.0  
**Analytical Method:** 6020A

**Extraction Lot:** 330432  
**Extraction Date:** 01/28/19 11:34

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
DP-167-43-48-0119	K1900739-001	1/23/19	1/25/19	10 mL	10 mL	
DP-167-52-57-0119	K1900739-002	1/23/19	1/25/19	10 mL	10 mL	
DP-9-167-52-57-0119	K1900739-003	1/23/19	1/25/19	10 mL	10 mL	
DP-167-61-66-0119	K1900739-004	1/23/19	1/25/19	10 mL	10 mL	
EB01-0119	K1900739-005	1/23/19	1/25/19	10 mL	10 mL	
DP-167-70-75-0119	K1900739-006	1/23/19	1/25/19	10 mL	10 mL	
Duplicate	KQ1901096-07DUP	1/23/19	1/25/19	10 mL	10 mL	
Matrix Spike	KQ1901096-08MS	1/23/19	1/25/19	10 mL	10.3 mL	
DP-167-43-48-0119	K1900739-001	1/23/19	1/25/19	10 mL	10 mL	
DP-167-52-57-0119	K1900739-002	1/23/19	1/25/19	10 mL	10 mL	
DP-9-167-52-57-0119	K1900739-003	1/23/19	1/25/19	10 mL	10 mL	
DP-167-61-66-0119	K1900739-004	1/23/19	1/25/19	10 mL	10 mL	
EB01-0119	K1900739-005	1/23/19	1/25/19	10 mL	10 mL	
DP-167-70-75-0119	K1900739-006	1/23/19	1/25/19	10 mL	10 mL	
Lab Control Sample	KQ1901096-01LCS	NA	NA	10 mL	10.3 mL	
Method Blank	KQ1901096-02MB	NA	NA	10 mL	10 mL	
Duplicate	KQ1901096-03DUP	1/23/19	1/25/19	10 mL	10 mL	
Matrix Spike	KQ1901096-04MS	1/23/19	1/25/19	10 mL	10.3 mL	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**INITIAL AND CONTINUING CALIBRATION VERIFICATION**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits
ICV 01/29/19 09:57	Iron	6020A	623467	47.4	50.0	95	90-110
CCV 01/29/19 09:59	Iron	6020A	623467	249	250	99	90-110
CCV 01/29/19 10:30	Iron	6020A	623467	256	250	103	90-110
CCV 01/29/19 10:39	Iron	6020A	623467	255	250	102	90-110
CCV 01/29/19 11:14	Iron	6020A	623467	267	250	107	90-110
CCV 01/29/19 11:41	Iron	6020A	623467	258	250	103	90-110
CCV 01/29/19 11:54	Iron	6020A	623467	251	250	100	90-110

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**INITIAL AND CONTINUING CALIBRATION BLANKS**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>C</b>
ICB 01/29/19 10:01	Iron	6020A	623467	0.3	U
CCB 01/29/19 10:03	Iron	6020A	623467	0.3	U
CCB 01/29/19 10:31	Iron	6020A	623467	0.3	U
CCB 01/29/19 10:40	Iron	6020A	623467	0.6	J
CCB 01/29/19 11:27	Iron	6020A	623467	4.8	J
CCB 01/29/19 11:42	Iron	6020A	623467	4.5	J
CCB 01/29/19 11:55	Iron	6020A	623467	2.5	J

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**LOW LEVEL INITIAL AND LOW LEVEL CONTINUING CALIBRATION VERIFICATION**

**Concentration Units:** ug/L

<b>Sample ID</b>	<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
LLICV	Iron	6020A	623467	2.2	2.0	111	70-130	01/29/19 10:04
LLCCV	Iron	6020A	623467	2.1	2.0	107	70-130	01/29/19 10:57
LLCCV	Iron	6020A	623467	9.0	8.0	113	70-130	01/29/19 12:11



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSA

Concentration Units: ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	623467	46700	-	-	-	01/29/19 10:05

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

ICP INTERFERENCE CHECK SAMPLE

**Sample ID** ICSAB

**Concentration Units:** ug/L

<b>Analyte</b>	<b>Method</b>	<b>Analysis Batch:</b>	<b>Result</b>	<b>True Value</b>	<b>% Rec</b>	<b>% Rec. Limits</b>	<b>Analysis Date</b>
Iron	6020A	623467	47700	-	-	-	01/29/19 10:07

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**POST SPIKE SAMPLE RECOVERY**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Post Spike Result	True Value	% Rec	% Rec. Limits	Analysis Date
K1900739-006A	Iron	6020A	623467	36.8	36400	20.0	-2200	80-120	01/29/19 11:07

Results flagged with a pound (#) indicate the control criteria is not applicable.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**ICP SERIAL DILUTIONS**

Concentration Units: ug/L

Sample ID	Analyte	Method	Analysis Batch:	Initial Sample Result	Serial Dillution Result	% Diff	% Diff. Limit	Analysis Date
K1900739-006SDL	Iron	6020A	623467	36800	37500	2	10	01/29/19 11:06

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dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**Detection Limits**

**Instrument:** K-ICP-MS-06

**Matrix:** Water

<b>Analyte</b>	<b>Mass</b>	<b>Units</b>	<b>MRL</b>	<b>MDL</b>	<b>Method</b>
Iron	56	ug/L	8	0.3	6020A

**ALS Group USA, Corp.**  
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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**ICP Linear Range (Quarterly)**

**Instrument:** K-ICP-MS-06

<b>Analyte</b>	<b>Concentration (ug/L)</b>	<b>Method</b>
Iron 56	45000	6020A

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 623467

Sample	Dilution Factor	Date/Time	F e
ZZZZZZ	1	01/29/19 09:55	
ZZZZZZ	1	01/29/19 09:56	
ICV	1	01/29/19 09:57	X
CCV	1	01/29/19 09:59	X
ZZZZZZ	1	01/29/19 10:00	
ICB	1	01/29/19 10:01	X
CCB	1	01/29/19 10:03	X
LLICVW	1	01/29/19 10:04	X
ICSA	1	01/29/19 10:05	X
ICSAB	1	01/29/19 10:07	X
ZZZZZZ	1	01/29/19 10:08	
ZZZZZZ	1	01/29/19 10:21	
ZZZZZZ	1	01/29/19 10:22	
ZZZZZZ	1	01/29/19 10:23	
ZZZZZZ	1	01/29/19 10:25	
ZZZZZZ	5	01/29/19 10:26	
ZZZZZZ	1	01/29/19 10:27	
ZZZZZZ	1	01/29/19 10:28	
CCV	1	01/29/19 10:30	X
CCB	1	01/29/19 10:31	X
ZZZZZZ	1	01/29/19 10:32	
ZZZZZZ	1	01/29/19 10:34	
ZZZZZZ	1	01/29/19 10:35	
ZZZZZZ	1	01/29/19 10:36	
ZZZZZZ	1	01/29/19 10:38	
CCV	1	01/29/19 10:39	X
CCB	1	01/29/19 10:40	X
ZZZZZZ	1	01/29/19 10:42	
LLCCVW	1	01/29/19 10:57	X
ZZZZZZ	1	01/29/19 11:00	
KQ1901096-02MB	1	01/29/19 11:01	X
KQ1901096-01LCS	1	01/29/19 11:02	X
K1900739-006	1	01/29/19 11:03	X
K1900739-006DUP	1	01/29/19 11:05	X
K1900739-006SDL	5	01/29/19 11:06	X
K1900739-006PS	1	01/29/19 11:07	X
K1900739-006MS	1	01/29/19 11:09	X

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**Analysis Run Log**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 623467

Sample	Dilution Factor	Date/Time	F e
K1900739-001	1	01/29/19 11:10	X
K1900739-002	1	01/29/19 11:11	X
K1900739-003	1	01/29/19 11:13	X
CCV	1	01/29/19 11:14	X
ZZZZZZ	1	01/29/19 11:15	
CCB	1	01/29/19 11:27	X
K1900739-005	1	01/29/19 11:30	X
K1900739-004	1	01/29/19 11:31	X
K1900739-006	1	01/29/19 11:33	X
K1900739-006DUP	1	01/29/19 11:35	X
K1900739-006SDL	5	01/29/19 11:36	X
K1900739-006PS	1	01/29/19 11:38	X
K1900739-006MS	1	01/29/19 11:39	X
CCV	1	01/29/19 11:41	X
CCB	1	01/29/19 11:42	X
K1900739-005	1	01/29/19 11:46	X
K1900739-001	1	01/29/19 11:47	X
K1900739-002	1	01/29/19 11:49	X
K1900739-003	1	01/29/19 11:50	X
K1900739-004	1	01/29/19 11:52	X
CCV	1	01/29/19 11:54	X
CCB	1	01/29/19 11:55	X
ZZZZZZ	1	01/29/19 11:57	
ZZZZZZ	1	01/29/19 12:00	
LLCCV 4X	1	01/29/19 12:11	X



**ALS Group USA, Corp.**  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 623467

Sample	Date/Time	Ge72He	Th232He
ZZZZZZ	01/29/19 09:55		
ZZZZZZ	01/29/19 09:56		
ICV	01/29/19 09:57	99	98
CCV	01/29/19 09:59	98	98
ZZZZZZ	01/29/19 10:00		
ICB	01/29/19 10:01	96	97
CCB	01/29/19 10:03	96	97
LLICVW	01/29/19 10:04	96	97
ICSA	01/29/19 10:05	94	98
ICSAB	01/29/19 10:07	93	95
ZZZZZZ	01/29/19 10:08		
ZZZZZZ	01/29/19 10:21		
ZZZZZZ	01/29/19 10:22		
ZZZZZZ	01/29/19 10:23		
ZZZZZZ	01/29/19 10:25		
ZZZZZZ	01/29/19 10:26		
ZZZZZZ	01/29/19 10:27		
ZZZZZZ	01/29/19 10:28		
CCV	01/29/19 10:30	97	97
CCB	01/29/19 10:31	97	96
ZZZZZZ	01/29/19 10:32		
ZZZZZZ	01/29/19 10:34		
ZZZZZZ	01/29/19 10:35		
ZZZZZZ	01/29/19 10:36		
ZZZZZZ	01/29/19 10:38		
CCV	01/29/19 10:39	96	96
CCB	01/29/19 10:40	94	98
ZZZZZZ	01/29/19 10:42		
LLCCVW	01/29/19 10:57	92	95
ZZZZZZ	01/29/19 11:00		
KQ1901096-02MB	01/29/19 11:01	93	96
KQ1901096-01LCS	01/29/19 11:02	93	95
K1900739-006	01/29/19 11:03	92	96
K1900739-006DUP	01/29/19 11:05	84	83
K1900739-006SDL	01/29/19 11:06	92	96
K1900739-006PS	01/29/19 11:07	91	95
K1900739-006MS	01/29/19 11:09	93	95

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739

**ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY**

**Instrument ID:** K-ICP-MS-06

**Analytical BatchID:** 623467

Sample	Date/Time	Ge72He	Th232He
K1900739-001	01/29/19 11:10	91	95
K1900739-002	01/29/19 11:11	93	95
K1900739-003	01/29/19 11:13	93	94
CCV	01/29/19 11:14	96	96
ZZZZZZ	01/29/19 11:15		
CCB	01/29/19 11:27	84	85
K1900739-005	01/29/19 11:30	94	95
K1900739-004	01/29/19 11:31	92	95
K1900739-006	01/29/19 11:33	93	95
K1900739-006DUP	01/29/19 11:35	93	95
ZZZZZZ	01/29/19 11:36		
ZZZZZZ	01/29/19 11:38		
K1900739-006MS	01/29/19 11:39	94	96
CCV	01/29/19 11:41	96	96
CCB	01/29/19 11:42	95	96
K1900739-005	01/29/19 11:46	96	97
K1900739-001	01/29/19 11:47	94	95
K1900739-002	01/29/19 11:49	93	95
K1900739-003	01/29/19 11:50	93	95
K1900739-004	01/29/19 11:52	92	92
CCV	01/29/19 11:54	97	96
CCB	01/29/19 11:55	98	97
ZZZZZZ	01/29/19 11:57		
ZZZZZZ	01/29/19 12:00		
LLCCV 4X	01/29/19 12:11	95	96



## 1,4-Dioxane by GC/MS

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:00  
**Date Received:** 01/25/19 09:40

**Sample Name:** DP-167-43-48-0119  
**Lab Code:** K1900739-001

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	160	2.0	0.80	5	01/30/19 15:48	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	57	48 - 118	01/30/19 12:15	

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dba ALS Environmental

Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:45  
**Date Received:** 01/25/19 09:40

**Sample Name:** DP-167-52-57-0119  
**Lab Code:** K1900739-002

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	130	2.0	0.80	5	01/30/19 16:07	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	107	48 - 118	01/30/19 12:34	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 10:50  
**Date Received:** 01/25/19 09:40

**Sample Name:** DP-9-167-52-57-0119  
**Lab Code:** K1900739-003

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	120	2.0	0.80	5	01/30/19 16:26	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	82	48 - 118	01/30/19 16:26	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 11:40  
**Date Received:** 01/25/19 09:40

**Sample Name:** DP-167-61-66-0119  
**Lab Code:** K1900739-004

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	220	4.0	1.6	10	01/31/19 11:05	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	77	48 - 118	01/31/19 11:05	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 12:00  
**Date Received:** 01/25/19 09:40

**Sample Name:** EB01-0119  
**Lab Code:** K1900739-005

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	01/30/19 13:29	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	84	48 - 118	01/30/19 13:29	



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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19 13:50  
**Date Received:** 01/25/19 09:40

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006

**Units:** ug/L  
**Basis:** NA

**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	140	2.0	0.80	5	01/31/19 09:56	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	63	48 - 118	01/31/19 09:56	

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Analytical Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** KQ1901167-02

**Units:** ug/L  
**Basis:** NA

1,4-Dioxane by GC/MS

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.40	0.16	1	01/30/19 11:00	1/29/19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	80	48 - 118	01/30/19 11:00	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739

**SURROGATE RECOVERY SUMMARY**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**Extraction Method:** EPA 3535A

Sample Name	Lab Code	1,4-Dioxane-d8
		48-118
DP-167-43-48-0119	K1900739-001	57
DP-167-52-57-0119	K1900739-002	107
DP-9-167-52-57-0119	K1900739-003	82
DP-167-61-66-0119	K1900739-004	77
EB01-0119	K1900739-005	84
DP-167-70-75-0119	K1900739-006	63
Method Blank	KQ1901167-02	80
Lab Control Sample	KQ1901167-01	74
DP-167-70-75-0119	KQ1901167-03	70
DP-167-70-75-0119	KQ1901167-04	83

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19 09:26

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\013019\0130F002.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D SIM

**Lab Code:** KQ1901257-02  
**Analysis Lot:** 623635  
**Signal ID:** 1

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>Result ==&gt;</b>	37,793	5.20
<b>Upper Limit ==&gt;</b>	75,586	5.70
<b>Lower Limit ==&gt;</b>	18,897	4.70

**Associated Analyses**

Continuing Calibration Verification	KQ1901257-02	37793	5.20
Method Blank	KQ1901167-02	34705	5.21
Lab Control Sample	KQ1901167-01	33748	5.21
DP-167-70-75-0119MS	KQ1901167-03	36810	5.20
DP-167-70-75-0119DMS	KQ1901167-04	26348	5.21
DP-167-43-48-0119	K1900739-001	34100	5.21
DP-167-52-57-0119	K1900739-002	27060	5.21
EB01-0119	K1900739-005	37887	5.21
DP-167-43-48-0119	K1900739-001	36353	5.21
DP-167-52-57-0119	K1900739-002	37948	5.21
DP-9-167-52-57-0119	K1900739-003	35945	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/31/19 08:58

**Internal Standard Area and RT SUMMARY**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\013119\0131F002.D\  
**Instrument ID:** K-MS-26  
**Analysis Method:** 8270D SIM

**Lab Code:** KQ1901339-02  
**Analysis Lot:** 623808  
**Signal ID:** 1

	1,4-Dichlorobenzene-d4	
	Area	RT
<b>Result ==&gt;</b>	37,763	5.21
<b>Upper Limit ==&gt;</b>	75,526	5.71
<b>Lower Limit ==&gt;</b>	18,882	4.71

**Associated Analyses**

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Continuing Calibration Verification	KQ1901339-02	37763	5.21
DP-167-70-75-0119	K1900739-006	33673	5.21
DP-167-61-66-0119	K1900739-004	36914	5.21

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Collected:** 01/23/19  
**Date Received:** 01/25/19  
**Date Analyzed:** 01/30/19  
**Date Extracted:** 01/29/19

**Duplicate Matrix Spike Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** DP-167-70-75-0119  
**Lab Code:** K1900739-006  
**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA

Analyte Name	Sample Result	Result	Matrix Spike KQ1901167-03		Duplicate Matrix Spike KQ1901167-04		% Rec Limits	RPD	RPD Limit
			Spike Amount	% Rec	Result	Spike Amount			
1,4-Dioxane	140	158 E	10.0	133 #	179 E	10.0	33-127	12	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19  
**Date Extracted:** 01/29/19

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

**Units:** ug/L  
**Basis:** NA  
**Analysis Lot:** 623635

**Lab Control Sample**  
**KQ1901167-01**

<b>Analyte Name</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
1,4-Dioxane	6.68	10.0	67	52-111

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QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19 11:00  
**Date Extracted:** 01/29/19

**Method Blank Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Method Blank  
**Lab Code:** KQ1901167-02  
**Analysis Method:** 8270D SIM  
**Prep Method:** EPA 3535A

**Instrument ID:** K-MS-26  
**File ID:** J:\MS26\DATA\013019\0130F003.D\  
**Analysis Lot:** 623635,623808  
**Extraction Lot:** 330499

This Method Blank applies to the following analyses.

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>
Lab Control Sample	KQ1901167-01	J:\MS26\DATA\013019\0130F004.D\	01/30/19 11:19
DP-167-70-75-0119MS	KQ1901167-03	J:\MS26\DATA\013019\0130F005.D\	01/30/19 11:38
DP-167-70-75-0119DMS	KQ1901167-04	J:\MS26\DATA\013019\0130F006.D\	01/30/19 11:56
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F007.D\	01/30/19 12:15
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F008.D\	01/30/19 12:34
EB01-0119	K1900739-005	J:\MS26\DATA\013019\0130F011.D\	01/30/19 13:29
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F014.D\	01/30/19 15:48
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F015.D\	01/30/19 16:07
DP-9-167-52-57-0119	K1900739-003	J:\MS26\DATA\013019\0130F016.D\	01/30/19 16:26
DP-167-70-75-0119	K1900739-006	J:\MS26\DATA\013119\0131F005.D\	01/31/19 09:56
DP-167-61-66-0119	K1900739-004	J:\MS26\DATA\013119\0131F008.D\	01/31/19 11:05



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19 11:19  
**Date Extracted:** 01/29/19

**Lab Control Sample Summary**  
**1,4-Dioxane by GC/MS**

**Sample Name:** Lab Control Sample      **Instrument ID:** K-MS-26  
**Lab Code:** KQ1901167-01      **File ID:** J:\MS26\DATA\013019\0130F004.D\  
**Analysis Method:** 8270D SIM      **Analysis Lot:** 623635,623808  
**Prep Method:** EPA 3535A      **Extraction Lot:** 330499

This Lab Control Sample applies to the following analyses.

<b>Sample Name</b>	<b>Lab Code</b>	<b>File ID</b>	<b>Date Analyzed</b>
Method Blank	KQ1901167-02	J:\MS26\DATA\013019\0130F003.D\	01/30/19 11:00
DP-167-70-75-0119MS	KQ1901167-03	J:\MS26\DATA\013019\0130F005.D\	01/30/19 11:38
DP-167-70-75-0119DMS	KQ1901167-04	J:\MS26\DATA\013019\0130F006.D\	01/30/19 11:56
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F007.D\	01/30/19 12:15
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F008.D\	01/30/19 12:34
EB01-0119	K1900739-005	J:\MS26\DATA\013019\0130F011.D\	01/30/19 13:29
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F014.D\	01/30/19 15:48
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F015.D\	01/30/19 16:07
DP-9-167-52-57-0119	K1900739-003	J:\MS26\DATA\013019\0130F016.D\	01/30/19 16:26
DP-167-70-75-0119	K1900739-006	J:\MS26\DATA\013119\0131F005.D\	01/31/19 09:56
DP-167-61-66-0119	K1900739-004	J:\MS26\DATA\013119\0131F008.D\	01/31/19 11:05

**ALS Group USA, Corp.**  
dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19 09:07

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\013019\0130F001.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D SIM  
**Analysis Lot:** 623635

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.40	303850	Pass
68	69	0	2	1.40	5269	Pass
69	198	0	100	20.35	377057	Pass
70	69	0	2	0.41	1558	Pass
127	198	10	80	36.53	677080	Pass
197	198	0	2	0.20	3636	Pass
198	442	30	100	59.09	1853269	Pass
199	198	5	9	6.77	125520	Pass
275	198	10	60	33.23	615829	Pass
365	442	1	50	2.50	78541	Pass
441	443	0.01	100	76.57	470186	Pass
442	442	100	100	100.00	3136170	Pass
443	442	15	24	19.58	614080	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1901257-02	J:\MS26\DATA\013019\0130F002.D\	01/30/19 09:26	
Method Blank	KQ1901167-02	J:\MS26\DATA\013019\0130F003.D\	01/30/19 11:00	
Lab Control Sample	KQ1901167-01	J:\MS26\DATA\013019\0130F004.D\	01/30/19 11:19	
DP-167-70-75-0119	KQ1901167-03	J:\MS26\DATA\013019\0130F005.D\	01/30/19 11:38	
DP-167-70-75-0119	KQ1901167-04	J:\MS26\DATA\013019\0130F006.D\	01/30/19 11:56	
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F007.D\	01/30/19 12:15	
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F008.D\	01/30/19 12:34	
EB01-0119	K1900739-005	J:\MS26\DATA\013019\0130F011.D\	01/30/19 13:29	
DP-167-43-48-0119	K1900739-001	J:\MS26\DATA\013019\0130F014.D\	01/30/19 15:48	
DP-167-52-57-0119	K1900739-002	J:\MS26\DATA\013019\0130F015.D\	01/30/19 16:07	
DP-9-167-52-57-0119	K1900739-003	J:\MS26\DATA\013019\0130F016.D\	01/30/19 16:26	

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dba ALS Environmental

QC/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/31/19 08:39

**Tune Summary**  
**1,4-Dioxane by GC/MS**

**File ID:** J:\MS26\DATA\013119\0131F001.D\  
**Instrument ID:** K-MS-26

**Analytical Method:** 8270D SIM  
**Analysis Lot:** 623808

Target Mass	Relative to Mass	Lower Limit %	Upper Limit %	Relative Abundance %	Raw Abundance	Result Pass/Fail
51	198	10	80	16.59	319901	Pass
68	69	0	2	1.37	5494	Pass
69	198	0	100	20.85	401882	Pass
70	69	0	2	0.47	1870	Pass
127	198	10	80	37.08	714817	Pass
197	198	0	2	0.17	3294	Pass
198	442	30	100	65.67	1927850	Pass
199	198	5	9	6.73	129706	Pass
275	198	10	60	32.27	622037	Pass
365	442	1	50	2.55	74874	Pass
441	443	0.01	100	76.84	440000	Pass
442	442	100	100	100.00	2935466	Pass
443	442	15	24	19.51	572586	Pass

Sample Name	Lab Code	File ID:	Date Analyzed:	Q
Continuing Calibration Verification	KQ1901339-02	J:\MS26\DATA\013119\0131F002.D\	01/31/19 08:58	
DP-167-70-75-0119	K1900739-006	J:\MS26\DATA\013119\0131F005.D\	01/31/19 09:56	
DP-167-61-66-0119	K1900739-004	J:\MS26\DATA\013119\0131F008.D\	01/31/19 11:05	

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1900739  
**Calibration Date:** 10/29/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800492  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
01	KC1800492-01	1,4 DX ICAL 2.0ng/mL SVM59-54B	J:\MS26\DATA\102918\1029F004.D	10/29/2018 11:26
02	KC1800492-02	1,4 DX ICAL 4.0ng/mL SVM59-54C	J:\MS26\DATA\102918\1029F005.D	10/29/2018 11:44
03	KC1800492-03	1,4 DX ICAL 10ng/mL SVM59-54D	J:\MS26\DATA\102918\1029F006.D	10/29/2018 12:02
04	KC1800492-04	1,4 DX ICAL 20ng/mL SVM59-54E	J:\MS26\DATA\102918\1029F007.D	10/29/2018 12:21
05	KC1800492-05	1,4 DX ICAL 50ng/mL SVM59-54F	J:\MS26\DATA\102918\1029F008.D	10/29/2018 12:39
06	KC1800492-06	1,4 DX ICAL 100ng/mL SVM59-54G	J:\MS26\DATA\102918\1029F009.D	10/29/2018 12:58
07	KC1800492-07	1,4 DX ICAL 200ng/mL SVM59-54H	J:\MS26\DATA\102918\1029F010.D	10/29/2018 13:16

**Analyte**

1,4-Dioxane											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.3467	02	4.000	0.3477	03	10.000	0.3601	04	20.000	0.3489
05	50.000	0.3464	06	100.000	0.3757	07	200.000	0.3763			

1,4-Dioxane-d8											
#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	2.000	0.36	02	4.000	0.3761	03	10.000	0.3657	04	20.000	0.3658
05	50.000	0.3452	06	100.000	0.3601	07	200.000	0.3643			

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1900739  
**Calibration Date:** 10/29/2018

**Initial Calibration Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800492  
**Instrument ID:** K-MS-26

**Signal ID:** 1

Analyte Name	Compound Type	Calibration Evaluation				Calibration Evaluation	
		Fit Type	Eval	Eval Result	Control Criteria	Average RRF	Minimum RRF
1,4-Dioxane	TRG	Average RF	% RSD	3.8	20	0.3574	0.01
1,4-Dioxane-d8	SURR	Average RF	% RSD	2.6	20	0.3625	0.01

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown

**Service Request:** K1900739  
**Calibration Date:** 10/29/2018

**Initial Calibration Verification Summary**  
**1,4-Dioxane by GC/MS**

**Calibration ID:** KC1800492  
**Instrument ID:** K-MS-26

**Signal ID:** 1

#	Lab Code	Sample Name	File Location	Acquisition Date
08	KC1800492-08	1,4 DX ICV 20ng/mL SVM59-54I	J:\MS26\DATA\102918\1029F011.D	10/29/2018 13:35

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane	20.0	20.4	3.574E-1	3.648E-1	2.07	±30	Average RF

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	21.0	3.625E-1	3.8E-1	4.84	±30	Average RF

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/30/19 09:26

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**File ID:** J:\MS26\DATA\013019\0130F002.D\  
**Signal ID:** 1

**Calibration Date:** 10/29/2018  
**Calibration ID:** KC1800492  
**Analysis Lot:** 623635  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	18.1	0.3574	0.3227	-9.7	NA	±20	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	18.0	0.3625	0.3257	-10.2	NA	±20	Average RF

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:** K1900739  
**Date Analyzed:** 01/31/19 08:58

**Continuing Calibration Verification (CCV) Summary**  
**1,4-Dioxane by GC/MS**

**Analysis Method:** 8270D SIM  
**File ID:** J:\MS26\DATA\013119\0131F002.D\  
**Signal ID:** 1

**Calibration Date:** 10/29/2018  
**Calibration ID:** KC1800492  
**Analysis Lot:** 623808  
**Units:** ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane	20.0	22.8	0.3574	0.408	14.2	NA	±20	Average RF

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
1,4-Dioxane-d8	20.0	21.9	0.3625	0.3962	9.3	NA	±20	Average RF



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:**K1900739

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:**623635  
**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\013019\0130F001.D\	ZZZZZZZ	ZZZZZZZ	1/30/2019	09:07:00	
J:\MS26\DATA\013019\0130F002.D\	Continuing Calibration Verification	KQ1901257-02	1/30/2019	09:26:00	
J:\MS26\DATA\013019\0130F003.D\	Method Blank	KQ1901167-02	1/30/2019	11:00:00	
J:\MS26\DATA\013019\0130F004.D\	Lab Control Sample	KQ1901167-01	1/30/2019	11:19:00	
J:\MS26\DATA\013019\0130F005.D\	DP-167-70-75-0119 MS	KQ1901167-03	1/30/2019	11:38:00	
J:\MS26\DATA\013019\0130F006.D\	DP-167-70-75-0119 DMS	KQ1901167-04	1/30/2019	11:56:00	
J:\MS26\DATA\013019\0130F007.D\	DP-167-43-48-0119	K1900739-001	1/30/2019	12:15:00	
J:\MS26\DATA\013019\0130F008.D\	DP-167-52-57-0119	K1900739-002	1/30/2019	12:34:00	
J:\MS26\DATA\013019\0130F011.D\	EB01-0119	K1900739-005	1/30/2019	13:29:00	
J:\MS26\DATA\013019\0130F013.D\	ZZZZZZZ	ZZZZZZZ	1/30/2019	14:07:00	
J:\MS26\DATA\013019\0130F014.D\	DP-167-43-48-0119	K1900739-001	1/30/2019	15:48:00	
J:\MS26\DATA\013019\0130F015.D\	DP-167-52-57-0119	K1900739-002	1/30/2019	16:07:00	
J:\MS26\DATA\013019\0130F016.D\	DP-9-167-52-57-0119	K1900739-003	1/30/2019	16:26:00	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08

**Service Request:**K1900739

**Analysis Run Log**  
**1,4-Dioxane by GC/MS**

**Analysis Method:**

**Analysis Lot:**623808  
**Instrument ID:**K-MS-26

<b>Raw Data File</b>	<b>Sample Name</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>Time Analyzed</b>	<b>Q</b>
J:\MS26\DATA\013119\0131F001.D\	ZZZZZZZ	ZZZZZZZ	1/31/2019	08:39:00	
J:\MS26\DATA\013119\0131F002.D\	Continuing Calibration Verification	KQ1901339-02	1/31/2019	08:58:00	
J:\MS26\DATA\013119\0131F005.D\	DP-167-70-75-0119	K1900739-006	1/31/2019	09:56:00	
J:\MS26\DATA\013119\0131F008.D\	DP-167-61-66-0119	K1900739-004	1/31/2019	11:05:00	

ALS Group USA, Corp.  
dba ALS Environmental

Prep Summary Report

**Client:** Stericycle Environmental Solutions, Inc.  
**Project:** Stericycle Georgetown/STRCL-001 375.08  
**Sample Matrix:** Water

**Service Request:** K1900739

**1,4-Dioxane by GC/MS**

**Prep Method:** EPA 3535A  
**Analytical Method:** 8270D SIM

**Extraction Lot:** 330499  
**Extraction Date:** 01/29/19 10:05

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
DP-167-43-48-0119	K1900739-001	1/23/19	1/25/19	10 mL	2 mL	
DP-167-52-57-0119	K1900739-002	1/23/19	1/25/19	10 mL	2 mL	
DP-9-167-52-57-0119	K1900739-003	1/23/19	1/25/19	10 mL	2 mL	
DP-167-61-66-0119	K1900739-004	1/23/19	1/25/19	10 mL	2 mL	
EB01-0119	K1900739-005	1/23/19	1/25/19	10 mL	2 mL	
DP-167-70-75-0119	K1900739-006	1/23/19	1/25/19	10 mL	2 mL	
Lab Control Sample	KQ1901167-01LCS	NA	NA	10 mL	2 mL	
Method Blank	KQ1901167-02MB	NA	NA	10 mL	2 mL	
Matrix Spike	KQ1901167-03MS	1/23/19	1/25/19	10 mL	2 mL	
Duplicate Matrix Spike	KQ1901167-04DMS	1/23/19	1/25/19	10 mL	2 mL	

## QA/QC SOLUTIONS, LLC



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April 7, 2019

William Beck and Duane Beery  
Stericycle Environmental Solutions  
18000 72nd Avenue South, Suite 201  
Kent, Washington 98032

Subject: Georgetown 1,4-Dioxane January 2019 Sampling Event Data Validation Review  
Client Project No.: 375.08  
QA/QC Solutions, LLC Project No.: 022219.1 (GT 1,4-Dioxane Jan2019 Event)

Dear Bill and Duane:

This letter documents the results of the data validation review completed by *QA/QC Solutions, LLC* for the analysis of 1,4-Dioxane on groundwater samples. The samples are all associated with the Georgetown 1,4-Dioxane January 2019 sampling event completed in January 2019.

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met. During data validation, the following actions were taken:

- All six (6) results reported for ferrous were qualified as estimated (assigned a *UJ* or *J* qualifier).
- Two results were restated as undetected (*U*).
- No results required rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J* or *UJ*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory and qualified as estimated (*UJ*) during data validation or that were restated as undetected and qualified as estimated (*UJ*) during data validation are usable.

*\*Data users must note that results may be qualified for more than one reason. A summary of the qualified data and the reasons for qualification are summarized in Table 2.*

## Data Set

The data set consisted of six aqueous samples (i.e., 4 groundwater samples, 1 field duplicate sample, and 1 equipment rinsate blank) that were collected in January 2019. A summary of the samples collected and analyses completed is presented in Table 1.

Analyses were completed by the ALS Group USA Corp. dba ALS Environmental (ALS) located in Kelso, Washington work order K1900739. ALS submitted a complete hardcopy data validation package and electronic data deliverable (EDD).

## Analytical Methods

The analytical methods used by the laboratories to complete the chemical analyses included the following:

- Total organic carbon (TOC) by wet chemical oxidation and infrared detection using EPA Method 415.1 (U.S. EPA 1983).
- Ferrous iron (divalent iron) by UV-Vis spectrophotometry using laboratory standard operating procedure (SOP) ApplEnvMic7-87-1536-1540.
- Total iron by digestion with 1% nitric and 0.2% hydrochloric acid and analysis by inductively coupled plasma-mass spectrometry (ICP-MS) using U.S. EPA SW-846 Method 6020A (U.S. EPA 2019).
- Dissolved iron by filtration through 0.45 µm filter, digestion with 1% nitric and 0.2% hydrochloric acid and analysis by ICP-MS using U.S. EPA SW-846 Method 6020A (U.S. EPA 2019).
- 1,4-Dioxane by solid phase extraction (SPE) and analysis by GC/MS operated in the SIM mode to achieve lower reporting limits using U.S. EPA SW-846 Methods 3535A and 8270D, respectively (U.S. EPA 2019).

## Data Validation Procedures

One hundred percent of the results reported were validated (i.e., a comprehensive review of the results reported for the samples and applicable quality control measurement data); this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 4 review per U.S. EPA 2009, which is equivalent to “Level EPA4” for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

Data validation procedures included evaluating the sample results and applicable quality control results reported by the laboratories. The analytical data were validated generally following the applicable guidance and procedures:

- Requirements specified in the QAPP (AMEC 2011)
- Method-specific and laboratory-established quality control requirements, as applicable.
- Guidance on Environmental Data Verification and Validation (U.S. EPA 2002).

- USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review. Final. OSWER 9240.1-45. USEPA/540/R-08/01 (U.S. EPA 2008).
- Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., TOC) that are not specifically addressed by the USEPA functional guidelines or the QAPP (AMEC 2011). In this situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated included the following:

- Case narrative discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs and laboratory summary result forms to verify analytical holding times were met.
- Results for instrument tuning, initial calibration, and continuing calibration verification results to assess instrument performance.
- Results for the blanks (e.g., a method blank and the equipment rinsate blank) to determine whether an analyte reported as detected in any sample was the result of possible contamination at the laboratory or contamination during sampling, respectively.
- Results for the internal standard to ensure instrument sensitivity and response were stable during the analysis of the samples.
- Results for surrogate compound, laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, MS, and/or MSD recoveries to assess analytical accuracy.
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results of the field duplicate sample to provide additional information.
- Instrument printouts (e.g., chromatograms, mass spectra, and quantification reports) to assess the validity of analyte identification as either detected or undetected and to verify quantification of sample results and confirming quantification results by recalculation.
- Laboratory summaries of analytical results reported for the analyses completed.

The adequacy of the sampling procedures was not completed during the data validation. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narrative did not indicate any significant problems with data reported.

Performance based control limits established by the laboratory and applicable control limits specified in the analytical methods were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S.

EPA (2002, 2008, and 2010) to the EDD when applicable QC measurement criteria were not met and qualification of the data was warranted.

### Reason for Data Qualification

The reasons for qualification of selected sample results was because method holding time constraint not met (ferrous iron), method blank contamination (ferrous iron), and the concentration was greater than the MDL, but less than the method reporting limit (MRL) (total and dissolved iron). A summary of the qualified data and the reason for qualification are summarized in Table 2.

### General Comments:

- During data validation, it was determined that selected data-validation-specific and/or method-specific QA/QC measurement criteria were not met. Qualification of the sample results was not required because the overall quality of the data reported was not affected and, therefore, are not summarized herein.
- In some instances, selected samples required dilution prior to analysis (as is required by the analytical methods) to obtain concentrations that were within the linear range of the instrument or to minimize the effects of matrix interferences to obtain reportable results.

This concludes the data validation review. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*  
James J. Mc Ateer, Jr., Managing Member

cc: Natasya Gray, L.G., Dalton, Olmsted & Fuglevand, Inc.

Attachments

## References

AMEC 2011. Revised Long-Term Groundwater Monitoring Plan. PSC Georgetown Facility, Seattle, September 2011. Washington. Prepared for Burlington Environmental, LLC. Prepared by AMEC Geomatrix, Inc., Seattle, Washington.

U.S. EPA. 1983. Methods for chemical analysis of water and wastes. EPA 600/4-79-020. March 1983. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH.

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U.S. EPA 2008. USEPA Contract Laboratory Program, national functional guidelines for superfund organic methods data review. Final. OSWER 9240.1-45. USEPA/540/R-08/01. June 2008. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

U.S. EPA 2019. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on October 15, 2018). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC



**Table 1. Summary of Samples Collected for 1,4-Dioxane January 2019 Sampling Event**

Sample Number	Laboratory	Sample Date	Sample Time	Sample Depth	Total			1,4-Dioxane
	Sample Number				Organic Carbon	Ferrous Iron	Total Iron	
DP-167-43-48-0119	K1900739-001	1/23/19	10:00	0	✓	✓	✓	✓
DP-167-52-57-0119	K1900739-002	1/23/19	10:45	0	✓	✓	✓	✓
DP-9-167-52-57-0119	K1900739-003	1/23/19	10:50	0	✓	✓	✓	✓
DP-167-61-66-0119	K1900739-004	1/23/19	11:40	0	✓	✓	✓	✓
EB01-0119	K1900739-005	1/23/19	12:00	0	✓	✓	✓	✓
DP-167-70-75-0119	K1900739-006	1/23/19	13:50	0	✓	✓	✓	✓

**Table 2. Summary of Qualified Data for for1,4-Dioxane January 2019 Sampling Event<sup>a</sup>**

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias <sup>b,c,d</sup>
DP-167-43-48-0119	K1900739-001	Iron, Ferrous, Fe+2	7.50	mg/L	0.40	0.10		J	Method holding time constraint not met	Not analyzed immediately and analyzed >24 hrs.	Low or high
DP-167-52-57-0119	K1900739-002	Iron, Ferrous, Fe+2	0.40	mg/L	0.20	0.05		J	Method holding time constraint not met	Not analyzed immediately and analyzed >24 hrs.	Low or high
DP-9-167-52-57-0119	K1900739-003	Iron, Ferrous, Fe+2	1.69	mg/L	0.20	0.05		J	Method holding time constraint not met	Not analyzed immediately and analyzed >24 hrs.	Low or high
DP-167-61-66-0119	K1900739-004	Iron, Ferrous, Fe+2	0.30	mg/L	0.20	0.05		UJ	Detected in the method blank and method holding time constraint not met	Detected at 0.15 mg/L, not analyzed immediately, and analyzed >24 hrs.	False positive
EB01-0119	K1900739-005	Iron, Ferrous, Fe+2	0.15	mg/L	0.20	0.05	J	UJ	Detected in the method blank and method holding time constraint not met	Detected at 0.15 mg/L, not analyzed immediately, and analyzed >24 hrs.	False positive
DP-167-70-75-0119	K1900739-006	Iron, Ferrous, Fe+2	11.5	mg/L	1.0	0.3		J	Method holding time constraint not met	Not analyzed immediately and analyzed >24 hrs.	Low or high
EB01-0119	K1900739-005	Iron	0.0043	mg/L	0.0080	0.0003	J	J	Concentration >MDL, <MRL	NA	Low or high
		Iron, Dissolved	0.0033	mg/L	0.0080	0.0003	J	J	Concentration >MDL, <MRL	NA	Low or high

**Notes:**

- J - estimated
- MDL - method detection limit
- MRL - method reporting limit
- U - undetected at value shown

Total results qualified "J" =	6
Total results qualified "U" =	0
Total results qualified "UJ" =	2
Total results qualified "R" =	0

<sup>a</sup> Summary of qualified data is for natural and field quality control samples only

<sup>b</sup> Low bias - concentration reported is likely low and the actual reporting limit or concentration may be greater than reported

<sup>c</sup> High bias - result reported is likely high and the actual reporting limit or concentration may be lower than reported

<sup>d</sup> False positive - compound is likely not present

## Appendix D



# BENCH SCALE TREATABILITY STUDY REPORT

STERICYCLE-GEORGETOWN FACILITY SITE  
SEATTLE, WASHINGTON

MARCH 26, 2019

*PREPARED FOR*

DALTON, OLMSTED & FUGLEVAND  
1001 SW KLUCKITAT WAY, SUITE 200B  
SEATTLE, WA

ISOTEC PROJECT No. 802476

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[www.ISOTEC-INC.com](http://www.ISOTEC-INC.com)

*SBA Certified Small Business*



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## ATTACHMENTS

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## ACRONYMS

CHASP	Carbohydrate activated sodium persulfate
COCs	Contaminants of concern
g/kg	Grams per kilogram
GW	Groundwater
ISCO	In-situ chemical oxidation
ISOTEC	In-Situ Oxidative Technologies, Inc.
MASP	MFR activated sodium persulfate
MFR	Modified Fenton's Reagent
mg/kg	Milligrams per kilogram
mg/l	Milligrams per liter
ND	Non detect concentration
SGS	SGS Laboratories
TOC	Total organic carbon
TOD	Total oxidant demand
µg/l	Micrograms per liter
µg/kg	Micrograms per kilogram
1,4-D	1,4-Dioxane

## 1.0 EXECUTIVE SUMMARY

In-Situ Oxidative Technologies, Inc. (ISOTEC<sup>SM</sup>) was retained by Dalton, Olmsted & Fuglevand (DOF) to conduct an in-situ chemical oxidation (ISCO) bench-scale laboratory treatability study (study) on soil and groundwater samples collected from the Stericycle-Georgetown Facility (Stericycle) Site located in Seattle, Washington. The primary constituent of concern (COC) for the study is 1,4-dioxane (1,4-D). The purpose of the study was to evaluate the treatment effectiveness of 1,4-D using different methods of activated sodium persulfate (ASP) as below:

- 1) Sodium persulfate activated by modified Fenton's reagent (MASP),
- 2) Sodium persulfate activated by food grade carbohydrates with/without base (CHASP), and
- 3) Sodium persulfate activated by MFR and food grade carbohydrates (MFR+CHASP).

In addition, total oxidant demand (TOD) of sodium persulfate ( $\text{Na}_2\text{S}_2\text{O}_8$ ) was evaluated for each activation method and soil base buffering capacity was assessed using sodium hydroxide (NaOH). Potential mobilization of selected metals including arsenic (As), cadmium (Cd), chromium (Cr), iron (Fe) and lead (Pb) as well as sulfate was also evaluated for each reagent in the study.

DOF provided soil samples from 8 depth intervals and groundwater (GW) sample from one location at the Site for use in the treatability study. Prior to start of the experiments, soil samples collected from 50 to 60 feet below ground surface (bgs) depth interval were composited and designated as "Soil Comp." A portion of "Soil Comp" was collected and submitted for 1,4-D, total organic carbon (TOC), iron and manganese analyses to collect initial characterization data of the soil sample. Similarly, a portion of GW sample was collected and submitted for analyses on the same parameters as soil (except TOC) to collect initial characterization data of the GW sample. The remaining composited soil was mixed with the groundwater at a soil-to-GW ratio of 2:1 [2 parts soil and 1 part groundwater (by weight)] to generate a 2:1 slurry. Treatability study experiments were conducted on the slurry samples to evaluate for each reagent the effectiveness of 1,4-D treatment and potential metal mobilization. Each reagent was tested at three doses, 0.3 grams per kilogram (g/kg) (low dose), 1.5 g/kg (medium dose) and 3 g/kg (high dose) of oxidant by weight of soil in the slurry samples tested.

Two experiments were performed, one for 1,4-D analysis (1,4-D test) and the other for metals/sulfate analyses (Metal test). The experiments were conducted over a period of 5 days. Then the reactions were quenched and the sample contents in each reactor were separated into aqueous and solid phases, and submitted for 1,4-D, and metals/sulfate analyses. The table below summarizes the reactor set up and analytical sample matrix/parameters for each test.



Reactor Type>>	Control	MASP	MFR+CHASP	CHASP (with base)	CHASP (without base)	Analytical Sample Matrix
1,4-D Test	Control	Low Dose	Low Dose	Low Dose	Medium Dose	Aqueous Phase Solid Phase
		Medium Dose	Medium Dose	Medium Dose		
		High Dose	High Dose	High Dose		
Metal Test	Control	High Dose	High Dose	High Dose		Aqueous Phase

Treatability study results indicate the following:

- All tested reagents promoted effective 1,4-D treatment with MASP, MFR+CHASP, and CHASP (without base) producing better results than CHASP (with base). When aqueous and soil/solid phase results are combined, the highest mass reductions of 1,4-D achieved were as follows – 99.9% for MASP, 99.9% for MFR+CHASP, 28.1% for CHASP (with base), and 96.5% for CHASP (without base). Total oxidant demand (TOD) of Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> was estimated to be in the range of 0.39-2.42 g/kg for MASP, 0.42-2.45 g/kg for MFR+CHASP and 0.77-3.34 g/kg for CHASP.
- Site soil buffering capacity was determined to be ~4.6 ml of 25% NaOH per kilogram (ml/kg) of soil. The natural base buffering capacity appears to be on the high side meaning a large quantity of base is required to raise the pH of the soil slurry. Therefore, base activation of persulfate would not be recommended for field application.
- In the Metals test, no increases were observed for As and Pb concentrations following all 3 reagents applications. Increases in the aqueous phase concentrations of Cr and Fe were observed following all three reagents applications and slight increases in Cd concentrations were observed following MASP and MFR+CHASP applications (but not observed for CHASP application). Previous experience indicates that the metals increases are temporary in nature and typically return to background values in a matter of months following post-ISCO aquifer equilibration.

Based on the treatability study results, MFR+CHASP is recommended as the activation strategy for sodium persulfate. Based on the TOD, an oxidant dose of 2.50 g/kg (i.e. 1.25+1.25 g/kg) is optimal for field application based on overall 95.9% 1,4-D mass reduction achieved, and the ability of carbohydrates to enhance persulfate activation under field conditions even after MFR has been consumed. Although not proposed for activation, a small amount of base will be required to be used in an effort to protect the direct push technology (DPT) tooling from corrosive effects of sodium persulfate (no base will be used in areas of the Site with PVC injection wells). Any drops in pH values of the

subsurface in the immediate areas of injection following reagent applications can be minimized with upward pH adjustments to the makeup of the chelated iron catalyst; however, based on our past experience the pH is expected to return to back ground conditions naturally upon aquifer equilibration due to free groundwater flow conditions present at the Site (versus batch reactors in the bench test).

Past experience when comparing treatability study results to ISCO field results suggests that there are inherent implementation variables between lab study set-ups and field injections. Lab set ups typically include mixing that makes it more likely to achieve 100% contact with the soil/groundwater matrix. Hence, maximum treatment can be achieved with just one application. As such, the primary goal of this bench scale study was to compare activation methods. To reduce variability in comparing those activation methods, this study included mixing of the groundwater and soil to make a slurry which was then mixed gently with the reagents. This removed any natural heterogeneities in the soil samples, allowing for better contact between reagents and contaminants.

Field injections are limited by the ability of the subsurface to accept reagent volumes and by heterogeneous soils reducing optimum contact of oxidant and contaminants. Field implementation is performed using a network of injection points with overlapping radius of influence and multiple rounds of injection (if needed) to increase the probability of contact. Injection pressures will increase and reagents may find pathways to daylight when too large a reagent volume is injected at any one time. Therefore, the total volume (mass) of reagent required for treatment may be injected over multiple batch injection events in order to safely complete a remediation project. Also, due to inherent heterogeneity associated with most native soil subsurface matrices, the reagent volumes estimated from the bench-scale studies do not necessarily apply for the entire site. Therefore, the estimated reagent volume from the treatability study should be applied in increments. This will ensure that the field injections are completed in the most economical manner while meeting the necessary performance objectives.

In some cases, multiple events are required to achieve maximum treatment effectiveness, but this is based on site specific geology and chemical conditions. In heterogeneous aquifers, even multiple round of injections do not guarantee great contact with contaminants and each successive injection is likely to remove less contaminant mass. Therefore, while these bench scale results provide recommendations on which activation methods are likely to be most effective, overall reductions in concentration may still be less than bench scale results.

## 2.0 BENCH SCALE STUDY OBJECTIVES

The objectives of the study were as follows:

- Determine if significant 1,4-D reduction could be achieved utilizing the proposed reagents, MASP, CHASP and MFR+CHASP.
- Identify the optimal reagent type and doses for future field scale application of ISCO based on COC treatment effectiveness.
- Evaluate the potential for mobilization of selected metals including As, Cd, Cr, Fe, and Pb.
- Assess the base buffering capacity of site soils.

## 3.0 SAMPLE COLLECTION AND PREPARATION

DOF provided soil samples collected from eight (8) depth intervals extending from 40 feet to 80 feet bgs and 1 groundwater sample (CG-127-65-75) collected from the Site on Jan. 22, 2019. Both soil and groundwater samples were shipped to the ISOTEC research facility for use during the treatability study. The samples were stored at <4°C during the shipment and at ISOTEC's facility until commencement of the bench-scale experiments.

Based on high levels of 1,4-D detected during historical sampling at the site, soils collected from the interval of 50-60 feet bgs were selected to perform the experiments of the study. Prior to initiating the study, the soils from the 50 to 60 feet bgs interval were composited to generate a single sample designated as "Soil Comp." Then, a portion of Soil Comp was collected and submitted to SGS Laboratories of Dayton, NJ for 1,4-D, TOC, Fe and Mn analyses to collect initial characterization data of the soil sample (time = 0 days). Similarly, a portion of CG-127-65-75 was also collected and submitted for 1,4-D, Fe and Mn analyses to collect initial characterization data of the GW sample.

To prepare the samples for the bench-scale experiments, the composited soils and GW were mixed at a 2:1 soil to groundwater ratio by weight to generate slurry samples that were used to perform the experiments. SGS performed all analyses associated with the treatability study.

## 4.0 EXPERIMENTAL PROCEDURES

Two experiments were performed to evaluate reagents treatment effectiveness, one to evaluate 1,4-D treatment effectiveness (1,4-D test), and the other to evaluate potential metal mobilization following reagents applications (Metal test). In general, each experiment comprised of the following four steps:

1. Reagent selection,
2. Establishing experimental control,
3. Experimental setup, and
4. Sample analysis.

### 4.1 Reagent Selection

The selected reagents were MASP, CHASP and MFR+CHASP. All selected reagents consist of an oxidant and an activating agent. The primary oxidant used for all experiments was sodium persulfate ( $\text{Na}_2\text{S}_2\text{O}_8$ ). The activating agent was modified Fenton's reagent (MFR) in MASP, food grade carbohydrate with/without base (sodium hydroxide, NaOH) in CHASP, and both MFR and carbohydrate (with slight base) in MFR+CHASP. MFR comprises of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) mixed with proprietary stabilizers, and a patented catalyst 4260 (Cat-4260), which is a circum-neutral pH (e.g. 5-8) organometallic complex (chelated iron) with high mobility within the subsurface. While MFR served as the activating agent to activate persulfate, the hydrogen peroxide contained in MFR also served as a secondary oxidant to enhance 1,4-D treatment. Therefore, the oxidant dose in MASP and MFR+CHASP comprised of both hydrogen peroxide and sodium persulfate, and each oxidant contributed 50% of the respective doses.

### 4.2 Establishing Experimental Controls

An experimental "control" sample was set up in each experiment to document the following:

- Reduction or changes in concentrations of the target constituents due to sample dilution by reagent volumes injected.
- Reduction in concentrations of the target constituents due to volatilization caused by room temperature test conditions.

The "control" sample was set up exactly the same way, remained at, and subject to the same conditions as the associated "treatment" reactors. However, the "control" reactor was injected with distilled water instead of reagent at the time of reagent injection (see Section 4.3 below). The volume of distilled water injected was identical to the volumes of reagent injected into the "treatment" reactors.

### 4.3 Experimental Setup

A total of 2 types of experiments were performed, 1,4-D test and Metal test. Reactors set up, reagent doses tested, and analytical sample matrix/parameters are summarized in table below.

**Experiments Summary**

Reagent Evaluated >>	MASP	CHASP (with base)	CHASP (without base)	MFR+CHASP
Oxidant >>	Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> + H <sub>2</sub> O <sub>2</sub>	Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> + H <sub>2</sub> O <sub>2</sub>
<b>1,4-D test</b>				
Control	0 g/kg			
Low dose	(0.5+0.5) g/kg	1 g/kg		(0.5+0.5) g/kg
Medium dose	(1.25+1.25) g/kg	2.5 g/kg	2.5 g/kg	(1.25+1.25) g/kg
High dose	(2.5+2.5) g/kg	5 g/kg		(2.5+2.5) g/kg
<b>Metal test</b>				
Control	0 g/kg			
High dose	(2.5+2.5) g/kg	5 g/kg		(2.5+2.5) g/kg
<b>Experiment Duration</b>	5 days	5 days	5 days	5 days

**Note:** Oxidant doses are presented as grams of oxidant per kilogram (g/kg) of soil (in slurry) tested. Oxidant in MASP and MFR+CHASP comprised of both Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> and H<sub>2</sub>O<sub>2</sub>, and each contributed one half of the respective doses.

H<sub>2</sub>O<sub>2</sub> = Hydrogen Peroxide; Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> = Sodium Persulfate

#### 4.3.1 1,4-D test

A total of 11 reactors (one "control" and 10 "treatment") were set up in duplicates in 240 milliliter (ml) glass bottles sealed with screw-top caps fitted with septa to facilitate reagent injections. Exactly 300 grams (g) of 2:1 slurry (200 g soil and 100 ml of GW) were introduced into each reactor.

#### 4.3.2 Metal test

A total of 4 reactors (one "control" and 3 "treatment") were set up in duplicates in 240 milliliter (ml) glass bottles sealed with screw-top caps fitted septa to facilitate reagent injections. Exactly 300 grams (g) of 2:1 slurry (200 g soil and 100 ml of GW) were introduced into each reactor.

## 4.4 Reagent Applications

### 4.4.1 MASP and MFR+CHASP

A predetermined amount of MASP or MFR+CHASP was injected into each “treatment” reactor in incremental doses. The “control” reactor received DI water instead of reagent. A multiple dosage approach (incremental approach) was used to increase treatment efficiency, minimize gas formation and resulting pressure buildup. For this study, the low dose reactor received 1 incremental injection, the medium dose reactor received 2 incremental injections, and the high dose reactor received 3 incremental injections. A time gap of approximately 6-8 hours was maintained between incremental dosages. The final oxidant ( $\text{Na}_2\text{S}_2\text{O}_8 + \text{H}_2\text{O}_2$ ) concentrations were (0.5+0.5) g/kg for the low dose, (1.25+1.25) g/kg for the medium dose and (2.5+2.5) g/kg for the high dose. Distilled (DI) water was used to compensate the difference of reagent volumes applied between reactors. All reactors (control and treatment) experienced room temperature test conditions and were inverted exactly 10 times between reagent applications to gain maximum contact between the reagent and the sample matrix. The total duration of the experiment was 5 days.



### 4.4.2 CHASP

A predetermined amount of CHASP was injected into each “treatment” reactor in a single batch. The “control” reactor received DI water instead of reagent. The final oxidant ( $\text{Na}_2\text{S}_2\text{O}_8$  only) concentrations were 1 g/kg for the low dose, 2.5 g/kg for the medium dose and 5 g/kg for the high dose. For the CHASP application without base, only the medium dose at 2.5 g/kg was evaluated. Distilled (DI) water was used to compensate the difference of reagent volumes applied between reactors. All reactors (control and treatment) experienced room temperature conditions and were inverted exactly 10 times between reagent applications to gain maximum contact between the reagent and the sample matrix. The duration of the experiment was 5 days.

## 4.5 Analytical Sample Collection and Analysis

Upon experiment completion and quenching, the sample contents in each reactor (control and treatment) in both tests were separated into aqueous and solid phases.

Analytical samples were collected from both aqueous and solid phases for 1,4-D analysis and from aqueous phase only for As, Cd, Cr, Fe, Pb and sulfate analyses.

SGS Laboratories of Dayton, NJ, a NELAP certified analytical laboratory, performed all analyses associated with the bench-scale study. Laboratory analytical data packages including chains of custody, and internal laboratory custody chronicle are included as Attachment A.

#### **4.6 TOD Evaluation**

TOD data was collected from the duplicates 1,4-D test reactors internally at ISOTEC. The TOD was determined by measuring the initial oxidant measurements (i.e. time = 0 days) collected immediately after introducing the oxidant into each reactor to obtain a baseline starting oxidant concentration and the residual oxidant concentrations were obtained throughout the experiment and at the specific quenching period. TOD is determined from the difference of initial oxidant concentration and the final oxidant concentration and is reported as "g/kg" of oxidant (grams of  $\text{Na}_2\text{S}_2\text{O}_8$  per kilogram of soil being tested).

#### **4.7 Soil Base Buffering Capacity**

Soil base buffering capacity assessment was performed using a 25% sodium hydroxide (NaOH) solution. The test consisted of 2 identical reactors, each containing 10 g of site soil and 30 ml of DI water. NaOH (25%) solution was added to each reactor in small, incremental volumes and mixed thoroughly to slowly raise the pH value of the sample contents. The pH value of sample contents was measured and recorded after each NaOH addition. When a pH value reached and remained above 11 standard units (su) for more than 2 hours, the test was terminated. The buffering capacity of the soil was then determined by dividing the total volume (ml) of 25% NaOH solution added by the weight of soil (kg) being tested. The estimated buffering capacity was determined from the average value from the two identical reactors.

## 5.0 RESULTS AND DISCUSSION

Detailed bench-scale study results including the initial characteristics analyses and experiment results are summarized in Table 1 (Initial Characterization), Table 2 (1,4-D Test Results) and Table 3 (Metal Test Results). 1,4-D Test results are also illustrated in Figures 1 and 2. TOD data are presented in Table 2 and illustrated in Figure 3. Soil base buffering capacity results are presented in Table 4 and illustrated in Figure 4. Laboratory analytical data packages are provided as Attachment A. Initial characteristics results are discussed in Section 5.1, and experiment results are discussed in Section 5.2.

### 5.1 Initial Characteristics (Table 1)

The initial characterization includes analyses of 1,4-D, TOC, Fe and Mn on soil, and 1,4-D, dissolved Fe and Mn on GW. Data indicate the following:

- Iron was detected at 3,820 µg/l in GW and 11,100 mg/kg in soil; manganese was detected at 930 µg/l in GW and 103 mg/kg in soil. Total organic carbon (TOC) was detected at 1,230 mg/kg in soil (Table 1).
  - TOC in soil consumes oxidants, and a higher TOC results in greater competition for oxidants, which can result in significant oxidant scavenging. The TOC level of 1,230 mg/kg detected in site soils is expected to exert a low to moderate oxidant demand.
  - Iron in its dissolved form present in groundwater is known to catalyze hydrogen peroxide and sodium persulfate. Based on ISOTEC's experience, iron concentrations in the aqueous phase should be in the range of 50-100 mg/l to serve as effective MFR catalyst, and 100-150 mg/l to be effective ASP catalyst. The iron concentration detected in the aqueous phase (3.8 mg/l) is below the minimum iron concentration required for proper activation of peroxide or persulfate. Therefore, external activator is needed for field applications of these oxidants.
- Concentration of 1,4-D was detected in GW sample at 356 µg/l, and 32.3 µg/kg in composited soil sample.

## 5.2 Experiment Results

### 5.2.1 1,4-D Test Results (Table 2)

COC treatment effectiveness is evaluated by comparison of "treated" sample data with the "control" sample data. A comparison between the "initial" and "control" data was not made because they represent different sample matrices (i.e., the "initial" show data for discrete soil and GW samples, and the "control" show the aqueous and solid phases data of slurry samples). The "initial" samples typically have a higher COC concentration



compared to "control" since the "control" samples are diluted after addition of DI water and are also subject to the room temperature test conditions similar to the "treated" samples (Section 4.4). It should be noted that 1,4-D levels in the "control" sample was higher in the soil/solid phase but lower in the aqueous phase when compared to that in the "initial" soil and GW samples, respectively. This is most likely attributed to COC redistribution between matrices when soil and GW were mixed to form a slurry. When aqueous and soil/solid phases are combined, the total 1,4-D mass in "Control" sample was lower than the initial samples as expected due to sample dilution.

As discussed in Section 4.2, a "control" sample was set up to document COC concentration changes due to the addition of reagents as well as the room temperature test conditions. The "control" sample was prepared in the same manner and subjected the same conditions as the corresponding "treated" samples but did not receive a dosage of reagent. Therefore, the differences among the contaminant concentrations of "treated" samples and the "control" sample best represents the treatment effectiveness. For discussion purposes, all non-detect (ND) values are assumed to be equal to zero in the contaminant reduction calculation. Results are discussed below for each reagent type tested.

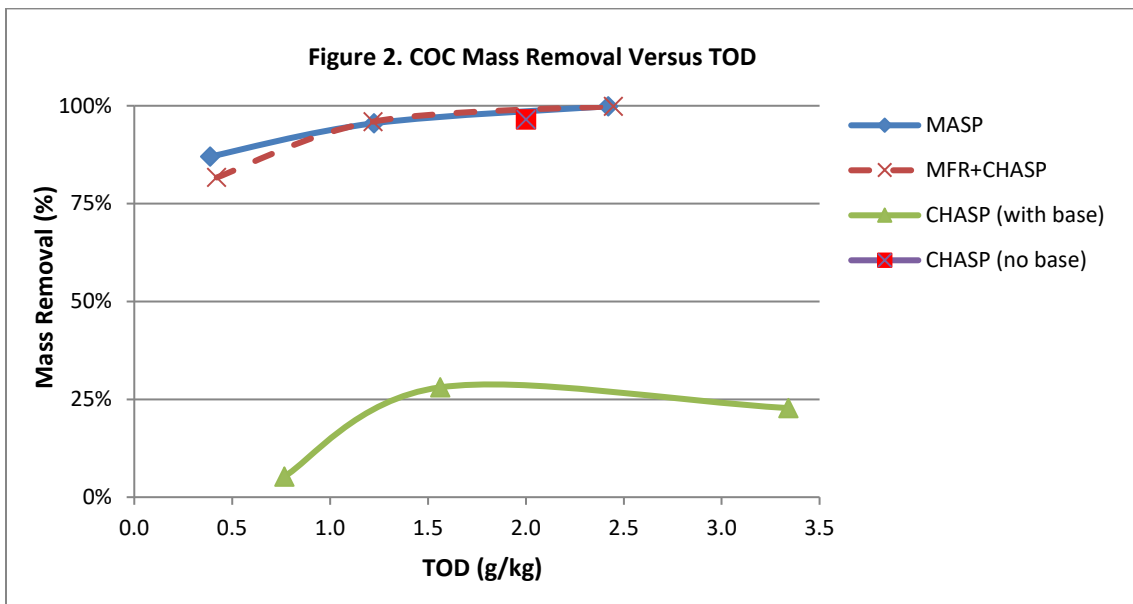
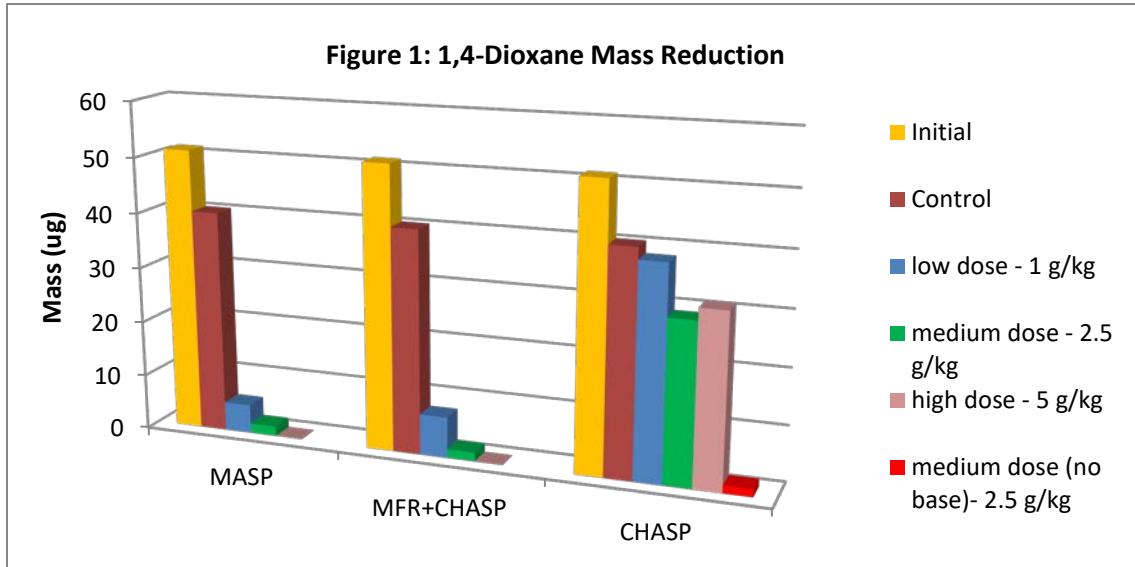
- Using MASP, 1,4-D was treated from 223 µg/l to a range of 0.4-24.6 µg/l in the aqueous phase, and from 88.6 µg/kg to a range of ND (<2.6 µg/kg) to 16.3 µg/kg in the solid phase, an equivalent reduction of 89%-99.8% (aqueous phase) and 81.6%-100% (solid phase), respectively. When aqueous and solid phases are combined, 1,4-D mass reduction achieved (Figure 1) was 87%-99.9% when compared to "Control". An increasing trend in 1,4-D percent mass reduction was observed with increasing reagent doses. The optimum dose in terms of mass reduction per unit of oxidant (Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>) consumed appeared to be in the vicinity of the medium dose, which achieved 96.5% mass reduction whereas the highest dose achieved 99.9% mass reduction as shown in Figure 1.
- Using MFR+CHASP, 1,4-D was treated from 223 µg/l to a range of 0.31-35.4 µg/l in the aqueous phase, and from 88.6 µg/kg to a range of ND (<2.3 µg/kg) to 22.3 µg/kg in the solid phase, an equivalent reduction of 84.1%-99.9% (aqueous phase) and 74.8%-100% (solid phase), respectively. When aqueous and solid phases are combined, 1,4-D mass reduction achieved (Figure 1) was 85.6%-99.9% when compared to "Control". An increasing trend in 1,4-D percent mass reduction was observed with increasing reagent doses. Once again, the optimum dose in terms of mass reduction per unit of oxidant (Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>) consumed appeared to be in the vicinity of the medium dose, which achieved 96.8% mass reduction whereas the highest dose achieved 99.9% mass reduction as shown in Figure 1.
- Using CHASP (with base), 1,4-D levels in the aqueous phase were treated from 223 µg/l to a range of 184-222 µg/l in low and medium doses reactors but increased

to 234 µg/l in the high dose reactor. In the solid phase, 1,4-D was treated from 88.6 µg/kg to a range of 37.6-72 µg/kg, an equivalent reduction of 18.7%-57.6%. When aqueous and solid phases are combined, 1,4-D mass reduction achieved (Figure 1) was 5.3%-28.1% when compared to "Control". The optimum dose appeared to be in the vicinity of the medium dose at Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, which achieved a mass reduction of 28.1%.

- Using CHASP (without base), 1,4-D levels were treated from 223 µg/l to 10.6 µg/l in the aqueous phase and from 88.6 µg/kg to 6.1 µg/kg in the solid phase for an equivalent reduction of 95.2% in the aqueous phase and 96.5% in the solid phase. When aqueous and solid phases are combined, 1,4-D mass reduction achieved was 96.5% when compared to "Control." Other doses were not evaluated for this reagent type but based on the behavior of other reagents, the optimum dose is likely to be in the vicinity of the medium dose at Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, which achieved a mass reduction of 96.5%.

Overall, results indicate that significantly superior treatment of 1,4-D is achieved using CHASP when carbohydrates activation is used without base when compared to with base although when used in combination with MFR (i.e. MFR+CHASP), the results were not affected by the presence of base in CHASP.

Final pH values were at 7.15 in control reactor, range of 3.31-5.97 in MASP reactors, range of 3.24-6.18 in MFR+CHASP reactors range of 4.45-5.80 in CHASP reactors (with base), and 4.31 in CHASP reactor (without base). Overall, pH values indicate increasing acidity in the treatment reactors when compared to the control reactor, and more acidic pH values were measured with increasing persulfate concentration. This was expected due to sulfuric acid generation during persulfate activation/decomposition. The final pH values appear to indicate that the soils tested exhibit limited buffering capacity against pH drop in the lab reactors. Nonetheless, under the field conditions, the pH drops are typically temporary in nature as significant dilution of any sulfuric acid generated will occur due to free groundwater flow conditions. It is also possible to increase the concentration/volume of base buffer and/or adjust the pH of the chelated iron catalyst to offset the acidity produced from persulfate decomposition.



### 5.2.2 TOD Evaluation

TOD data shown in Table 2 and Figure 3 indicate that  $\text{Na}_2\text{S}_2\text{O}_8$  consumption was 77.5%-98.0% in MASP, 84.2%-97.9% in MFR+CHASP and 62.5%-76.6% in CHASP (with base), and 80% in CHASP (no base). TOD of  $\text{Na}_2\text{S}_2\text{O}_8$  estimated for each reagent is summarized in the table below. As discussed in Section 5.2.1 and shown in Figure 2, the optimal dose for field scale up appears to be in the vicinity of the medium dose and hence the

corresponding TOD values should be used although using higher TOD values is improving 1,4-D reduction to ND levels for all reagents except for CHASP (with base).

#### TOD Estimation

Reagent Dose >>	Low	Medium	High
MASP	0.39 g/kg	1.23 g/kg	2.42 g/kg
MFR+CHASP	0.42 g/kg	1.22 g/kg	2.45 g/kg
CHASP (with base)	0.77 g/kg	1.56 g/kg	3.34 g/kg
CHASP (no base)		2.00 g/kg	

#### 5.2.3 Metals Test

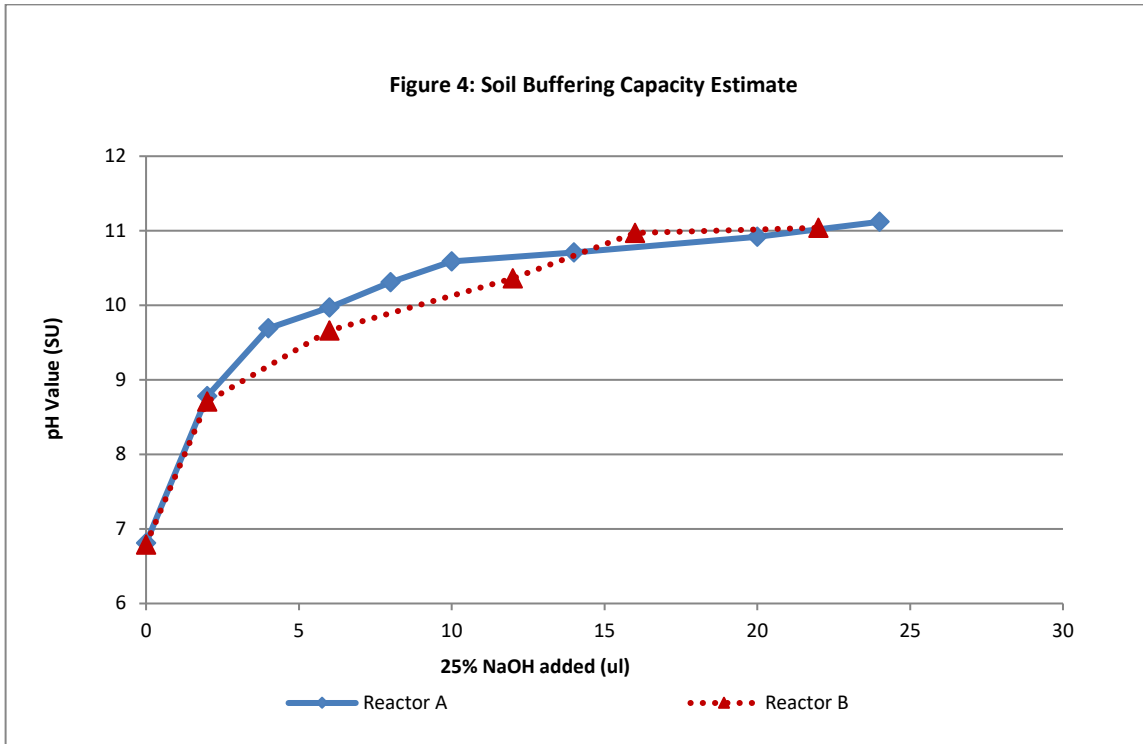
Table 3 summarizes the results of Metal-test, which evaluated changes in metal concentrations in the aqueous phase following the high dose application (i.e. metal mobilization under the worst-case dosage scenario) over the 5-day testing period. All analytical samples for metal/sulfate analyses were filtered via vacuum filtration at a pore size of 0.45 micron to minimize interference from sample turbidity. An increase in the aqueous phase concentration may be an indication of the potential for metals mobilization. Following all reagents applications, As and Pb concentrations remained at ND levels though the laboratory detection limit increased from 3.0 µg/l to 75 µg/l due to turbidity. Levels of Cd remained at ND (<3.0 µg/l) following CHASP application while slightly increasing from <3.0 µg/l to 5.9 µg/l in the MASP reactor and to 3.3 µg/l in the MFR+CHASP reactor. Increases in Cr and Fe were observed following all 3 reagents applications. Cr increased from <10 µg/l to 111 µg/l, 68.5 µg/l, and 27.5 µg/l, respectively for MASP, MFR+CHASP, and CHASP indicating some mobilization. Fe increased sharply from <100 µg/l to 284,000 µg/l for MASP and to 172,000 µg/l for MFR+CHASP, which was expected as Fe was a component of the activator used for MASP and MFR+CHASP. The reason for the Fe increase noted in the CHASP reactor (from <100 µg/l to 44,100 µg/l) is unclear but may be coming from the associated soils in the slurry matrix.

Sulfate levels increased from 14 mg/l in "Control" to 3,920 mg/l, 3,800 mg/l, and 8,880 mg/l, respectively for MASP, MFR+CHASP, and CHASP, which is expected as sulfate is a byproduct of sodium persulfate decomposition.

Although metal increases occurred, the increases noted are believed to be temporary in nature based on ISOTEC's experience with metals concentrations typically returning to background levels in a matter of months following ISCO application once aquifer equilibration has occurred and redox conditions are normalized. Furthermore, it may be noted that these results represent the worst-case scenario based on the highest dosage level evaluated.

### 5.2.4 Soil Buffering Capacity Test

Results of soil base buffering capacity test are presented in **Table 4** and illustrated in **Figure 4**. Soil base buffering capacity was estimated using 25% NaOH solution. The estimated average base buffering capacity was 4.6 ml/kg (4.60 milliliters of 25% NaOH per kilogram of soil) for site soil, which appears to be on the high side meaning a high quantity of base is required to raise the pH of the soil slurry. Therefore, base activation would not be recommended for field application.



## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Results of the bench scale treatability study indicate that all tested reagents promoted active treatment of 1,4-D with MASP and MFR+CHASP achieving up to 99.9% 1,4-D mass removal, and CHASP (no base) achieving 95.2% when compared to CHASP (with base). However, substantial residual oxidant (23%-37%) remained in the CHASP reactors, which could continue to yield higher 1,4-D reduction given more reaction time.

Metals test indicated slight increases in the aqueous phase concentration of Cd following MASP and MFR+CHASP while Cr increased for all 3 reagents. Based on ISOTEC's past experience, the metals concentrations typically tend to return to background conditions following post-ISCO aquifer equilibration. Buffering capacity test indicated a base buffering capacity of 4.60 ml/kg for site soil.

Based on the treatability study results, MFR+CHASP is recommended as the activation strategy for sodium persulfate. An oxidant dose of 2.50 g/kg (i.e. 1.25+1.25 g/kg) is optimal for field application based on overall 95.9% 1,4-D mass reduction achieved, and the ability of carbohydrates to enhance persulfate activation under field conditions even after MFR has been consumed. Drops in pH values of the subsurface in the immediate areas of injection following reagent applications can be minimized with upward pH adjustments to make up of the chelated iron catalyst; however, based on our past experience the pH is expected to return to background conditions naturally upon aquifer equilibration due to free groundwater flow conditions present at the Site (versus batch reactors in the bench test).

Results of the bench scale study can be used to design a pilot or field scale application of ISCO. An updated field scale treatment program proposal will be issued by ISOTEC under separate cover.



## **TABLES**

**Table 1. Initial Characterization**  
**DOF/Stericycle-Georgetown Facility, Seattle, WA**  
**ISOTEC Project #802476**

<b>Sample ID Matrix</b>	<b>CG-127-65-75 GW (ug/l)</b>	<b>Soil Comp (50'-60' bgs) Soil (mg/kg)</b>
<b>1,4-Dioxane</b>	356	0.0323
<b>Total Organic Carbon (TOC)</b>	na	1,230
<b>Iron</b>	3,820	11,100
<b>Manganese</b>	930	103
<b>% Solids</b>	na	80.3

Notes:

mg/kg = milligrams per kilogram      ug/l = micrograms per liter

na = the compound was not analyzed.



**Table 2. VOCs Results**  
**DOF/Stericycle-Georgetown Facility, Seattle, WA**  
**ISOTEC Project #802476**

Sample Description	Initial	Control	MASP			MFR+CHASP			CHASP (with base)			CHASP (no base)
			Low	Medium	High	Low	Medium	High	Low	Medium	High	Medium
Catalyst Used	none	none	Cat-4260	Cat-4260	Cat-4260	Cat-4260 + CH +B	Cat-4260 + CH +B	Cat-4260 + CH +B	CH + B	CH + B	CH + B	CH
Oxidant Used	none	none	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8	Na2S2O8	Na2S2O8	Na2S2O8
Oxidant Added (by weight)	0 g/kg	0 g/kg	0.5+0.5 g/kg	1.25+1.25 g/kg	2.5+2.5 g/kg	0.5+0.5 g/kg	1.25+1.25 g/kg	2.5+2.5 g/kg	1 g/kg	2.5 g/kg	5 g/kg	2.5 g/kg
Experiment Duration (days)	t = 0 day			t = 5 days								
	CG-127-65-75		Aqueous phase (ug/l)									
1,4-Dioxane (1,4-D)	356	223	24.6	1.6	0.4	35.4	2.1	0.31	222	184	234	10.6
1,4-D Reduction vs Control		-	89.0%	99.3%	99.8%	84.1%	99.1%	99.9%	0.4%	17.5%	-4.9%	95.2%
	Soil Comp (50'-60')		Solid phase (ug/kg)									
1,4-Dioxane (1,4-D)	32.3	88.6	16.3	13.2	ND (2.6)	22.3	11.3	ND (2.3)	72	37.6	61.6	6.1
1,4-D Reduction vs Control		-	81.6%	85.1%	100.0%	74.8%	87.2%	100.0%	18.7%	57.6%	30.5%	93.1%
	Mass (Aqueous phase and Solid phase combined)											
1,4-D Mass (ug)*	51.2	40.3	5.2	1.8	0.1	7.4	1.6	0.04	38.2	29.0	31.12	1.41
1,4-D Mass Reduction vs Control		-	87.0%	95.5%	99.9%	81.7%	95.9%	99.9%	5.3%	28.1%	22.8%	96.5%
1,4-D Mass Reduction vs Initial			89.8%	96.5%	99.9%	85.6%	96.8%	99.9%	25.5%	43.4%	39.2%	97.2%
% Oxidant (Na2S2O8) consumption	-	-	77.5%	98.0%	96.8%	84.2%	97.5%	97.9%	76.6%	62.5%	66.8%	80.0%
Total Oxidant Demand (g/kg)	-	-	0.39	1.23	2.42	0.42	1.22	2.45	0.77	1.56	3.34	2.00
Sulfate (mg/l)		14			3,920			8,880			3,800	
Final pH value (SU)	-	7.15	5.97	4.28	3.31	6.18	5.36	3.24	5.61	4.45	5.8	4.31
Final ORP value (mV)	-	44	168	175	205	134	191	264	130	184	299	165

Note:

MFR = Modified Fenton's reagent    MASP = MFR activated sodium persulfate    CHASP = Carbohydrate activated sodium persulfate    B = Base (NaOH)

ug = microgram,    ug/l = micrograms per liter,    ug/kg = micrograms per kilogram,    SU = standard unit,    mV = milli volts

J = The result is less than the quantitation limit but greater than MDL.

In MASP and MFR+CHASP, the oxidant dose was comprised of sodium persulfate and hydrogen peroxide, each at a half of the designated dose

\*mass = (Aqueous Concentration, ug/L x Reactor Aqueous Volume, L) + (Solid Concentration, ug/Kg x Reactor Solids Weight, Kg)

Soils tested in the experiments were composited soils collected from the interval of 50-60 feet below ground surface.

**Table 3. Metals Results**  
**DOF/Stericycle-Georgetown Facility, Seattle, WA**  
**ISOTEC Project #802476**

Sample Description	Control	MASP/High	MFR+CHASP/High	CHASP/High
Catalyst Used	none	Cat-4260	Cat-4260 + CH +B	CH + B
Oxidant Used	none	Na2S2O8 + H2O2	Na2S2O8 + H2O2	Na2S2O8
Oxidant Added (by weight)	0 g/kg	2.5+2.5 g/kg	2.5+2.5 g/kg	5 g/kg
Experiment Duration (days)	t = 5 days			
	Aqueous phase			
<b>Metals_dissolved (ug/l)</b>				
Arsenic (As)	<3.0	<75 <sup>a</sup>	<75 <sup>a</sup>	<75 <sup>a</sup>
Cadmium (Cd)	<3.0	5.9	3.3	<3.0
Chromium (Cr)	<10	111	68.5	27.5
Iron (Fe)	<100	284,000	172,000	44,100
Lead (Pb)	<3.0	<75 <sup>a</sup>	<75 <sup>a</sup>	<75 <sup>a</sup>
Sulfate (mg/l)	<b>14</b>	<b>3,920</b>	<b>3,800</b>	<b>8,880</b>
<b>Final pH value (SU)</b>	<b>7.15</b>	<b>3.31</b>	<b>3.24</b>	<b>5.8</b>
<b>Final ORP value (mV)</b>	<b>44</b>	<b>205</b>	<b>264</b>	<b>299</b>

Note:

MFR = Modified Fenton's reagent    MASP = MFR activated sodium persulfate    CHASP = Carbohydrate activated sodium persulfate    B = Base (NaOH)

ug = microgram,    ug/l = micrograms per liter,    mg/l = milligrams per liter,    SU = standard unit,    mV = milli volts

In MASP and MFR+CHASP, an oxidant dose was comprised of sodium persulfate and hydrogen peroxide, each at 50% of the designated dose.

a: Elevated detection limit due to delution required for high interfering element.

**Table 4. Soil Buffering Capacity Estimate  
Steericycle-Georgetown Facility, Seattle, WA  
ISOTEC Project #802476**

Soil Comp				
	Reactor A		Reactor B	
time	NaOH-25% added (ul)	pH (SU)	NaOH-25% added (ul)	pH (SU)
2/7/2019				
1:30pm		6.81		6.79
	2	8.78	2	8.71
	1	9.32	5	9.66
	1	9.69	5	10.36
	2	9.97	5	10.97
	2	10.31	5	11.11
	2	10.59		
	4	10.92		
	5	11.12		
2:30pm		10.71		11.04
	5	11.64		
3:30pm		11.03		
<b>Total added (ul)</b>	<b>24</b>		<b>22</b>	
<b>Capacity (ml/kg)</b>	<b>4.8</b>		<b>4.4</b>	
<b>Average Capacity (ml/kg)</b>	<b>4.60</b>			

Note:

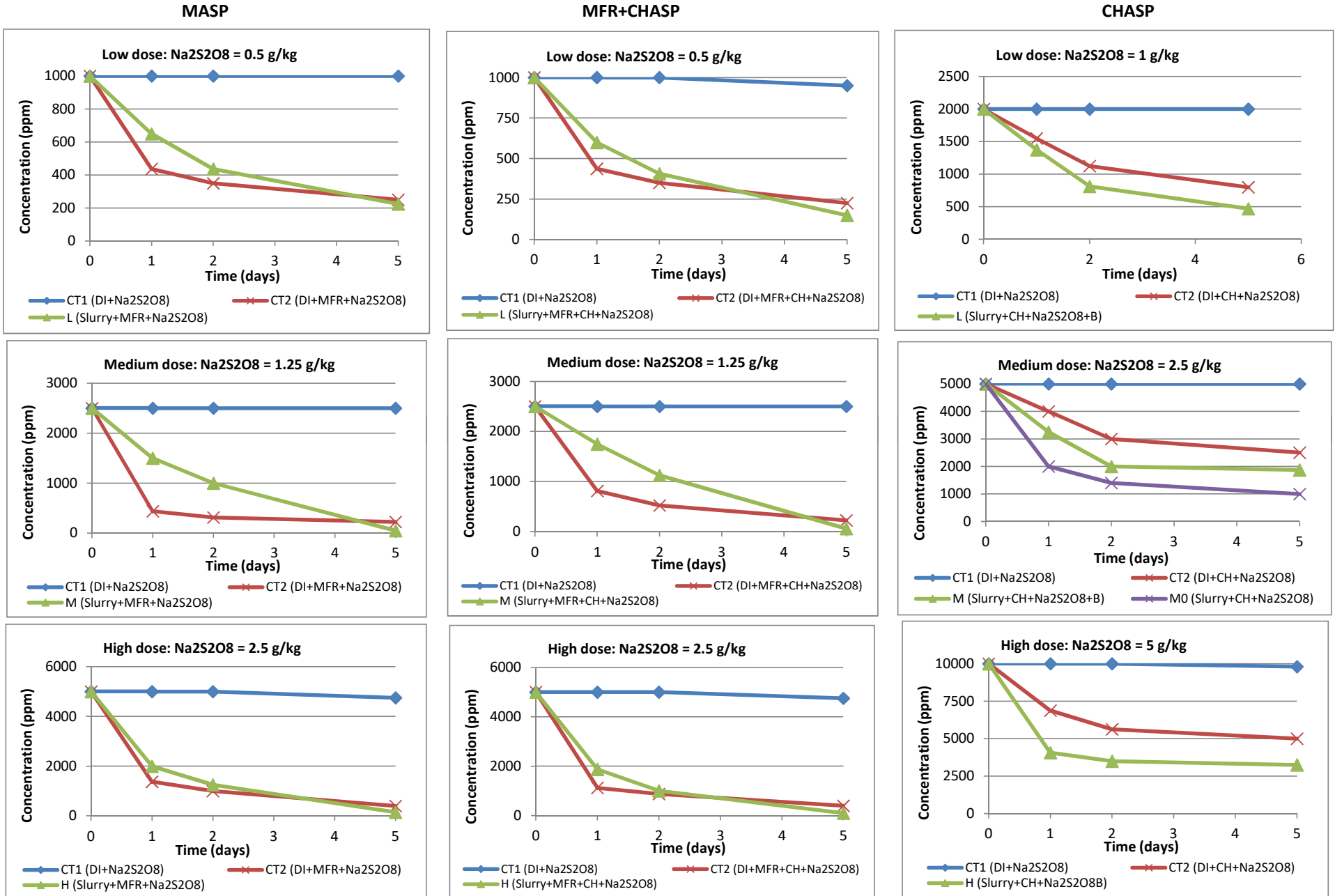
Reactor make up: 5 g-soil + 15 ml-DI

Buffering capacity is present as milliliter of 25% NaOH solution per gram of soil being tested.



## FIGURES

Figure 3. TOD ( $\text{Na}_2\text{S}_2\text{O}_8$ ) Estimates  
 Stericycle-Goergetown Site, Seattle, WA  
 ISOTEC Project #: 802476



Note: In MASP and MFR+CHASP, an oxidant dose was comprised of sodium persulfate and hydrogen peroxide, each contributing 50% of the designated dose.



## **ATTACHMENT A**

LABORATORY ANALYTICAL DATA PACKAGES

The results set forth herein are provided by SGS North America Inc.

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

**Isotec**

**Stericycle Site, WA**

**802476 PO# 5707**

**SGS Job Number: JC81964**

**Sampling Date: 01/29/19**



**Report to:**

**Isotec  
11 Princess Road Suite A  
Lawrenceville, NJ 08648  
YChin@insituoxidation.com**

**ATTN: Yan Chin**

**Total number of pages in report: 13**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

**Brian McGuire  
General Manager**

**Client Service contact: Cynthia Romero 732-329-0200**

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Test results relate only to samples analyzed.

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## Sample Summary

Isotec

Job No: JC81964

Stericycle Site, WA  
Project No: 802476 PO# 5707

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
JC81964-1	01/29/19	10:00 YC	01/29/19	SO	Soil	SOIL COMP
JC81964-2	01/29/19	10:00 YC	01/29/19	AQ	Water	CG-127-65-75
JC81964-2F	01/29/19	10:00 YC	01/29/19	AQ	Water Filtered	CG-127-65-75

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## Summary of Hits

**Job Number:** JC81964  
**Account:** Isotec  
**Project:** Stericycle Site, WA  
**Collected:** 01/29/19

2

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>JC81964-1</b>		<b>SOIL COMP</b>				
1,4-Dioxane		32.3	6.5	2.1	ug/kg	SW846 8260C BY SIM
Iron		11100	60		mg/kg	SW846 6010D
Manganese		103	1.8		mg/kg	SW846 6010D
Total Organic Carbon		1230	120		mg/kg	LLOYD KAHN 1988 MOD
<b>JC81964-2</b>		<b>CG-127-65-75</b>				
1,4-Dioxane		356	8.0	1.9	ug/l	SW846 8260C BY SIM
<b>JC81964-2F</b>		<b>CG-127-65-75</b>				
Iron		3820	100		ug/l	SW846 6010D
Manganese		930	15		ug/l	SW846 6010D

Sample Results

---

Report of Analysis

---

## Report of Analysis

<b>Client Sample ID:</b> SOIL COMP		
<b>Lab Sample ID:</b> JC81964-1		<b>Date Sampled:</b> 01/29/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 01/29/19
<b>Method:</b> SW846 8260C BY SIM		<b>Percent Solids:</b> 80.3
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33835.D	1	01/31/19 13:51	RS	n/a	n/a	V4V1334
Run #2							

	Initial Weight
Run #1	4.8 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	32.3	6.5	2.1	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	118%		40-130%		
460-00-4	4-Bromofluorobenzene	112%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> SOIL COMP	
<b>Lab Sample ID:</b> JC81964-1	<b>Date Sampled:</b> 01/29/19
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 01/29/19
	<b>Percent Solids:</b> 80.3
<b>Project:</b> Stericycle Site, WA	

### Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	11100	60	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D <sup>1</sup>	SW846 3050B <sup>2</sup>
Manganese	103	1.8	mg/kg	1	01/30/19	01/30/19 PP	SW846 6010D <sup>1</sup>	SW846 3050B <sup>2</sup>

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12317

---

RL = Reporting Limit

# Report of Analysis

3.1  
3

<b>Client Sample ID:</b> SOIL COMP	<b>Date Sampled:</b> 01/29/19
<b>Lab Sample ID:</b> JC81964-1	<b>Date Received:</b> 01/29/19
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> 80.3
<b>Project:</b> Stericycle Site, WA	

## General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Solids, Percent	80.3		%	1	01/30/19 17:16	BG	SM2540 G 18TH ED MOD
Total Organic Carbon	1230	120	mg/kg	1	01/30/19 18:52	JO	LLOYD KAHN 1988 MOD

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> CG-127-65-75	<b>Date Sampled:</b> 01/29/19
<b>Lab Sample ID:</b> JC81964-2	<b>Date Received:</b> 01/29/19
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM	
<b>Project:</b> Stericycle Site, WA	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161653.D	1	01/31/19 12:08	RS	n/a	n/a	V3A6989
Run #2	3A161655.D	20	01/31/19 14:38	RS	n/a	n/a	V3A6989

Run #	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	356 <sup>a</sup>	8.0	1.9	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
17647-74-4	1,4-Dioxane-d8	138%	113%	25-195%

(a) Result is from Run# 2

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> CG-127-65-75	<b>Date Sampled:</b> 01/29/19
<b>Lab Sample ID:</b> JC81964-2F	<b>Date Received:</b> 01/29/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Iron	3820	100	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D <sup>1</sup>	SW846 3010A <sup>2</sup>
Manganese	930	15	ug/l	1	01/30/19	01/30/19 PP	SW846 6010D <sup>1</sup>	SW846 3010A <sup>2</sup>

(1) Instrument QC Batch: MA46062

(2) Prep QC Batch: MP12316

RL = Reporting Limit



Misc. Forms

---

Custody Documents and Other Forms

---

Includes the following where applicable:

- Chain of Custody



## SGS Sample Receipt Summary

Job Number: JC81964

Client: \_\_\_\_\_

Project: \_\_\_\_\_

Date / Time Received: 1/29/2019 1:12:00 PM

Delivery Method: \_\_\_\_\_

Airbill #'s: \_\_\_\_\_

Cooler Temps (Raw Measured) °C: Cooler 1: (3.1);

Cooler Temps (Corrected) °C: Cooler 1: (2.8);

**Cooler Security**

- |  |  |
|--|--|
| <p>1. Custody Seals Present: <input checked="" type="checkbox"/> <input type="checkbox"/></p> <p>2. Custody Seals Intact: <input checked="" type="checkbox"/> <input type="checkbox"/></p> | <p>3. COC Present: <input checked="" type="checkbox"/> <input type="checkbox"/></p> <p>4. Smpl Dates/Time OK: <input checked="" type="checkbox"/> <input type="checkbox"/></p> |
|--|--|

**Cooler Temperature**

- |   |  |
|---|--|
| <p>1. Temp criteria achieved: <input checked="" type="checkbox"/> <input type="checkbox"/></p> <p>2. Cooler temp verification: <u>IR Gun</u></p> <p>3. Cooler media: <u>Ice (Bag)</u></p> <p>4. No. Coolers: <u>1</u></p> | <p style="text-align: center;"><b>Y or N</b></p> |
|---|--|

**Quality Control Preservation**

- |                                 |                                     |           |                                     |                          |
|---------------------------------|-------------------------------------|-----------|-------------------------------------|--------------------------|
|                                 | <b>Y</b>                            | <b>or</b> | <b>N</b>                            | <b>N/A</b>               |
| 1. Trip Blank present / cooler: | <input type="checkbox"/>            |           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Trip Blank listed on COC:    | <input type="checkbox"/>            |           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Samples preserved properly:  | <input checked="" type="checkbox"/> |           | <input type="checkbox"/>            | <input type="checkbox"/> |
| 4. VOCs headspace free:         | <input checked="" type="checkbox"/> |           | <input type="checkbox"/>            | <input type="checkbox"/> |

**Sample Integrity - Documentation**

- |  |                                     |           |                          |
|--|-------------------------------------|-----------|--------------------------|
|  | <b>Y</b>                            | <b>or</b> | <b>N</b>                 |
| 1. Sample labels present on bottles:   | <input checked="" type="checkbox"/> |           | <input type="checkbox"/> |
| 2. Container labeling complete:        | <input checked="" type="checkbox"/> |           | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> |           | <input type="checkbox"/> |

**Sample Integrity - Condition**

- |                                  |                                     |           |                          |
|----------------------------------|-------------------------------------|-----------|--------------------------|
|                                  | <b>Y</b>                            | <b>or</b> | <b>N</b>                 |
| 1. Sample recvd within HT:       | <input checked="" type="checkbox"/> |           | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> |           | <input type="checkbox"/> |
| 3. Condition of sample:          | <u>Intact</u>                       |           |                          |

**Sample Integrity - Instructions**

- |  |                                     |           |                                     |                                     |
|--|-------------------------------------|-----------|-------------------------------------|-------------------------------------|
|  | <b>Y</b>                            | <b>or</b> | <b>N</b>                            | <b>N/A</b>                          |
| 1. Analysis requested is clear:            | <input checked="" type="checkbox"/> |           | <input type="checkbox"/>            |                                     |
| 2. Bottles received for unspecified tests: | <input type="checkbox"/>            |           | <input checked="" type="checkbox"/> |                                     |
| 3. Sufficient volume recvd for analysis:   | <input checked="" type="checkbox"/> |           | <input type="checkbox"/>            |                                     |
| 4. Compositing instructions clear:         | <input type="checkbox"/>            |           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear:           | <input type="checkbox"/>            |           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Test Strip Lot #s:      pH 1-12: 206717      pH 12+: 208717      Other: (Specify) \_\_\_\_\_

Comments

SM089-03  
Rev. Date 12/7/17

**JC81964: Chain of Custody**

Page 2 of 2

4.1  
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The results set forth herein are provided by SGS North America Inc.

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

Isotec

Stericycle Site, WA

802476 PO#5707

SGS Job Number: JC82688

Sampling Date: 02/11/19

Report to:

Isotec  
11 Princess Road Suite A  
Lawrenceville, NJ 08648  
YChin@insituoxidation.com

ATTN: Yan Chin

Total number of pages in report: 45



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read "Brian McGuire".

Brian McGuire  
General Manager

Client Service contact: Cynthia Romero 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Test results relate only to samples analyzed.



February 26, 2019

Mr. Yan Chin  
Isotec  
11 Princess Road Suite A  
Lawrenceville, NJ 08648

Re: SGS North America – Dayton, NJ Jobs # JC82688 – Reissues

Dear Mr. Chin,

The final reports for SGS jobs number JC82688 has been edited to reflect corrections to the results. These edits have been incorporated into the revised report which is attached.

Specifically, samples ID of JC82688-13F, -14F, -15F have been revised to reflect matching chain of custody. The attached revised report incorporates these revisions.

SGS apologizes for this occurrence and for any inconvenience this situation may have caused. Please contact me if I can be of further assistance in this matter.

Sincerely,

Report Department

SGS North America Inc.



**CONTINUOUS SERVICE IMPROVEMENT!**

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Member of the SGS Group (SGS SA)

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## Sample Summary

Isotec

**Job No:** JC82688

Stericycle Site, WA  
 Project No: 802476 PO#5707

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
JC82688-1	02/11/19	13:00 YC	02/11/19	AQ	Water	CT AQ
JC82688-2	02/11/19	13:00 YC	02/11/19	AQ	Water	R1 AQ
JC82688-3	02/11/19	13:00 YC	02/11/19	AQ	Water	R2 AQ
JC82688-4	02/11/19	13:00 YC	02/11/19	AQ	Water	R3 AQ
JC82688-5	02/11/19	13:00 YC	02/11/19	AQ	Water	R4 AQ
JC82688-6	02/11/19	13:00 YC	02/11/19	AQ	Water	R5 AQ
JC82688-7	02/11/19	13:00 YC	02/11/19	AQ	Water	R6 AQ
JC82688-8	02/11/19	13:00 YC	02/11/19	AQ	Water	R7 AQ
JC82688-9	02/11/19	13:00 YC	02/11/19	AQ	Water	R8 AQ
JC82688-10	02/11/19	13:00 YC	02/11/19	AQ	Water	R9 AQ
JC82688-11	02/11/19	13:00 YC	02/11/19	AQ	Water	R10 AQ
JC82688-12F	02/11/19	10:00 YC	02/11/19	AQ	Water Filtered	CT AQ FIL
JC82688-13F	02/11/19	10:00 YC	02/11/19	AQ	Water Filtered	R3 AQ FIL

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Soil samples reported on a dry weight basis unless otherwise indicated on result page.



## Sample Summary

(continued)

Isotec

**Job No:** JC82688

Stericycle Site, WA  
 Project No: 802476 PO#5707

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
JC82688-14F	02/11/19	10:00 YC	02/11/19	AQ	Water Filtered	R6 AQ FIL
JC82688-15F	02/11/19	10:00 YC	02/11/19	AQ	Water Filtered	R9 AQ FIL
JC82688-16	02/11/19	10:00 YC	02/11/19	SO	Soil	CT SO
JC82688-17	02/11/19	10:00 YC	02/11/19	SO	Soil	R1 SO
JC82688-18	02/11/19	10:00 YC	02/11/19	SO	Soil	R2 SO
JC82688-19	02/11/19	10:00 YC	02/11/19	SO	Soil	R3 SO
JC82688-20	02/11/19	10:00 YC	02/11/19	SO	Soil	R4 SO
JC82688-21	02/11/19	10:00 YC	02/11/19	SO	Soil	R5 SO
JC82688-22	02/11/19	10:00 YC	02/11/19	SO	Soil	R6 SO
JC82688-23	02/11/19	10:00 YC	02/11/19	SO	Soil	R7 SO
JC82688-24	02/11/19	10:00 YC	02/11/19	SO	Soil	R8 SO
JC82688-25	02/11/19	10:00 YC	02/11/19	SO	Soil	R9 SO
JC82688-26	02/11/19	10:00 YC	02/11/19	SO	Soil	R10 SO

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Soil samples reported on a dry weight basis unless otherwise indicated on result page.



## Summary of Hits

**Job Number:** JC82688  
**Account:** Isotec  
**Project:** Stericycle Site, WA  
**Collected:** 02/11/19

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Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>JC82688-1</b>	<b>CT AQ</b>					
1,4-Dioxane		223	4.0	0.95	ug/l	SW846 8260C BY SIM
<b>JC82688-2</b>	<b>R1 AQ</b>					
1,4-Dioxane		24.6	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-3</b>	<b>R2 AQ</b>					
1,4-Dioxane		1.6	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-4</b>	<b>R3 AQ</b>					
1,4-Dioxane		0.40	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-5</b>	<b>R4 AQ</b>					
1,4-Dioxane <sup>a</sup>		222	4.0	0.95	ug/l	SW846 8260C BY SIM
<b>JC82688-6</b>	<b>R5 AQ</b>					
1,4-Dioxane <sup>a</sup>		184	4.0	0.95	ug/l	SW846 8260C BY SIM
<b>JC82688-7</b>	<b>R6 AQ</b>					
1,4-Dioxane <sup>b</sup>		234	4.0	0.95	ug/l	SW846 8260C BY SIM
<b>JC82688-8</b>	<b>R7 AQ</b>					
1,4-Dioxane		35.4	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-9</b>	<b>R8 AQ</b>					
1,4-Dioxane		2.1	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-10</b>	<b>R9 AQ</b>					
1,4-Dioxane		0.31 J	0.40	0.095	ug/l	SW846 8260C BY SIM
<b>JC82688-11</b>	<b>R10 AQ</b>					
1,4-Dioxane		10.6	0.40	0.095	ug/l	SW846 8260C BY SIM

## Summary of Hits

**Job Number:** JC82688  
**Account:** Isotec  
**Project:** Stericycle Site, WA  
**Collected:** 02/11/19

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>JC82688-12F CT AQ FIL</b>						
Sulfate		14.0	2.0		mg/l	EPA 300/SW846 9056A
<b>JC82688-13F R3 AQ FIL</b>						
Cadmium		5.9	3.0		ug/l	SW846 6010D
Chromium		111	10		ug/l	SW846 6010D
Iron		284000	2500		ug/l	SW846 6010D
Sulfate		3920	40		mg/l	EPA 300/SW846 9056A
<b>JC82688-14F R6 AQ FIL</b>						
Chromium		27.5	10		ug/l	SW846 6010D
Iron		44100	100		ug/l	SW846 6010D
Sulfate		8880	100		mg/l	EPA 300/SW846 9056A
<b>JC82688-15F R9 AQ FIL</b>						
Cadmium		3.3	3.0		ug/l	SW846 6010D
Chromium		68.5	10		ug/l	SW846 6010D
Iron		172000	100		ug/l	SW846 6010D
Sulfate		3800	40		mg/l	EPA 300/SW846 9056A
<b>JC82688-16 CT SO</b>						
1,4-Dioxane		88.6	7.8	2.5	ug/kg	SW846 8260C BY SIM
<b>JC82688-17 R1 SO</b>						
1,4-Dioxane		16.3	7.7	2.5	ug/kg	SW846 8260C BY SIM
<b>JC82688-18 R2 SO</b>						
1,4-Dioxane		13.2	7.2	2.3	ug/kg	SW846 8260C BY SIM
<b>JC82688-19 R3 SO</b>						
No hits reported in this sample.						
<b>JC82688-20 R4 SO</b>						
1,4-Dioxane		72.0	9.3	2.9	ug/kg	SW846 8260C BY SIM

## Summary of Hits

**Job Number:** JC82688  
**Account:** Isotec  
**Project:** Stericycle Site, WA  
**Collected:** 02/11/19

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>JC82688-21</b>	<b>R5 SO</b>					
1,4-Dioxane		37.6	7.4	2.3	ug/kg	SW846 8260C BY SIM
<b>JC82688-22</b>	<b>R6 SO</b>					
1,4-Dioxane		61.6	8.8	2.8	ug/kg	SW846 8260C BY SIM
<b>JC82688-23</b>	<b>R7 SO</b>					
1,4-Dioxane		22.3	9.6	3.1	ug/kg	SW846 8260C BY SIM
<b>JC82688-24</b>	<b>R8 SO</b>					
1,4-Dioxane		11.3	8.4	2.7	ug/kg	SW846 8260C BY SIM
<b>JC82688-25</b>	<b>R9 SO</b>					
No hits reported in this sample.						
<b>JC82688-26</b>	<b>R10 SO</b>					
1,4-Dioxane		6.1 J	9.6	3.0	ug/kg	SW846 8260C BY SIM

(a) Diluted due to high concentration of target compound.

(b) iluted due to high concentration of target compound.

Sample Results

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Report of Analysis

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## Report of Analysis

<b>Client Sample ID:</b> CT AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-1		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161708.D	1	02/13/19 10:59	RS	n/a	n/a	V3A6994
Run #2	3A161732.D	10	02/14/19 12:07	RS	n/a	n/a	V3A6995

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	223 <sup>a</sup>	4.0	0.95	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	134%	82%	25-195%		

(a) Result is from Run# 2

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

32  
3

<b>Client Sample ID:</b> R1 AQ	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-2	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM	
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161729.D	1	02/14/19 10:39	RS	n/a	n/a	V3A6995
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	24.6	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	113%		25-195%		

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R2 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-3		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161713.D	1	02/13/19 13:48	RS	n/a	n/a	V3A6994
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	1.6	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	112%		25-195%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R3 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-4		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161714.D	1	02/13/19 14:17	RS	n/a	n/a	V3A6994
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	0.40	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	111%		25-195%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> R4 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-5		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	3A161743.D	10	02/15/19 14:12	RS	n/a	n/a	V3A6996
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	222	4.0	0.95	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	102%		25-195%		

(a) Diluted due to high concentration of target compound.

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

3.6  
3

<b>Client Sample ID:</b> R5 AQ	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-6	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM	
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	3A161744.D	10	02/15/19 14:41	RS	n/a	n/a	V3A6996
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	184	4.0	0.95	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	96%		25-195%		

(a) Diluted due to high concentration of target compound.

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ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R6 AQ	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-7	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM	
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	3A161745.D	10	02/15/19 15:10	RS	n/a	n/a	V3A6996
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	234	4.0	0.95	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	109%		25-195%		

(a) iluted due to high concentration of target compound.

---

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

## Report of Analysis



<b>Client Sample ID:</b> R7 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-8		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161730.D	1	02/14/19 11:09	RS	n/a	n/a	V3A6995
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	35.4	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	105%		25-195%		

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R8 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-9		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161727.D	1	02/14/19 09:28	RS	n/a	n/a	V3A6995
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	2.1	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	78%		25-195%		

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> R9 AQ		
<b>Lab Sample ID:</b> JC82688-10		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM		<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161728.D	1	02/14/19 10:06	RS	n/a	n/a	V3A6995
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	0.31	0.40	0.095	ug/l	J
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	101%		25-195%		

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R10 AQ		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-11		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260C BY SIM		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3A161731.D	1	02/14/19 11:38	RS	n/a	n/a	V3A6995
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	10.6	0.40	0.095	ug/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
17647-74-4	1,4-Dioxane-d8	110%		25-195%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> CT AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-12F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	< 3.0	3.0	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Cadmium	< 3.0	3.0	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Chromium	< 10	10	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Iron	< 100	100	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Lead	< 3.0	3.0	ug/l	1	02/13/19	02/14/19 ND	SW846 6010D <sup>2</sup>	SW846 3010A <sup>3</sup>

(1) Instrument QC Batch: MA46139

(2) Instrument QC Batch: MA46150

(3) Prep QC Batch: MP12530

RL = Reporting Limit



## Report of Analysis

<b>Client Sample ID:</b> CT AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-12F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sulfate	14.0	2.0	mg/l	1	02/14/19 20:55	NV	EPA 300/SW846 9056A

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R3 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-13F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D <sup>2</sup> SW846 3010A <sup>3</sup>
Cadmium	5.9	3.0	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D <sup>1</sup> SW846 3010A <sup>3</sup>
Chromium	111	10	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D <sup>1</sup> SW846 3010A <sup>3</sup>
Iron	284000	2500	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D <sup>2</sup> SW846 3010A <sup>3</sup>
Lead <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D <sup>2</sup> SW846 3010A <sup>3</sup>

(1) Instrument QC Batch: MA46139

(2) Instrument QC Batch: MA46150

(3) Prep QC Batch: MP12530

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R3 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-13F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sulfate	3920	40	mg/l	20	02/16/19 04:10	NV	EPA 300/SW846 9056A

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R6 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-14F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19 ND	SW846 6010D <sup>2</sup>	SW846 3010A <sup>3</sup>
Cadmium	< 3.0	3.0	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Chromium	27.5	10	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Iron	44100	100	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Lead <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19 ND	SW846 6010D <sup>2</sup>	SW846 3010A <sup>3</sup>

(1) Instrument QC Batch: MA46139

(2) Instrument QC Batch: MA46150

(3) Prep QC Batch: MP12530

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R6 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-14F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sulfate	8880	100	mg/l	50	02/17/19 11:15	NV	EPA 300/SW846 9056A

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R9 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-15F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19 ND	SW846 6010D <sup>2</sup>	SW846 3010A <sup>3</sup>
Cadmium	3.3	3.0	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Chromium	68.5	10	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Iron	172000	100	ug/l	1	02/13/19	02/13/19 ND	SW846 6010D <sup>1</sup>	SW846 3010A <sup>3</sup>
Lead <sup>a</sup>	< 75	75	ug/l	25	02/13/19	02/14/19 ND	SW846 6010D <sup>2</sup>	SW846 3010A <sup>3</sup>

(1) Instrument QC Batch: MA46139

(2) Instrument QC Batch: MA46150

(3) Prep QC Batch: MP12530

(a) Elevated detection limit due to dilution required for high interfering element.

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> R9 AQ FIL	<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-15F	<b>Date Received:</b> 02/11/19
<b>Matrix:</b> AQ - Water Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> Stericycle Site, WA	

### General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sulfate	3800	40	mg/l	20	02/16/19 04:58	NV	EPA 300/SW846 9056A

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> CT SO		
<b>Lab Sample ID:</b> JC82688-16		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 72.4
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33852.D	1	02/13/19 13:55	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	4.4 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	88.6	7.8	2.5	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	104%		40-130%		
460-00-4	4-Bromofluorobenzene	100%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> R1 SO		
<b>Lab Sample ID:</b> JC82688-17		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 71.9
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33853.D	1	02/13/19 14:27	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	4.5 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	16.3	7.7	2.5	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	99%		40-130%		
460-00-4	4-Bromofluorobenzene	99%		42-114%		

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R2 SO	
<b>Lab Sample ID:</b> JC82688-18	<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035	<b>Percent Solids:</b> 72.7
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33857.D	1	02/13/19 16:35	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	4.8 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	13.2	7.2	2.3	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	97%		40-130%		
460-00-4	4-Bromofluorobenzene	95%		42-114%		

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R3 SO		
<b>Lab Sample ID:</b> JC82688-19		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 72.3
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33858.D	1	02/13/19 17:06	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	4.3 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	ND	8.0	2.6	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	91%		40-130%		
460-00-4	4-Bromofluorobenzene	86%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R4 SO		
<b>Lab Sample ID:</b> JC82688-20		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 72.9
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33859.D	1	02/13/19 17:38	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	3.7 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	72.0	9.3	2.9	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	96%		40-130%		
460-00-4	4-Bromofluorobenzene	96%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R5 SO		
<b>Lab Sample ID:</b> JC82688-21		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 73.6
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33860.D	1	02/13/19 18:09	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	4.6 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	37.6	7.4	2.3	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	87%		40-130%		
460-00-4	4-Bromofluorobenzene	91%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R6 SO	
<b>Lab Sample ID:</b> JC82688-22	<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035	<b>Percent Solids:</b> 72.9
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33861.D	1	02/13/19 18:41	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	3.9 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	61.6	8.8	2.8	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	80%		40-130%		
460-00-4	4-Bromofluorobenzene	84%		42-114%		

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R7 SO	
<b>Lab Sample ID:</b> JC82688-23	<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil	<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035	<b>Percent Solids:</b> 72.2
<b>Project:</b> Stericycle Site, WA	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33862.D	1	02/13/19 19:13	RS	02/12/19 09:00	n/a	V4V1336
Run #2							

	Initial Weight
Run #1	3.6 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	22.3	9.6	3.1	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	83%		40-130%		
460-00-4	4-Bromofluorobenzene	90%		42-114%		

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> R8 SO		
<b>Lab Sample ID:</b> JC82688-24		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 72.7
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33869.D	1	02/14/19 10:48	RS	02/12/19 09:00	n/a	V4V1337
Run #2							

	Initial Weight
Run #1	4.1 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	11.3	8.4	2.7	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	106%		40-130%		
460-00-4	4-Bromofluorobenzene	112%		42-114%		

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> R9 SO		<b>Date Sampled:</b> 02/11/19
<b>Lab Sample ID:</b> JC82688-25		<b>Date Received:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Percent Solids:</b> 72.1
<b>Method:</b> SW846 8260C BY SIM SW846 5035		
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33870.D	1	02/14/19 11:20	RS	02/12/19 09:00	n/a	V4V1337
Run #2							

	Initial Weight
Run #1	4.8 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	ND	7.2	2.3	ug/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	102%		40-130%		
460-00-4	4-Bromofluorobenzene	113%		42-114%		

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> R10 SO		
<b>Lab Sample ID:</b> JC82688-26		<b>Date Sampled:</b> 02/11/19
<b>Matrix:</b> SO - Soil		<b>Date Received:</b> 02/11/19
<b>Method:</b> SW846 8260C BY SIM SW846 5035		<b>Percent Solids:</b> 72.6
<b>Project:</b> Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4V33871.D	1	02/14/19 11:52	RS	02/12/19 09:00	n/a	V4V1337
Run #2							

	Initial Weight
Run #1	3.6 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
123-91-1	1,4-Dioxane	6.1	9.6	3.0	ug/kg	J
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
2037-26-5	Toluene-D8	93%		40-130%		
460-00-4	4-Bromofluorobenzene	95%		42-114%		

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

Misc. Forms

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Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody

WV  
SLL  
SLL

**CHAIN OF CUSTODY**

AV

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Accutest Quote # \_\_\_\_\_ Accutest Job # **JC82688**

Client / Reporting Information		Project Information				Requested Analysis ( see TEST CODE sheet)												Matrix Codes												
Company Name <b>ISOTEC</b>		Project Name <b>Stericycle Site</b>				1,4-dioxane (8260C by SIM)												DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED - Sediment CI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB - Equipment Blank RB - Rinse Blank TB - Trip Blank												
Street Address <b>11 Prncell Road, Suite A</b>		Street <b>WA</b>																												
City State Zip <b>Lawrenceville NJ 08648</b>		City State <b>WA</b>																												
Project Contact <b>Yan Chin ychin@insituoxidation.com</b>		Project # <b>802476</b>																												
Phone # <b>609-843-0485</b>		Client Purchase Order # <b>5707</b>																												
Samplers Name(s) <b>Yan Chin</b>		Project Manager																												
Turnaround Time ( Business days)		Data Deliverable Information																	Comments / Special Instructions											
<input checked="" type="checkbox"/> Std. 10 Business Days <input type="checkbox"/> 5 Day RUSH <input type="checkbox"/> 3 Day EMERGENCY <input type="checkbox"/> 2 Day EMERGENCY <input type="checkbox"/> 1 Day EMERGENCY <input type="checkbox"/> other _____		Approved By (Accutest PM): / Date: _____ <input type="checkbox"/> Commercial "A" ( Level 1 ) <input type="checkbox"/> NYASP Category A <input type="checkbox"/> Commercial "B" ( Level 2 ) <input type="checkbox"/> NYASP Category B <input type="checkbox"/> FULLT1 ( Level 3+4 ) <input type="checkbox"/> State Forms <input type="checkbox"/> NJ Reduced <input type="checkbox"/> EDD Format <input type="checkbox"/> Commercial "C" <input checked="" type="checkbox"/> Other <u>Results only</u>																	Please use the lowest MDL possible. Water sample for metal analyses was filtered Anticipated 1,4-Dioxane concentrations < 0.01 ug/g <b>INITIAL ASSESSMENT</b> <u>JR 3A</u> <b>LABEL VERIFICATION</b> _____											
Emergency & Rush T/A data available VIA Lablink																														
Sample Custody must be documented below each time samples change possession, including courier delivery.																														
Relinquished by Sampler: <b>1 Yan Chin</b>		Date Time: <b>1/29/2019 1pm</b>		Received By: <b>1 [Signature]</b>		Relinquished By: <b>2 [Signature]</b>		Date Time: <b>1/29/19 11:50</b>		Received By: <b>2 [Signature]</b>		Relinquished by Sampler: <b>3</b>		Date Time: <b>4</b>		Received By: <b>4</b>														
Relinquished by:		Date Time:		Received By:		Custody Seal #		<input type="checkbox"/> Intact    Preserved where applicable <input type="checkbox"/> Not intact <input type="checkbox"/>		On Ice		Cooler Temp.		<b>2.400</b>																

4.1  
4

JC82688: Chain of Custody

Page 1 of 5







- 1) Per client, collection date is 2/11/2019.
- 2) Please proceed as noted.

**JC82688: Chain of Custody**  
**Page 5 of 5**



# Appendix E

**Appendix E - Recent 1,4-Dioxane Data  
Stericycle Georgetown**

122-60		122-75		122-60		128-80		128-70		128-45		127-75		161-60		165-45	
6/30/2016	310	7/7/2016	150	7/7/2016	210	2/20/2013	130	11/4/2009	96	2/20/2013	400	8/26/2015	760	2/20/2013	330	2/20/2013	320
7/7/2016	210	7/14/2016	130	7/14/2016	360	5/15/2013	130	11/9/2010	70	5/15/2013	420	2/16/2016	730	5/15/2013	490	5/15/2013	290
7/14/2016	360	8/4/2016	120	8/4/2016	300	8/22/2013	140	2/8/2012	63	8/22/2013	370	8/15/2016	810	8/22/2013	340	8/22/2013	250
8/4/2016	300	8/15/2016	120	8/15/2016	280	11/12/2013	130	8/30/2012	72	11/12/2013	400	2/20/2017	590	11/12/2013	560	11/12/2013	290
8/15/2016	280	2/20/2017	170	9/29/2016	240	2/26/2014	120	2/20/2013	49	2/26/2014	340	5/4/2017	755	2/26/2014	460	2/26/2014	230
9/29/2016	240	6/6/2017	160	2/20/2017	210	8/20/2014	110	8/22/2013	64	8/20/2014	350	6/15/2017	760	8/20/2014	410	8/20/2014	220
2/20/2017	210	7/19/2017	100	6/6/2017	290	2/16/2015	120	2/26/2014	59	2/16/2015	310	6/22/2017	780	2/16/2015	450	2/16/2015	220
6/6/2017	290	8/20/2017	93	7/19/2017	250	8/26/2015	140	8/20/2014	72	8/26/2015	360	6/29/2017	780	8/26/2015	520	8/26/2015	240
7/19/2017	250	8/30/2017	88	8/20/2017	240	2/16/2016	110	2/16/2015	49	2/16/2016	350	7/19/2017	710	2/16/2016	640	2/16/2016	190
8/20/2017	240	9/6/2017	93	8/30/2017	270	8/15/2016	160	8/26/2015	69	8/15/2016	300	9/6/2017	910	8/4/2016	740	8/4/2016	190
8/30/2017	270	11/20/2017	82	11/20/2017	210	2/20/2017	110	2/16/2016	57	2/20/2017	250	9/17/2017	710	2/20/2017	460	2/20/2017	140
11/20/2017	210	2/26/2018	240	2/20/2018	270	8/20/2017	150	8/15/2016	64	8/20/2017	330	12/13/2017	660	9/6/2017	610	9/6/2017	150
2/20/2018	270	3/7/2018	210	2/26/2018	280	3/7/2018	160	2/20/2017	45	3/7/2018	330	3/7/2018	810	3/7/2018	540	3/7/2018	180
2/26/2018	280	5/23/2018	110	5/23/2018	230	9/10/2018	150	8/20/2017	55	9/10/2018	320	9/10/2018	610	9/10/2018	510	9/10/2018	130
5/23/2018	230	9/10/2018	81	8/27/2018	200	3/5/2019	130	2/20/2018	59	3/5/2019	300	1/24/2019	356	3/5/2019	310		
9/10/2018	200	3/5/2019	180	9/10/2018	200			8/30/2018	51			3/5/2019	360				
<b>shrinking</b>		<b>stable</b>		<b>shrinking</b>		<b>stable</b>		<b>shrinking</b>		<b>shrinking</b>		<b>shrinking</b>		<b>stable</b>		<b>shrinking</b>	

131-40		127-40		135-40		135-50		162-80		159-45		160-45		160-65		166-80	
11/4/2009	250	8/20/2014	410	2/20/2013	73	11/13/2007	120	2/20/2013	0.16	2/20/2013	60	2/20/2013	90	2/20/2013	260	2/20/2013	0.16
11/9/2010	220	2/16/2015	19	5/15/2013	80	2/14/2008	120	5/15/2013	0.16	5/15/2013	49	5/15/2013	86	5/15/2013	270	5/15/2013	0.16
2/8/2012	250	8/26/2015	370	8/22/2013	77	11/6/2008	130	8/22/2013	0.16	8/22/2013	54	8/22/2013	100	8/22/2013	250	8/22/2013	1.8
9/5/2012	280	2/16/2016	340	11/12/2013	68	9/5/2012	80	11/12/2013	0.16	11/12/2013	53	11/12/2013	80	11/12/2013	260	11/12/2013	0.16
2/20/2013	240	8/15/2016	350	2/26/2014	49	8/22/2013	64	2/26/2014	0.16	2/26/2014	46	2/26/2014	67	2/26/2014	210	2/26/2014	0.16
8/22/2013	220	2/20/2017	260	8/20/2014	54	8/20/2014	56	8/20/2014	1	8/20/2014	42	8/20/2014	51	8/20/2014	170	8/20/2014	1
2/26/2014	170	5/4/2017	310	2/16/2015	38	8/26/2015	44	2/16/2015	0.26	2/16/2015	50	2/16/2015	47	2/16/2015	180	2/16/2015	1
8/20/2014	190	6/15/2017	330	8/26/2015	44	8/4/2016	28	8/26/2015	0.38	8/26/2015	54	8/26/2015	36	8/26/2015	150	8/26/2015	0.4
2/16/2015	140	6/22/2017	350	2/16/2016	38	8/30/2017	32	2/16/2016	0.49	2/16/2016	110	2/16/2016	45	2/16/2016	200	2/16/2016	0.4
8/26/2015	130	6/29/2017	310	8/4/2016	44	9/5/2018	24	8/4/2016	0.81	8/4/2016	53	8/4/2016	60	8/4/2016	220	8/4/2016	0.4
2/16/2016	120	7/19/2017	320	2/20/2017	21			2/20/2017	0.28	2/20/2017	84	2/20/2017	31	2/20/2017	150	2/20/2017	0.4
8/15/2016	93	8/20/2017	330	8/30/2017	38			9/6/2017	1.3	9/6/2017	53	9/6/2017	67	9/6/2017	230	9/6/2017	0.4
2/20/2017	74	9/17/2017	250	9/10/2018	37			3/7/2018	2.1	3/7/2018	61	3/7/2018	74	3/7/2018	74	3/7/2018	0.4
8/20/2017	75	12/13/2017	340	3/5/2019	36			9/10/2018	2.7	9/10/2018	90	9/10/2018	31	9/10/2018	160	9/10/2018	0.4
2/26/2018	75	2/20/2018	340					3/5/2019	2.8	3/5/2019	110	3/5/2019	50	3/5/2019	140	3/5/2019	0.16
8/29/2018	55	8/30/2018	260														
<b>shrinking</b>		<b>stable</b>		<b>shrinking</b>		<b>shrinking</b>		<b>expanding</b>		<b>expanding</b>		<b>shrinking</b>		<b>shrinking</b>		<b>stable</b>	

BDC-10-40		BDC-10-60		125-40		129-40		132-40		CI-7-60		C-7-40	
5/20/2009	150	5/20/2009	110	11/13/2007	31	11/13/2007	59	11/13/2007	5.3	5/13/2010	100	5/13/2010	87
2/9/2011	100	2/9/2011	92	11/6/2008	26	11/6/2008	64	11/6/2008	7.1	2/9/2011	38	2/9/2011	42
9/5/2012	180	9/5/2012	170	11/4/2009	37	11/4/2009	75	11/4/2009	12	9/5/2012	160	9/5/2012	130
8/22/2013	100	8/22/2013	110	11/9/2010	25	11/9/2010	50	11/9/2010	7.6	8/22/2013	150	8/22/2013	90
8/20/2014	91	8/20/2014	110	9/5/2012	27	9/5/2012	57	9/5/2012	11	2/26/2014	170	8/20/2014	97
8/26/2015	99	8/26/2015	89	8/22/2013	23	8/22/2013	57	8/22/2013	8.6	8/20/2014	160	8/26/2015	93
8/15/2016	110	8/15/2016	77	8/20/2014	14	8/20/2014	61	8/20/2014	8.5	8/26/2015	27	8/15/2016	84
8/20/2017	90	8/20/2017	82	8/26/2015	16	8/26/2015	47	8/26/2015	8.8	9/6/2018	130	8/30/2017	5.1
9/5/2018	75	9/6/2018	41	8/4/2016	11	8/4/2016	47	8/4/2016	9.4			9/6/2018	82
				8/30/2017	11	8/30/2017	47	8/30/2017	10				
				8/28/2018	9.6	8/16/2018	37	9/5/2018	10				
						9/10/2018	37						
<b>shrinking</b>		<b>shrinking</b>		<b>shrinking</b>		<b>shrinking</b>		<b>expanding</b>		<b>stable</b>		<b>stable</b>	

Notes:

- 1 This table summarizes plume stability results calculated using the Mann-Kendall Trend Test as provided by Washington State Department of Ecology in their User Manual: Natural Attenuation Analysis Tool Package for Petroleum-Contaminated Ground Water.
- 2 The stability results are based on input from the most recently available data at the time of Plume Stability Test Calculations.

## Appendix F



# IN-SITU CHEMICAL OXIDATION FOR 1,4-DIOXANE TREATMENT

STERICYCLE GEORGETOWN SITE  
SEATTLE, WA

MARCH 29, 2019

*PREPARED FOR*

DALTON, OLMSTED & FUGLEVAND  
1001 SW KLUCKITAT WAY, SUITE 200B  
SEATTLE, WA

ISOTEC PROPOSAL NO. 802476

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*SBA Certified Small Business*



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## FIGURES

FIGURE 1 .....	ISCO CONCEPTUAL DESIGN
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## **1.0 INTRODUCTION**

In-Situ Oxidative Technologies, Inc., (ISOTEC) is pleased to offer this cost estimate for *In-Situ* Chemical Oxidation (ISCO) for treatment of 1,4-dioxane for the Stericycle Georgetown Site in Seattle, WA. ISOTEC has prepared this ISCO proposal to treat the localized areas identified by DOF. Technical details for the ISCO approach are presented below based on the site characteristics and contaminant information provided by DOF. The ISCO approach is directed by results and observations of the Bench Scale Treatability Test performed by ISOTEC in February 2019.

### **1.1 Site Setting**

The site is located within a high developed area in Seattle. The area is covered with buildings and pavement and limited landscaped areas.

Site soils in the vertical intervals targeted for treatment are composed primarily of poorly graded sand with silt (SP-SM) interbedded with silt lenses with trace organics. The thin lenses of finer grain materials (silt and organic material) are believed to constitute a secondary source for aqueous phase contaminants to groundwater.

Chemical oxidation bench-scale and pilot-scale testing in addition to enhanced bioremediation pilot scale testing have been performed at the site for 1,4-dioxane treatment in 2015 to 2016. Previous bench scale ISCO tests estimated Total Oxidant Demand (TOD) for site soils using sodium persulfate (estimated 1 g/kg) and compared oxidation destruction of 1,4-dioxane using sodium persulfate (unactivated) and PersulfOx (persulfate with silica activator, manufactured by Regenesis). Field ISCO pilot testing included injection of sodium persulfate (no activator added; elevated native iron was proposed for activation) and slow-release persulfate cylinders (sodium persulfate encased within paraffin wax).

ISOTEC performed additional bench scale treatability testing in 2019 with the primary objective to evaluate the treatment effectiveness of 1,4-dioxane using different methods of activated sodium persulfate. The ISOTEC treatability tests were performed with a higher ratio of soil to water than the previous tests to better mimic aquifer conditions. All tested reagents promoted effective 1,4-dioxane treatment with Modified Fenton's Reagent Activated Sodium Persulfate (MASP), Carbohydrate Activated Sodium Persulfate (CHASP) without base, and Modified Fenton's Reagent (MFR) in sequence with CHASP (MFR+CHASP), producing better results than CHASP with added base. For low and medium dosages, persulfate TOD was found to range between approximately 0.5 and 1.5 g/kg, which is consistent with the initial bench scale test. The ISOTEC testing found that natural base buffering capacity appears to be on the high side meaning a large quantity of base is required to raise the pH of the soil slurry. Therefore, base activation of persulfate would not be recommended for field application. Based on the treatability study results, MFR+CHASP is recommended as the activation strategy for sodium persulfate. An oxidant dose of 2.50 g/kg (i.e. 1.25+1.25 g/kg) is optimal for field application based on overall 95.9% 1,4-D mass reduction achieved, and the ability of carbohydrates to enhance persulfate activation under field conditions even after MFR has been consumed.

## 1.2 Chemical Oxidation Objectives

The goal of the ISCO remediation is mass reduction of 1,4-dioxane in the subsurface as stated by DOF. Concentrations of 1,4-dioxane range from approximately 150 to 500 µg/L. The site groundwater concentration goal for 1,4-dioxane is 70 µg/L with an ultimate clean up goal of 2 µg/L at the downgradient receptor.

## 1.3 Treatment Areas

DOF has identified focused areas for ISCO, which are based on access and working in right of ways.

**Table 1: Proposed ISCO Treatment Areas**

Treatment Area / Location	Nearby Well Cluster	Surface Area (sq. ft.)	Treatment Depths (ft bgs)
1 Right of Way West side of Maynard Ave., North of S. Lucile St.	CG-122	200	50 – 60
2 Right of Way on south side of S. Findlay St. (East of 6 <sup>th</sup> Ave. S) and east side of 6 <sup>th</sup> Ave. S. (North of Findlay St)	CG-161	2,200	50 – 60
3 Right of Way on east side of 6 <sup>th</sup> Ave. S. (South of Lucile St.)	CG-128	1,000	35 – 45
4 Right of Way on East Side of 6 <sup>th</sup> Ave. S. (Row near and south of Findlay St.)	CG-127	2,900	35 - 75
Total		6,300	

## 2.0 WHY ISOTEC?

Founded in 1995, ISOTEC has 23 years of environmental remediation experience and is well qualified to complete the proposed ISCO work. Our technical staff and field crew have intimate knowledge of remediation using catalyzed hydrogen peroxide, sodium persulfate and combinations of oxidants for successful full-scale ISCO application for recalcitrant contaminants.

- ISOTEC has experience implementing more than 1,000 field scale ISCO applications, including some of the largest persulfate injections performed in the United States (see example projects in **Table 2**).
- ISOTEC is committed to maintaining the highest-level health and safety protocols. ISOTEC has 23 years of performing chemical injections with zero accidents/OSHA reportable



incidents safety record. ISOTEC has a Grade A rating with ISNET World and an EMR rate of 0.935-0.944 for the last three years.

- ISOTEC was one for the first firms to pioneer the transformation of ISCO from a laboratory technology to field-scale applications. ISOTEC developed the Modified Fenton's Reagent process for catalyzing hydrogen peroxide in a controlled manner, and have more than two decades of injecting hydrogen peroxide safely and successfully remediating contaminated sites.
- ISOTEC does not advocate any single technology or amendment line and can offer the optimal technologies/amendments to match site setting, contaminants and concentrations, objectives, and time lines.
- Our key project personnel (Project Manager, Project Engineer, Site Supervisor, Injection Specialists) have more than 50 years of combined experience with in-situ remediation. Our staff will be comprised of injection specialists, including ISOTEC site supervisors who have more than 10 years of focused injection experience.
- ISOTEC's team of engineers, geologists, scientists, and field service technicians offer a full-suite of implementation, design assistance, and data evaluation tools to projects. Careful attention is provided by the field team in collecting data to evaluate injection operations and distribution of injected materials. The team routinely supports clients in making adjustments during a remedial program based on field observations to optimize remedial performance.
- ISOTEC specializes in implementing in-situ remediation at active and sensitive sites, including in active parking lots and active roadways. Recent work in the last 18 months has included
  - ISCO injections at night within a big box store
  - ISCO injection at an active development site in downtown Seattle
  - Enhanced bioremediation injections within a busy parking lot and access road at a site containing an operational bank and fast food restaurant
  - Enhanced bioremediation injections at an active airport
  - Enhanced bioremediation injection in a very active school parking lot while school was in session
  - ISCO injection in a parking lot in a busy downtown area just north of Boston

A description of sites detailing the various remediation technologies we have implemented is provided in **Table 2**.

- One of ISOTEC's partners operates a laboratory, and through this partnership ISOTEC can offer laboratory analyses at no cost for Remedial Design Characterization and performance evaluation. This value-added service is vital to finalize treatment areas, identify and target vertical intervals with higher contaminant mass, to optimize remedial dosage, and assess performance.

**Table 2: Relevant Project Listing**

Site	Description
Ottati & Goss Superfund Site, NH	ISOTEC performed two rounds of ISCO injection for a Superfund Site that was the largest persulfate injection performed at the time (148,000 and 69,000 gallons injected) for successful treatment of chlorinated volatile organic compounds, petroleum hydrocarbons, and 1,4-dioxane. Oxidation approach was based on Base Activated Sodium Persulfate (BASP), and Modified Fenton's Reagent (MFR, chelated iron catalyzed hydrogen peroxide) was incorporated into the follow-up injection to enhance desorption and oxidation of contaminants. ISOTEC Senior Engineer was the lead remediation designer for the whole project that applied a total of 647,000 lbs. of sodium persulfate.
Former Manufacturing Site Teterboro, NJ	ISOTEC implemented ISCO to address soil and groundwater impacted with VOCs, primarily TCE, cis-DCE, and VC. Baseline TCE levels were as high as 117,000 µg/l in groundwater and 120 mg/kg in soils. Based on results of a successful bench-scale study, the ISCO process utilized MFR activated sodium persulfate (MASP). The total treatment area of 1.3 acres was divided into 13 individual parcels. A total of 2,061 temporary direct-push technology injection point locations were installed at various depths depending on the parcel; 489,865 gallons of ISCO reagents were injected over four events, totaling 217 working days.
Former MGP Site, NY	Injected sodium permanganate in an active roadway and immediately adjacent to apartment buildings in an urban, residential neighborhood. Oxidant and dosage selected based on ISOTEC Treatability Laboratory study. ISOTEC coordinated injection efforts to meet the requirement of local officials for one lane of traffic be open at all times
Ithaca MGP Site, NY	Injected MFR and BASP in an active roadway in an urban, residential neighborhood. Oxidants and dosages selected based on bench-scale studies managed by ISOTEC's Senior Remediation Engineer, and ISOTEC actively collaborated with client/consultant in optimization efforts to improve safety and performance during and in between the three rounds of injection. Three injection events were conducted over a 16-month time period with a total of 38,693 gallons safely injected into the subsurface within a very sensitive site setting.
Crown Cleaners Superfund Site Herrings, NY	ISOTEC implemented ISCO into overburden and bedrock for treatment of PCE in groundwater and soil. BASP was the primary ISCO technology utilized for bedrock treatment of groundwater and was injected via 85 injection wells for treatment of ~25,650 ft <sup>2</sup> . For treatment of overburden soils at the bedrock interface a combination of BASP and MFR were injected via temporary direct-push injection points across a ~10,000 ft <sup>2</sup> area. A total of 28,379 gallons of reagent (22,939 gallons of base activated ~26% sodium persulfate, 3,100 gallons of ~10% stabilized hydrogen peroxide and 1,800 gallons of ISOTEC chelated iron catalyst) were injected. Prior to commencing the injections, ISOTEC completed a base buffering capacity test on samples of groundwater and crushed bedrock collected from the site to determine the most appropriate and effective base to oxidant molar ratio required.

### **3.0 PROJECT APPROACH**

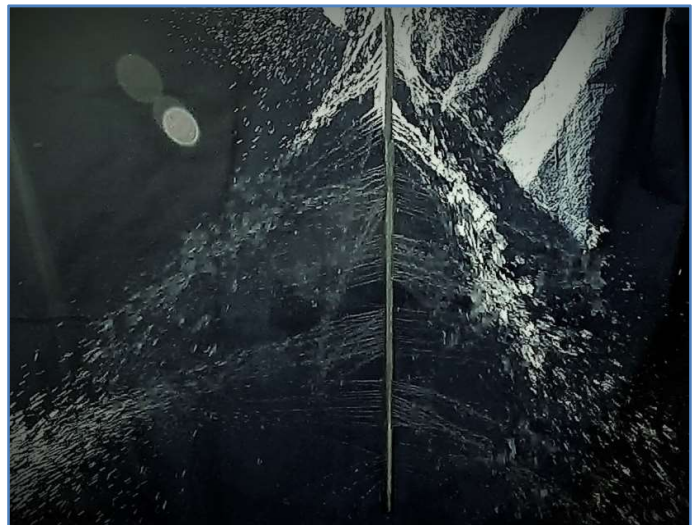
The bench-scale testing performed by ISOTEC as well as previously performed bench scale study and pilot study demonstrated effective treatment of 1,4-dioxane using sodium persulfate. Following the field pilot test injection, reductions in 1,4-dioxane were noted in groundwater monitoring wells, but concentrations reductions were lower than anticipated based on the bench tests. ISOTEC performed an evaluation of the treatment effectiveness of 1,4-dioxane using different methods of activated sodium persulfate to optimize the in-situ remediation strategy. ISOTEC will incorporate several modifications to optimize in-situ treatment of 1,4-dioxane, notably to injection tooling and activation of sodium persulfate. Based on the treatability study results, MFR+CHASP is recommended as the activation strategy for sodium persulfate.

#### **3.1 Delivering Oxidant to Thin Lenses of Fine Grain Soils**

The thin lenses of finer grain materials (silt and organic material) constitute a secondary source for aqueous phase contaminants to groundwater. Delivering the oxidants to the contaminants into the lower permeability lenses and where they are present is critical to remedial success. Field injection tools and approach will be utilized to optimize delivering the oxidant into the thin lenses.

ISOTEC recommends using temporary direct-push technology (DPT) injection points using ISOTEC proprietary laser-cut stainless-steel screens in multiple intervals across the total vertical thickness.

The screens are designed such that the injected reagent material enters the direct push rod and contracts within the ISOTEC screen to create a “pressurized jet flow” that allows the reagent to discharge under low pressure throughout the vertical depth interval of the screen by maintaining a continuous flow that completely fills the entire screen interval. Due to the small diameter (1 cm), a very small volume of water fills the screen (<0.1 gallon) allowing uniform discharge. The ISOTEC screens are available in lengths ranging from one foot to eight feet in length in one-foot increments. In order to focus injection delivery to the thin lenses of finer grain material, ISOTEC would use one-foot or two-foot length screens to preferentially distribute oxidant solutions to that smaller vertical interval and to target as finer grained lenses within.



For targeting thin lenses of finer grain material ISOTEC recommends performing injection under as low a pressure as possible. Fluids injected to porous media tend to follow paths of least resistance and injection under pressure results in most injected fluids going into higher permeability soils. To achieve uniform vertical distribution, ISOTEC prefers to inject at low to moderate pressures. [0 to 20 pounds per square inch (psi)].

Based on the injection point spacing in the pilot test, the overall injection volume was approximately 12% of the total pore volume. ISOTEC recommends injecting a larger volume of water (18-20% of the total pore volume). Higher injection volumes improve delivery, increase contact with 1,4-dioxane, and also allow for a greater treatment footprint as injection points are limited to accessible right of ways.

Temporary injection point spacing would be between 10 and 15 feet, with actual spacing determined by site features above and below ground. Using tighter injection spacing yields more injection points, and more injection points results in more potential contact between the oxidant and 1,4-dioxane in the subsurface. Injection into multiple points (3-4) is recommended, especially for injection with smaller vertical lifts. ISOTEC would advance more temporary injection points than being used for active injection to minimize injection downtime.

### **3.2 Sodium Persulfate Activation**

ISCO with sodium persulfate commonly utilizes an activating agent to produce sulfate free radicals and other oxidizing free radicals that are more powerful oxidants than persulfate. The pilot test injection solution did not include any activator, consistent with the bench scale test, with the intent that naturally occurring iron in the soil would serve as an activating agent. To be an effective oxidizing agent iron needs to be dissolved. Under oxidizing conditions at circumneutral pH (noted from the pilot test monitoring) iron is predominantly in its oxidized state ( $Fe^{3+}$ ) with low solubility due to precipitation of the iron as  $Fe(OH)_3$ . As a result, much of the sodium persulfate oxidation reactions occurring without activation, and therefore without production of sulfate free radicals.

ISOTEC performed an evaluation of the treatment effectiveness of 1,4-dioxane using different methods of activated sodium persulfate to optimize the in-situ remediation strategy. Based on the treatability study results, MFR+CHASP is recommended as the activation strategy for sodium persulfate.

Catalyzed hydrogen peroxide (Modified Fenton's Reagent or MFR) along with sodium persulfate takes advantage of the benefits and strengths of both of these oxidation processes. ISOTEC experience, including bench-scale and field-scale, has shown that MFR activated sodium persulfate and/or sequential applications of MFR and ASP is an effective remediation approach, especially for sites with recalcitrant contaminants like 1,1,1-TCA and 1,4-dioxane. Both MFR and activated sodium persulfate have been demonstrated to treat 1,4-dioxane. In combination, a suite of oxidizing free radicals is generated for oxidation of 1,4-dioxane. In addition, MFR enhances desorption of sorbed contaminant through free radicals, mechanical agitation of soil from gas byproducts, and oxidation of organic matter in soil. Oxidation of organic matter in the finer grained lenses may release 1,4-dioxane into the groundwater to be oxidized by sodium persulfate. The carbohydrate activation uses a food-grade activator. Incorporating chelated iron catalyst as part of the MFR will also allow added iron catalyst and/or native iron in the subsurface to activate sodium persulfate by keeping iron in a dissolved form under oxidizing and circumneutral pH conditions. This would increase the activation of sodium persulfate to generate more sulfate free radicals to achieve greater oxidative destruction of 1,4-dioxane.

### **3.3 Injection Design**

Flow rates of 1 to 2 gallons per minute (gpm) were recorded during the pilot test ISCO injection. ISOTEC anticipates these flow rates can be achieved using direct-push injection screens. Flow rates more likely on the lower portion of this range are anticipated to be used to minimize oxidant delivery to more permeable soils.

The MFR+CHASP ISCO approach will be implemented with a sequential chemical injection at each injection interval:

1. Chelated Iron Catalyst;
2. Stabilized Hydrogen Peroxide;
3. Sodium Persulfate + Carbohydrate Activator.

The chelated iron catalyst and stabilized hydrogen peroxide will constitute approximately 20% and 40% of the injection volume, respectively for each interval. The sodium persulfate with carbohydrate solution will constitute approximately the remaining 40% of the total volume at each interval. ISOTEC recommends a sodium persulfate dosage of 11-12% and a hydrogen peroxide dosage of 9-10%, based on the results of the ISOTEC Treatability Study, which achieves the desirable total oxidant dosage of 2.5 g/kg soil. This sodium persulfate dosage is slightly higher than the previous pilot test.

The treatment program summary is presented in the table below. The treatment plan is estimated to require 18 injection days. To efficiently implement the remediation program ISOTEC will perform the injection events with 10 days on site and 4 days off. This schedule will permit injections to be performed during weekends when traffic and activity in the area are anticipated to be less. ISOTEC will be equipped with the equipment required to complete the scope of work, including but not limited to, dual diaphragm pumps, drum pumps, air compressor, industrial tanks and drums (HDPE), quick disconnect reinforced PVC hoses and ball valves rated for the injection pressures, laser-cut stainless steel screens, industrial mixer motors and propellers, portable generator, injection well heads, box truck/ treatment trailer, and direct push drill rig with tooling and operator. All chemicals and chemical batching will be placed within secondary containment.

All the temporary DPT injection points will be abandoned the same day injection activities have been completed by filling with bentonite chips and hydrating with water or by bentonite grout.

**Table 3: Conceptual Treatment Program Design Summary**

Treatment Area	Surface Area (sq. ft.)	Injection Intervals <sup>1</sup> (ft bgs)	Injection Point Spacing (ft)	Injection Points	Total Injection Volume <sup>2</sup> (gal)
1	200	50 – 60	13 - 18	3 injection wells	700
2	2,200	50 – 60	13 – 18	12 – 15 DPT points	7,700
3	1,000	35 – 45	13 – 18	5 – 7 DPT points	3,500
4 <sup>3,4</sup>	2,900	[35-43, 50-60, 65-75] or [38-52, 58-72]	13 – 18	10 – 13 DPT points	28,400
Total	6,300			30 - 38	40,300

**Notes:**

1. Injection will be performed with DPT injection points using a bottom-up approach. The injection point will be advanced to the deepest identified treatment depth, injection will be performed, and the injection point will be raised to repeat injection. To focus injection delivery to the thin lenses of finer grain material, ISOTEC will use one-foot or two-foot length screens to preferentially distribute oxidant solutions to that smaller vertical interval and to target as finer grained lenses within.
2. Injection volume is an estimate to be finalized between DOF and ISOTEC. Injection volumes may be adjusted in the field. Total injection volume is based on 17 to 19 percent of the total estimated pore volume.
3. Injection points in Area 4 will utilize alternating vertical intervals on adjacent points to apply oxidant over a 40-foot interval. Limited mounding around injection intervals will apply treatment in between injection intervals.
4. DPT injection points in Area 4 may be completed in two adjacent boreholes in order to apply oxidant over a 40-foot interval with small injection screen (one-foot or two-foot length, resulting in 39 to 19 direct-push lifts).

**3.4 ISCO Chemical Safe Reagent Storage, Handling, and Injection**

Multiple reagents for ISCO will be delivered to the site.

- Sodium persulfate will be delivered as dry powder in 55.1 lb. bags on pallets.
- Stabilized hydrogen peroxide will be delivered as a liquid in 55-gallon drums.
- Carbohydrate activator will be delivered to the site as dry powder.

All chemicals will be staged per manufacturer’s guidance and consistent with Safety Data Sheets and ISOTEC protocols. ISOTEC will provide DOF with additional text and guidance regarding chemical storage and health and safety to support DOF’s work plan.

## **4.0 PROJECT COORDINATION**

The project will be managed by ISOTEC Senior Remediation Engineer Paul Dombrowski, P.E. Paul has more than 14 years of experience designing, implementing, and managing remediation injection projects. The ISOTEC Project Field Manager (Kolter Hartman, Kevin O'Neal, Mark Ratner or Thomas Musser) will have a minimum of 10 years of injection experience. The field manager will be supported by ISOTEC injection technicians who have field experience injecting the proposed amendments.

ISOTEC will provide all major equipment and supplies to complete the remediation program, including but not limited to pumps, flow meters, air compressor, portable generators, tanks, hoses, mixers, injection well heads, secondary containment, eye wash station, first aid supplies, and spill kits. The primary subcontractor to be procured by ISOTEC for field implementation activities will be a licensed driller required for injection point installation.

### **4.1 Health and Safety**

ISOTEC processes are some of the safest treatment processes. **ISOTEC has not had a significant health and safety incident in over 24 years of field application.** The processes have been designed with health and safety as a prime consideration.

A site-specific HASP will be prepared and submitted prior to field mobilization. This plan discusses safety monitoring procedures, material handling, storage procedures, etc. A detailed Job Safety Analysis (JSA) will be prepared to identify any potential hazards related to field implementation activities. Daily health and safety tailgate meetings will be held at the ISOTEC trailer prior to start of field activities to discuss JSA potential hazards and identify any new hazards that were encountered during previous day's activities. All members of the injection team have completed health and safety training consistent with the Occupational Safety and Health Act (Title 29 of the Code of Federal Regulations 1910.120) with current certificates. The site supervisor has completed an additional eight hours of OSHA supervisor training. All employees receive an annual physical, drug screening and 8-hour safety refresher course. In addition, all ISOTEC employees have also completed loss prevention system (LPS) training, cardio pulmonary resuscitation (CPR) training, and Transportation Worker Identification Credential (TWIC) training with complete fingerprinting and background checks.

## **5.0 LIST OF ASSUMPTIONS AND EXCEPTIONS**

The following items are excluded from the proposed costs, which are assumed to be DOF's responsibility.

- Site access, injection permits, water supply, road closures and traffic control.
- Baseline, interim and post-treatment performance monitoring and analysis.
- ISOTEC will request state Call 811 – WA Call Before You Dig. Additional utility mark-out is assumed to be DOF's responsibility. It is assumed that injection point locations do not require Air-Knife or similar pre-clearing, which if required, will be performed by DOF.

## 6.0 PROJECT COSTS

Costs associated with the in-situ remediation program are provided below.

<b>ESTIMATED TREATMENT PROGRAM COSTS</b>				
<b>Item (description)</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Cost</b>
<b>ISCO Injections – MFR+CHASP</b> <ul style="list-style-type: none"> <li>• Mobilization demobilization of staff, equipment, and materials to the site to perform the work</li> <li>• Injection of reagents as per Table 3</li> <li>• Includes all staff and equipment to complete the work.</li> <li>• Includes remedial amendments with shipping</li> <li>• Field Implementation – includes site supervisor and 2 technicians (includes drilling personnel) and field injection.</li> <li>• Lockable storage container for oxidant storage</li> <li>• Estimated 18 days field injection</li> <li>• Project management, health and safety plan</li> </ul>	<b>1</b>	<b>LS</b>	<b>\$239,650</b>	<b>\$239,650</b>
<b>Additional Injection Days (if needed including DPT)</b>	<b>1</b>	<b>LS</b>	<b>\$6,850</b>	

### 6.1 Standard Terms and Conditions

1. The above quote is not a guaranteed price to clean up the contamination noted at the referenced site. The number of ISOTEC treatments will be dependent on the amount of contamination and site geology. The higher the concentration of contamination and the tighter the geology, the greater the number of necessary treatments.
2. A typical ISOTEC treatment program is performed over multiple injection events to allow for (a) any desorbed contamination or converted product from the first injection event to be readily attacked during the second injection event, and (b) make changes to the reagent stoichiometry and/or injection approach based on lessons learned from previous events.
3. Treatment program reagent volumes and concentrations presented within this proposal are based on information provided within the RFP. Alternative reagent volumes and concentrations will require a change order.
4. Scheduling is based on a first come first serve basis, with an authorized proposal (or subcontract) being the primary basis for scheduling, followed by payment history. ISOTEC will not schedule fieldwork without an authorized proposal (or subcontract), or outstanding receivables over 30 days.
5. Work to be performed in modified Level D personal protective equipment (PPE). Higher-level PPE requires a change order for additional costs associated with such.
6. Regulatory approval will be the responsibility of Client.
7. Monitoring well installation, site monitoring and pre and post treatment sampling will be the responsibility of Client.

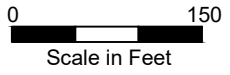
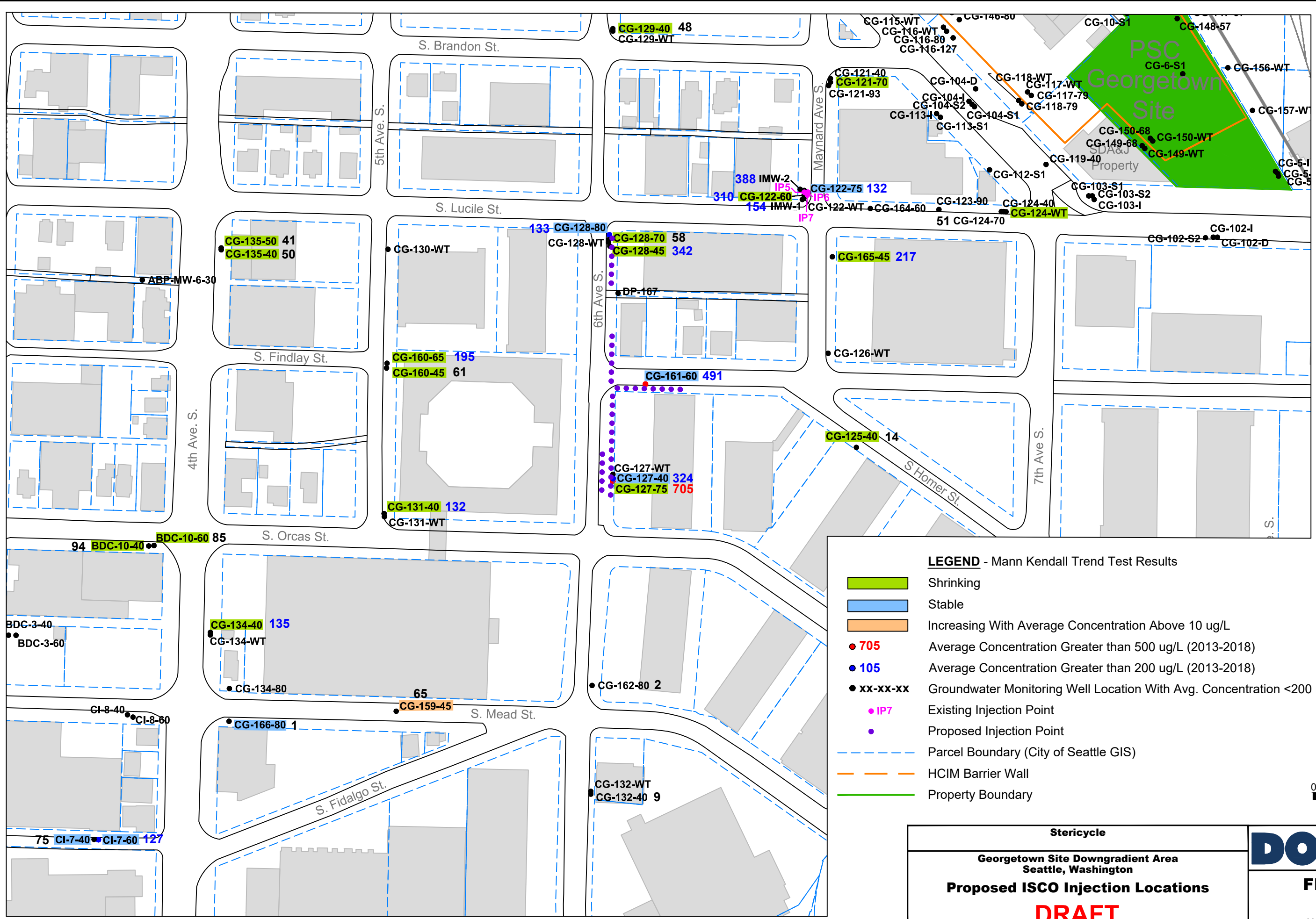


8. Cancellation of a scheduled treatment program within 3 weeks of authorized program start will be subject to a \$10,500 cancellation fee.
9. ISOTEC will require an on-site source (within 200 feet) of water supply (10 gpm minimum) to perform treatment program activities. Access and costs associated with this request will be provided/ incurred by the Client and/or Property Owner.
10. ISOTEC will require adequate and secure staging areas for chemical preparation and storage.
11. Traffic control, if required will be the responsibility of Client.
12. Work performed will be completed during regular business hours between 7 AM and 5 PM, Monday through Saturday. Alternative scheduling will require a change order.
13. Disposal of hazardous wastes and/or reagents collected will be handled by the client. The potential for reagent channeling along utility corridors and other preferential pathways exists with any injection program. ISOTEC is not responsible for seepage or surfacing of reagents and/or hazardous materials into any utility corridor, subsurface collection system or other preferential pathway, nor any costs associated with collection and disposal of such.
14. An initial invoice for reagent procurement will be issued upon approval and authorization of this proposal. Payment terms for this initial invoice is net 30 days. Remaining balance invoices will be submitted monthly proportional to the amount of work performed. Payment terms are net 30 days (unless other terms and conditions apply), 1.5% interest per month will be added to any outstanding balances that exceed 60 days. Price quotations are valid for 90 days. Any legal or other costs incurred in collecting delinquent amounts shall be incurred by the Client.
15. Information included within this proposal is to be considered confidential and for Client use only without written authorization by ISOTEC.
16. Without the prior consent of ISOTEC, Client and any affiliated or related companies will not for a period of 2 years from the date of this proposal and/or signed contract, directly or indirectly solicit for employment or engage as a consultant any person who is now employed by ISOTEC.



## FIGURES

PLOT TIME: 3/27/2019 9:20 AM MOD TIME: 3/27/2019 9:16 AM USER: John Bliss DWG: P:\Stericycle\Georgetown\CAD\Figures\2018-10\2019-03-26 GT ISCO Conceptual Design.dwg



**LEGEND - Mann Kendall Trend Test Results**

- Shrinking
- Stable
- Increasing With Average Concentration Above 10 ug/L
- 705 Average Concentration Greater than 500 ug/L (2013-2018)
- 105 Average Concentration Greater than 200 ug/L (2013-2018)
- xx-xx-xx Groundwater Monitoring Well Location With Avg. Concentration <200 ug/L (2013-2018)
- IP7 Existing Injection Point
- Proposed Injection Point
- Parcel Boundary (City of Seattle GIS)
- HCIM Barrier Wall
- Property Boundary

**Stericycle**  
**Georgetown Site Downgradient Area**  
**Seattle, Washington**  
**Proposed ISCO Injection Locations**  
DRAFT

**DOF** DALTON  
 OLMSTED  
 FUGLEVAND  
**FIGURE**  
**2**  
 March 26, 2019

## **SITE SETUP, REAGENT STORAGE, AND REAGENT PREPARATION PROCEDURE**

### **Purpose**

This procedure defines the techniques and establishes the requirements for the site setup, reagent storage and reagent preparation for injection operations using Modified Fenton's Reagent (combination of hydrogen peroxide and catalyst).

### **Personnel**

ISOTEC Field Team Leader – The ISOTEC Field Team Leader is responsible for ensuring that personnel perform the injection screen installation in accordance with this and other relevant procedures.

ISOTEC Field Personnel – The Field Personnel are responsible for understanding and following this procedure.

ISOTEC Site Safety Officer – The ISOTEC Site Safety Officer (may also be the Field Team Leader) is responsible for the overall health and safety of the project and personnel.

### **Health and Safety**

1. Appropriate precautions shall be taken to minimize personnel exposure to hydrogen peroxide and iron catalyst.
2. Appropriate precautions shall be taken to minimize personnel exposure to the following potential physical hazards:
  - Slips, trips, falls, and protruding objects
  - Temperature extremes
  - Hazardous noise

### **Equipment, Tools, and Supplies**

1. Reagent Preparation Equipment
  - Electric Drum Pumps
  - Electric Mixing Motors
  - Polyethylene tubing
  - Diaphragm pumps
  - Cam-locks
  - PVC drop tubes
  - Air regulators
  - Air dryers
  - Water tanks

- On-site Water Source
- Hydrogen peroxide tanks
- Catalyst tanks
- Air compressor
- Generator

## 2. Chemicals

- 30% Hydrogen Peroxide (aqueous)
- Stabilizer (granular)
- ISOTEC Catalyst A Component (granular)
- ISOTEC Catalyst B Component (granular)
- Sodium Persulfate (granular)
- Carbohydrate (granular)

## 3. Instruments

- Flow meters
- pH strips

## 4. Personal Protective Equipment

- Splash-proof face shield
- Chemical resistant gloves
- Nitrile gloves
- Chemical resistant apron
- NIOSH approved dust mask
- Work clothing
- Eye protection
- Safety-toe boots
- Hardhat (as necessary)
- Hearing protection (as necessary)

## 5. Decontamination Equipment

- Hoses
- Water buckets

## 6. Safety Equipment

- Hand/face washing supplies (one 5-gallon bucket, soap, paper towels)
- Eyewash
- First aid kit
- Type ABC fire extinguisher

## **Field Preparation**

1. The work plan, procedures, and other applicable plans shall be reviewed by the work crew prior to commencing work.
2. Evaluate surrounding work area for additional hazards that may be present and modify work activities accordingly.
3. Store hydrogen peroxide in Department of Transportation approved 55-gallon drums in a box truck or containment area separate from the catalyst components.
4. Store catalyst components in sealed polyethylene drums and/or original manufacture packaging in a box truck or containment area separate from the hydrogen peroxide.

## **Site Setup and Reagent Storage**

### *ISOTEC Field Team Leader*

1. Establish work zone control areas using proper delineation methods such as cones, delineators, caution tape, and/or rope.

### *ISOTEC Field Personnel*

2. Setup at least two box trucks or equivalent containment areas – one for storing and mixing catalyst solution and the second for storing and mixing oxidizer solution.
3. Place two or more tanks in the catalyst truck – one for water, and one or more for mixing catalyst solution.
4. Place two or more tanks in the oxidizer truck – one for water (if water is not stored on the catalyst truck), and one or more for oxidizer solution.
5. Place catalyst and oxidizer mixing tanks on spill containment.

## **Catalyst Solution Preparation**

### *ISOTEC Field Personnel*

1. Note quantity of leftover solution, if any, from previous batch.
2. Fill catalyst mixing tank with the appropriate volume of water.
3. Turn on electric mixing motor.
4. Place Catalyst A granular powder into the catalyst mixing tank.
5. Mix solution until all Catalyst A is dissolved.
6. After Catalyst A is dissolved, add Catalyst B powder to the mixing tank.

7. Continue mixing until all catalyst powder is dissolved and the solution is uniformly mixed.
8. After mixing the solution, it is ready to be introduced into the subsurface.
9. Repeat steps [1] to [8] as necessary to provide catalyst solution for injection.

### **Hydrogen Peroxide Solution Preparation**

#### *ISOTEC Field Personnel*

1. Note quantity of leftover solution, if any, from previous batch.
2. Add required amount of water to oxidizer mixing tank.
3. Add stabilizer granular powder to oxidizer mixing tank.
4. While filling oxidizer tank with water, use drop tube attached to water hose to uniformly mix water and stabilizer.
5. Attach transfer hose to drum pump.
6. Ensure that both transfer hose valves are closed.
7. Insert drum pump into an open drum of 30% hydrogen peroxide and place transfer hose drop tube in oxidizer tank.
8. Open both transfer hose valves.
9. Plug in drum pump and begin pumping.
10. While pumping, use drop tube to uniformly mix the solution in the oxidizer tank.
11. After drum has been emptied, close both transfer hose valves and allow drum pump tube to thoroughly drain.
12. If necessary, transfer drum pump to additional drum of 30% hydrogen peroxide and repeat steps [10] and [11].
13. When finished pumping, flush drum pump and transfer hose with 5 gallons of water.
14. Rinse drum pump tube and drop tube with water.
15. Securely fasten drum pump in designated storage area and allow to air dry.
16. Manually pour any residual 30% hydrogen peroxide left in drums into oxidizer tank.
17. Reseal each drum with threaded bung.
18. After mixing the solution, it is ready to be introduced into the subsurface.
19. Repeat steps [1] to [18] as necessary to provide oxidizer for injection.

## **Activated Sodium Persulfate Solution Preparation**

*ISOTEC Field Personnel*

1. Note quantity of leftover solution, if any, from previous batch.
2. Add required amount of water to oxidizer mixing tank.
3. Add appropriate mass of sodium persulfate powder to oxidizer mixing tank.
4. While filling oxidizer tank with water, use drop tube attached to water hose to uniformly mix water and stabilizer.
5. Add appropriate mass of carbohydrate powder and sodium hydroxide (25%) to the oxidizer mixing tank.
6. After mixing the solution, it is ready to be introduced into the subsurface.
7. Repeat steps [1] to [6] as necessary to provide oxidizer for injection.



## **Chemical Storage and Handling**

ISOTEC employees will handle and store hydrogen peroxide, catalyst and sodium persulfate to complete this project. Material Safety Data Sheets (MSDS) and photos of typical site setup are included as Attachment D. These employees, the injection technicians and the Site Safety Office, have received training in the proper handling and storage of these chemicals. They have also received specific training in the PPE required to handle these chemicals safely. A fire extinguisher will be on-site in the truck at all times.

The chemicals to be used during the treatment program will be delivered to the site at the time of, or directly prior to the arrival of ISOTEC personnel. Chemicals to be delivered include 34% hydrogen peroxide, dry catalyst, stabilizer and sodium persulfate. The 34% hydrogen peroxide will be delivered to the site by a licensed transportation company in DOT approved 55-gallon polyethylene drums. The drums will be transferred onto a secondary containment for storage during the injection activities. The secondary containment will be located in a fenced and secured area within the Stericycle Georgetown facility, located at 5400 Denver Ave South, Seattle, WA. The hydrogen peroxide drums will be properly labeled throughout the treatment program. Dry catalyst, stabilizer will also be delivered by a licensed transportation company. The catalyst and stabilizer will be delivered in pre-packaged bags and stored in 55-gallon poly drums within a separate secondary containment. The sodium persulfate will be delivered in 55-pound bags on pallets. The pallets of sodium persulfate will be transferred to a box truck and staged within the fenced and secured area at the Stericycle facility. The box trucks will remain locked during non-work hours.

## **Reagent Preparation**

Hydrogen peroxide is prepared in a 250-gallon bulk storage Intermediate Bulk Container (IBC) tank and/or 55-gallon poly drum. Water is first added to the tank along with dry stabilizer in a predetermined volume. Hydrogen peroxide is then added to create a 6-10% concentration. An electric drum pump or an air operated double diaphragm pump is used to transfer the hydrogen peroxide into the tank. Two technicians are required to complete this process. One operates the pump and one holds the transfer wand in the tank. Both technicians wear splash shields and gloves while completing the transfer. The ISOTEC reagents are not mixed at the surface. The peroxide and catalyst only come into contact with one another in the subsurface. Precautions are taken, by flushing all equipment with water, between separate injections of each reagent. The maximum temperature rise documented in the subsurface due to the ISOTEC process is 25°F.

The catalyst is also prepared in a 300-gallon bulk storage IBC tank and/or 55-gallon poly drum. To mix catalyst, Catalyst 4260 Component A is added to the mixing tank followed by a predetermined quantity of water and an electric mixer is turned on to mix the solution. Catalyst 4260 Component B1 is then added to the solution and mixing continues. Catalyst component B2 is then added to the solution and mixing continues. Although the mixing process is generally dust free, the technician completing the mixing will wear a dust mask as a precautionary measure.

The sodium persulfate is also prepared in a 300-gallon bulk storage IBC tank and/or poly drum. To mix sodium persulfate, the predetermined amount of sodium persulfate (granular) is added

to the mixing tank followed by a predetermined quantity of water and an electric mixer is turned on to mix the solution. Again, although the mixing process is generally dust free, the technician completing the mixing will wear a dust mask as a precautionary measure.

The bulk storage tanks/55-gallon poly drums utilized to prepare the hydrogen peroxide, catalyst, and sodium persulfate will be stored in such a way that if a spill were to occur they will not come into contact with each other. Specifically, splash containment will be utilized for the hydrogen peroxide, catalyst and sodium persulfate tanks inside the box trucks.

While mixing/transferring chemicals, only ISOTEC personnel will be allowed in the work/ exclusion zones. All visitors will be advised of a safe distance to stay away while these activities are being performed and will be alerted when it is safe to enter that area after the mixing/transferring activities are completed.

### **Equipment Storage**

Injection equipment (i.e. hoses, pumps and tools) will be stored at the Stericycle facility prior to ISOTEC's arrival. During non-work hours, all equipment will be stored in a locked box truck on-site at the Stericycle. Equipment will be removed from the site following the completion of the treatment program.

### **Injection in Active Area**

ISOTEC will employ the use of both permanent injection wells and temporary direct-push injection points to install numerous pathways in the test area. ISOTEC will use a pneumatic diaphragm pump to deliver their reagents into these points. The following Standard Operating Procedure for Injections will be followed. using A DIAPHRAGM pump

- Base of diaphragm pump must be fastened to a structural support to prevent vibration
- Connect transfer hoses. Hose connections, valves, etc. on discharge side of pump must be reinforced and rated for the maximum pressure to be used,
- At the beginning of injecting on each injection point approximately 10 gallons of water will be used for test run to confirm proper operation of pump and equipment leak test,
- Hose connections at reagent suction point, pump inlet, pump discharge, and injection point must be "double-valved" (i.e., two gate valves in succession),
- Inspect transfer lines/hoses, valves, and all connections for wear, damage, and security. Inspections will occur at the beginning of each day during set up, periodically during the day while injecting, and at the end of each day during shutdown. Loose fittings or other damaged equipment will be replaced if needed.
- Transfer hoses on the pressure discharge side must be secured to prevent "spraying" in the event of line breach,
- Connect air compressor lines and pressure regulators to diaphragm pumps; air line ball valve and pump pressure regulator valve should be closed (i.e., no pressure),
- Open ball valve on diaphragm pump air line and increase pressure on pump regulator until pumping begins,
- Confirm operation/leak check of diaphragm pump and transfer hoses using water only,
- Adjust to minimum pressure required to sustain continuous pump flow varying from <5 psi (min.) to 50 psi (max.),

- Upon successful operation/leak check, begin injection of reagents,
- Monitor ground in injection point area, immediately discontinue injection if material surfaces by closing the ball valve located before the diaphragm pump pressure regulator,
- At the completion of a reagent injection cycle, a sufficient volume of water will be injected to rinse the pump, transfer lines and injection point apparatus.
- When finished with an injection sequence, the air compressor will be shut off. The diaphragm pump(s) will continue to operate until the air compressor pressure supply is depleted.
- All exclusion area injection equipment will be disassembled and decontaminated as required.

### **Site Safety Hazards and Working in Active Site**

The site is located within right of way and parking lots in an urban environment adjacent to active roadway with daily vehicular traffic. All personnel should be aware of moving vehicles and alert each other when any moving vehicles are in the vicinity. High visibility safety vests will be worn at all times while on site. Traffic control measures will be implemented to create a safe work zone and to control traffic patterns during work activities within the roadway, parking lot, and pedestrian walkways. Equipment used to delineate work areas and traffic zones include traffic cones, delineators, caution tape, hose ramps, traffic pattern signs and flagmen (as needed). When moving vehicles, equipment, or reagents across the site a spotter will be used to watch for traffic and other hazards that may be present.

On a given day, treatment activities will target a localized group of injection locations to minimize disturbances to traffic patterns, pedestrian walkways, and business operations. The equipment/reagent staging area will be set up near of the injection locations and will be well defined with delineators, traffic cones, and caution tape. Injection locations will be covered with poly sheeting to prevent reagents from contacting field personnel, vehicles and pedestrian traffic in the event surfacing or leaking occurs.

### **House Keeping and Movement of Drill Rigs**

A direct-push drill rig will be utilized for advancing temporary injection points. Before moving a drill rig, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts and other obstacles. Assistance of a spotter will be used when lateral or overhead clearance is close. All loads will be secured before moving a drill rig.

Suitable storage locations should be provided for all tools, materials and supplies so that they can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor, without creating tripping hazards, and without protruding at eye or head level. Pipe, drill rods, bit casings, augers and similar drilling tools should be orderly stacked on racks or sills to prevent spreading, rolling or sliding. Work areas, platforms, walkways, scaffolding and other access ways should be kept free of materials, obstructions and substances such as ice, excess grease or oil that could cause a surface to become slick or otherwise hazardous.

## **REAGENT INJECTION PROCEDURE**

### **Purpose**

This procedure defines the techniques and establishes the requirements for injection of Modified Fenton's Reagent and Activated Sodium Persulfate into the subsurface.

### **Personnel**

ISOTEC Field Team Leader – The ISOTEC Field Team Leader is responsible for ensuring that personnel perform the injection screen installation in accordance with this and other relevant procedures.

ISOTEC Field Personnel – The Field Personnel are responsible for understanding and following this procedure.

ISOTEC Site Safety Officer – The ISOTEC Site Safety Officer (may also be the Field Team Leader) is responsible for the overall health and safety of the project and personnel.

### **Health and Safety**

1. Appropriate precautions shall be taken to minimize personnel exposure to sodium persulfate, hydrogen peroxide and iron catalyst.
2. Appropriate precautions shall be taken to minimize personnel exposure to the following potential physical hazards:
  - Slips, trips, falls, and protruding objects
  - Temperature extremes
  - Hazardous noise

### **Equipment, Tools, and Supplies**

At times it may be necessary to include additional equipment not shown on this list.

1. Injection Equipment
  - Polyethylene tubing
  - Diaphragm pumps
  - Cam-locks
  - PVC drop tubes
  - Air regulators
  - Air dryers
  - Water tanks
  - On-site water Source

- Batch solution tanks
- Catalyst tanks
- Air compressor
- Generator

## 2. Instruments

- Flow meters
- Pressure gauges

## 3. Personal Protective Equipment

- Work clothing
- Eye protection
- Safety-toe boots
- Gloves (leather, nitrile, etc.)
- Hardhat (as necessary)
- Hearing protection (as necessary)

## 4. Decontamination Equipment

- Hoses
- Water buckets

## 5. Safety Equipment

- Hand/face washing supplies (one 5-gallon bucket, soap, paper towels)
- Eyewash
- First aid kit
- Type ABC fire extinguisher

## **Field Preparation**

1. The work plan, procedures, and other applicable plans shall be reviewed by the work crew prior to commencing work.
2. Evaluate surrounding work area for additional hazards that may be present and modify work activities accordingly.
3. Stage sodium persulfate bags, hydrogen peroxide drums, carbohydrate bags, and iron catalyst bags to be injected at an appropriate location and according to Safety Data Sheet instructions. Reactive chemicals will be segregated.
4. Seal existing wells in the vicinity of the injection point with appropriate pipe fittings or hydrostatic seals.
5. Install air compressor and diaphragm pumps per manufacturer's instructions.

6. Install air hose between air compressor and pumps.

## **Reagent Injection**

### *ISOTEC Field Team Leader*

1. Establish work zone control areas using proper delineation methods such as cones, delineators, caution tape, and/or rope.
2. Determine the location for the injection point.
3. Install injection screen per the Injection Screen Installation and Abandonment Procedure

### *ISOTEC Field Personnel*

4. Identify and record depth of injection point on the Injection Log (Attachment A).
  - a. Identify, assign, and record on the Injection Log the unique DPT injection location identifier such as 1I-1 (First Injection Event Point-1).
  - b. Use this nomenclature for assigning the identifiers to each DPT injection location.
5. Connect reagent injection equipment using Attachment B as a guide.
6. Insert drop tube into water tank filled with water.
7. Confirm air control valve is closed.
8. Turn on air compressor and/or generator.
9. Open all reagent injection path valves.
10. Turn on air control valve and set required flow rate.
11. Turn air regulator to required flow rate and record all applicable information on the Injection Log.
12. Inject water into the subsurface.
13. Record volume of water injected, remove drop tube from water tank and insert it into catalyst solution tank (or oxidizer solution tank if oxidizer is to be injected first).
14. Inject catalyst solution into the subsurface.
15. Monitor and document flow rate and pressure at well head and at other wells as appropriate.
16. Record volume of catalyst injected, remove drop tube from catalyst tank, and insert it into the water tank.
17. Inject potable water to flush excess catalyst solution from the injection piping and equipment.
18. Record volume of water injected, remove drop tube from water tank and insert it into the oxidizer solution tank (or catalyst solution tank if oxidizer was injected first).

19. Inject hydrogen peroxide oxidizer solution into the subsurface.
20. Monitor and document flow rate and pressure at well head and at other wells as appropriate.
21. Record volume of oxidizer injected, remove drop tube from tank and insert it into the water tank.
22. Inject potable water to flush excess oxidizer solution from the injection piping and equipment
23. Record volume of water injected.
24. Inject activated persulfate solution (will contain carbohydrate activator and caustic to prevent corrosion of drill rods) into the subsurface.
25. Monitor and document flow rate and pressure at well head and at other wells as appropriate.
26. Record volume of oxidizer injected, remove drop tube from tank and insert it into the water tank.
27. Inject potable water to flush excess oxidizer solution from the injection piping and equipment
28. Close all chemical injection path valves.
29. As necessary, close valve to isolate temporary well from injection hose, and break quick disconnect where reinforced hose connects to well head.
30. As necessary, repeat steps [4] through [27] for additional injection intervals or injection locations.
31. As necessary, vent temporary well into bucket to depressurize the system.
32. Monitor and depressurize system before removing well head.

*ISOTEC Field Team Leader*

33. Abandon injection screen borehole per the Injection Screen Installation and Abandonment Procedure

## **INJECTION METHODOLOGY**

The field ISCO injections will be performed using existing injection wells in Area 1 and temporary, direct-push points using ISOTEC proprietary laser-cut stainless-steel screens in multiple intervals across the total vertical thickness in Areas 2, 3, and 4. For temporary direct-push injection, direct-push rods with 1.5" diameter will be used. The ISOTEC screens are designed such that the injected reagent material enters the direct push rod and contracts within the ISOTEC screen to create a "pressurized jet flow" that allows the reagent to discharge under low pressure throughout the vertical depth interval by maintaining a continuous flow that fills the entire screen interval. Due to the small diameter (1 cm), a very small volume of water fills the screen (<0.1 gallon) allowing uniform discharge. The ISOTEC screens are available in lengths ranging from one foot to eight feet in length in one-foot increments. For the relatively high permeability geology, ISOTEC will utilize two-foot screens to ensure reagent distribution across the target treatment interval.

During the field injection activities, ISOTEC will inject into three to four points simultaneously. A manifold will not be used; each injection point will have a dedicated pump and batch tank, which allows the field team to record specific volume into each point and injection flow rate to each individual point.

### **TEMPORARY INJECTION SCREEN INSTALLATION**

ISOTEC will utilize direct-push technology (DPT) to introduce reagents into the subsurface at Areas 2, 3 and 4 at the site. The target saturated treatment intervals for each area is: 1) Area 2 from 50 to 60 feet bgs, 2) Area 3 from 35 to 45 feet bgs, and 3) Area 4 from 35 to 75 feet bgs.

Injection screen installation will begin with a DPT subcontractor first advancing 1.5-inch threaded steel rods to a target total depth within each Area. Once the proper depth has been attained, a 2-foot long ISOTEC injection screen will be lowered through the center of the rods to the bottom of the rod string and then held in place with down-hole tooling. The rod string will then be retracted 2 feet, which will release an expendable point that is attached to the bottom of the rod string and expose the screen to impacted soils and groundwater in the targeted treatment interval. ISOTEC reagents will then be injected through the temporary injection screen. Following completion of the injections into this interval, the direct-push rods will be retracted 2 feet and injection will begin.

Specifically, at each of the approximately 13 injection locations within Area 2, the rod-string will be advanced to 60 feet bgs. The 2-foot injection screen will be lowered to the bottom of the rod-string and then held in place with the down-hole tooling. The rod-string will then be retracted 2 feet to expose the screen across the 58 to 60 feet bgs interval. Reagent injection will be initiated and following completion of the injections of the target reagent volume, the rod-string will be retracted to expose the screen across the 56 to 58 feet bgs interval. This 2-foot lift procedure will be repeated across the 50 to 60 feet bgs target treatment interval.

The injection procedure at Area 3 will be the same as Area 2 except the specific target treatment interval will be from 35 to 45 feet bgs.



As discussed, Area 4 has a 40-foot thick target saturated treatment interval (35 to 75 feet bgs). The injection screen procedure at Area 3 will vary slightly from the other two areas. Specifically, 6 of the estimated 12 injection locations will break up the 40-foot interval into three separate intervals; 35 to 43 feet bgs, 50 to 60 feet bgs and 65 to 75 feet bgs. The remaining 6 injection locations will be divided into two separate intervals; 38 to 52 feet bgs and 58 to 72 feet bgs. Initially, ISOTEC plans on using one rod-string per location and utilize the 2-foot lift approach. However, due to field observations (elevated injection pressures) and/or time constraints, two rod-strings/boreholes per injection location may be required.

#### **INJECTION EQUIPMENT**

Chemical application equipment consists of varying size storage containers (250-gallon IBCs and 55-gallon poly drums, pneumatic double-diaphragm pumps, regulators, flow meters, 3/4-inch diameter (3/4") reinforced PVC tubing, valves, and cam-lock connectors. Transfer of the reagents from the storage and/or mixing containers to the point of injection will be performed via a double-diaphragm pump. Reagents are conveyed through 3/4" reinforced PVC tubing and connected to the probe rod with a wellhead containing ball valves, cam-lock fittings and a pressure gauge.

All injection equipment is inspected prior to initiating the injection event as well as on a daily basis. In the event that any equipment is observed to need repairs, it will be immediately replaced with backup equipment that is always maintained on-site by ISOTEC.

#### **INJECTION METHOD**

Reagents will be injected into the subsurface at the site using ISOTEC designed direct-push screens or through existing injection wells. Injection of reagents into the injection screens is a seven-step process. In general, ISOTEC will setup on an injection wellhead and inject water into the subsurface, followed by catalyst. Water will then be injected to flush the catalyst away from the screen. Following the water flush, ISOTEC will inject oxidizer into the subsurface. Water will then be injected to flush the oxidizer away from the screen. Following the water flush, ISOTEC will inject the sodium persulfate solution into the subsurface. A final water injection is completed to flush the sodium persulfate from the injection equipment. This process is repeated for each injection interval. The actual order of sequencing, catalyst followed by oxidizer or oxidizer followed by catalyst, may vary from screen to screen based on field observations at the time of injections. A MFR+CHASP injection method schematic detailing the injection method utilizing DPT is included as **Attachment C**.

It is important to note that if surfacing occurs during injections into a particular injection screen, the injection pump will be immediately shut off to limit the amount of liquid escaping to the surface.

Based on the results of the previous ISCO injection activities conducted at the site, it is anticipated that the reagents will be delivered into the subsurface under low to moderate

pressure [0 to 40 pounds per square inch (psi)]. In the event that the injection pressure exceeds 50 psi at a given interval, the injections at that interval will be terminated. The rod-string will then be retracted to the next 2-foot interval and injections will begin.

A design flow rate of approximately 1 to 4 gallons per minute per pump is proposed for field delivery of oxidant into the subsurface. ISCO injection rates and volume of discharge are interrelated to the reaction rates with the contaminants, the contaminant distribution coefficients in the subsurface systems, and the rate of oxidant decomposition within the subsurface. The rate at which the oxidant flow can be injected into the subsurface is initially determined by the soil/aquifer characteristics, or possible premature stoppage due to oxidant material seeping up from monitoring well seals or injection points. Field decisions regarding injection volumes will be based on the subsurface intake, radial effects noted during injection, and the distance of the injection point from the nearest monitoring point.

### **Field Monitoring**

The ISCO field injection activities will be evaluated in the field through test kit measurement of oxidants (sodium persulfate and hydrogen peroxide) and activating chemicals (iron test kit). In addition, ISOTEC will monitor water quality parameters that indicate impacts of the injected oxidants (oxidation reduction potential, specific conductivity, pH, dissolved oxygen, temperature) using a down-hole meter (YSI or similar). Readings will be taken in select monitoring wells prior to injections to establish baseline conditions and then daily throughout the injection activities (depending on oxidant concentrations, YSI readings may be limited during injection activities.)

## **INJECTION POINT INSTALLATION AND ABANDONMENT PROCEDURE**

### **Purpose**

This procedure defines the techniques and establishes the requirements for the installation of ISOTEC's injection screen system.

### **Personnel**

ISOTEC Field Team Leader – The ISOTEC Field Team Leader is responsible for ensuring that personnel perform the injection screen installation in accordance with this and other relevant procedures.

ISOTEC Field Personnel – The Field Personnel are responsible for understanding and following this procedure.

ISOTEC Site Safety Officer – The ISOTEC Site Safety Officer (may also be the Field Team Leader) is responsible for the overall health and safety of the project and personnel.

DPT Probe Operator – Ensures that safe and effective drilling procedures are followed. Ensures training of helper is complete for assigned work. Inspects rig daily and checks all safety devices.

DPT Probe Helper – Performs assigned tasks safely and effectively. Assists probe operator. Performs incidental site work.

### **Health and Safety**

1. Identify location of above ground and below ground utilities before raising mast or commencing drilling.
2. Identify possible pinch points.
3. Wear appropriate hand protection during all tool assembly or disassembly.
4. Inspect rig daily to ensure all fittings are secure.
5. Minimize personnel exposure to the following potential physical hazards:
  - Slips, trips, falls, and protruding objects
  - Temperature extremes
  - Hazardous noise

### **Equipment, Tools, and Supplies**

1. Drilling Equipment and Tooling
  - Track or truck-mounted probe unit

- Probe rod
- Point holders
- Expendable drive points
- Extension rods
- ISOTEC injection screen
- On-site water source

## 2. Borehole Abandonment Materials

- On-site water source
- Bentonite
- Concrete

## 3. Decontamination Equipment

- Pressure washer
- Hoses
- Decon water drums
- Water buckets

## 4. Personal Protective Equipment

- Work clothing
- Eye protection
- Safety-toe boots
- Gloves (leather, nitrile, etc.)
- Hardhat
- Hearing protection

## 5. Safety Equipment

- Hand/face washing supplies (one 5-gallon bucket, soap, paper towels)
- Eyewash
- First aid kit
- Type ABC fire extinguisher

## **Field Preparation**

1. The work plan, procedures, and other applicable plans shall be reviewed by the work crew prior to commencing work.
2. Evaluate surrounding work area for additional hazards that may be present and modify work activities accordingly.
3. Probe operator will complete pre-job and daily inspections of the drill rig.

4. Identify location of aboveground and below ground utilities before raising mast or commencing drilling.

### **Injection Point Installation**

#### *ISOTEC Field Team Leader*

1. Establish work zone control areas using proper delineation methods such as cones, delineators, and/or caution tape.
2. Determine and identify the location for the injection point.
3. Verify the depth of each DPT injection location.

#### *DPT Probe Operator*

4. Set up the DPT equipment and begin direct push of rods.
5. Advance probe rod to the required depth.
6. Upon reaching the required depth, fill the probe rod string with water.
7. Use extension rod to lower the injection screen through the center of the rod string.
8. Verify that the injection screen has been placed at the bottom of the rod string.
9. Use the extension rod to immobilize the injection screen.
10. Retract the rod string until the required length of screen is exposed to impacted soils and groundwater.
11. Remove the extension rod from the rod string.

#### *ISOTEC Field Personnel*

12. Attach a wellhead assembly and other applicable equipment to the uppermost probe rod.
13. Identify and record depth of each location on the Injection Log (Attachment A in Reagent Injection Procedure).
14. Commence reagent injection per the Reagent Injection Procedure.

### **Injection Point Abandonment**

#### *DPT Probe Operator*

1. Pull rod and screen from injection location.
2. Fill abandoned injection location with bentonite chips/grout to a depth of approximately 6 inches below ground surface and concrete to surface.

*ISOTEC Field Personnel*

3. Label abandoned injection location with a tag (with laminated paper, brass, or other approved tags).

**ATTACHMENT A**

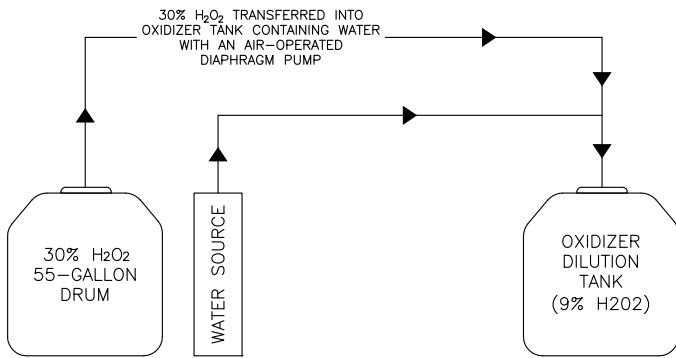




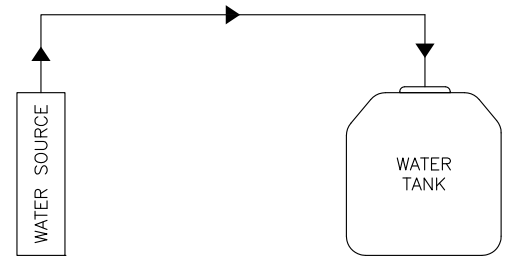
**ATTACHMENT B**

## CATALYZED HYDROGEN PEROXIDE MIXING PROCEDURES

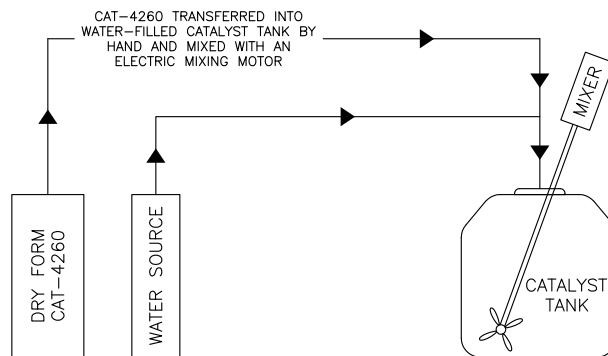
### OXIDIZER TANK PROCEDURES



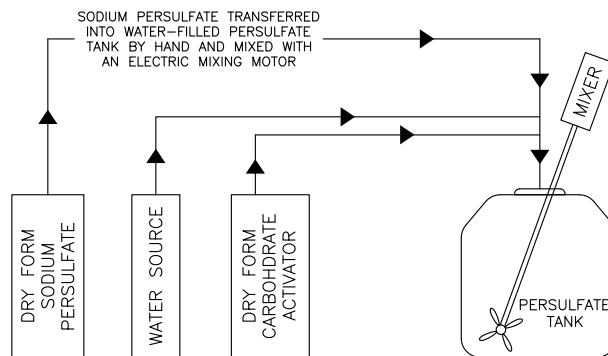
### WATER TANK PROCEDURES



### CATALYST TANK PROCEDURES

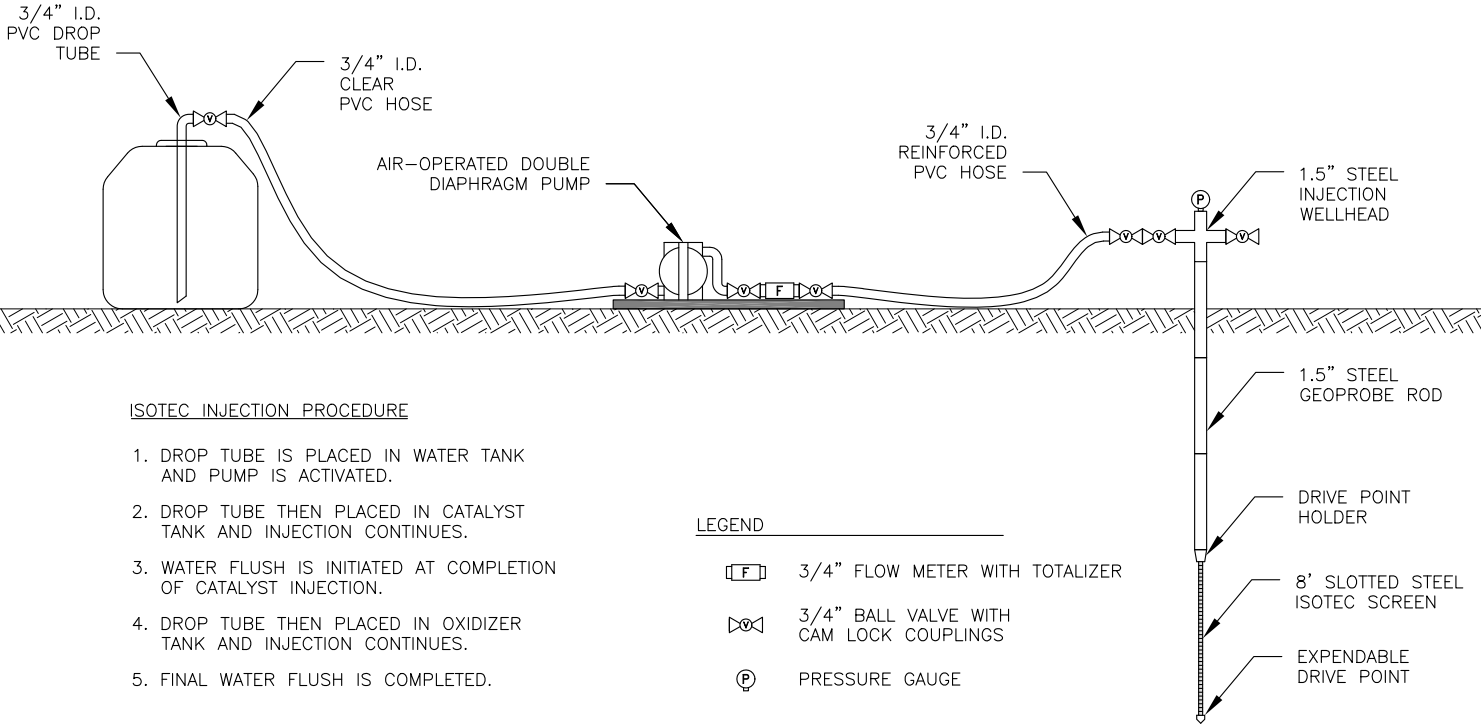


## SODIUM PERSULFATE WITH CARBOHYDRATE MIXING PROCEDURES

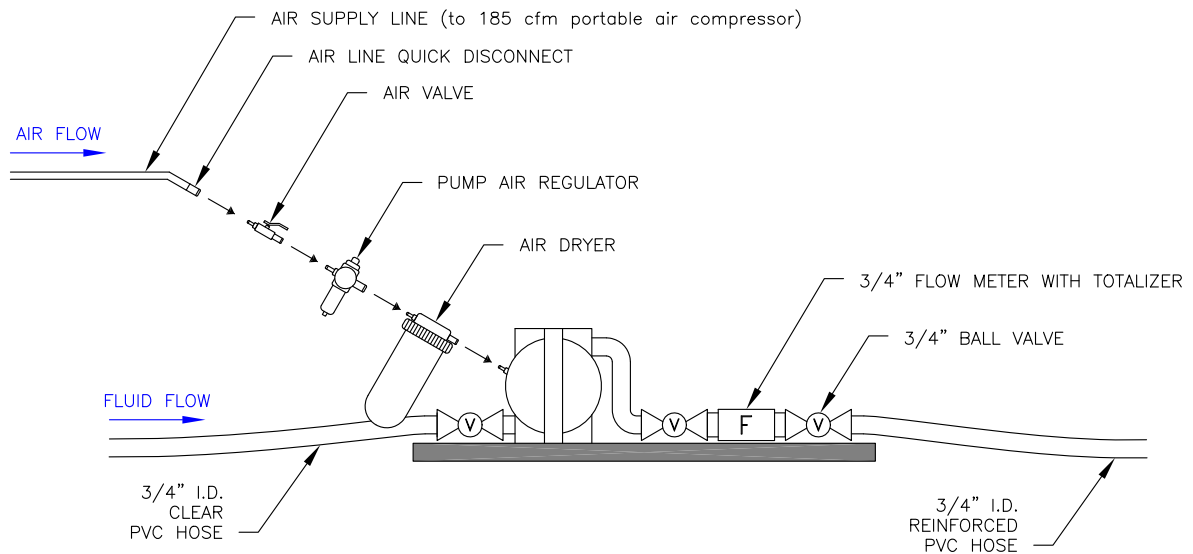


**ATTACHMENT C**

## REAGENT INJECTION DIAGRAM



## INJECTION PUMP INSTALLATION



**ATTACHMENT D**



## IMPLEMENTATION OVERVIEW

ISOTEC Remediation Technologies, Inc. (ISOTEC) is committed to maintaining the highest-level health and safety protocols. ISOTEC has 24 years of performing chemical injections with zero accidents/OSHA reportable incidents safety record. The below procedures, with accompanying photographs, provide an overview of health and safety precautions that ISOTEC takes for handling chemical oxidants, working near traffic, and protection of site workers.

- A site-specific Health and Safety Plan will be developed prior to any on-site work.



- All chemicals and pumps will be staged within secondary containment.
- An eye wash station will be located immediately adjacent to the chemical staging and batching area
- All ISOTEC staff will wear high visibility vests at all times
- All work areas will be kept tidy with potential trip hazards removed or managed with cones and delineators



- Poly-sheeting covers will be placed over each injection head to prevent exposure of oxidants
- Numerous traffic cones and delineators will be used for traffic control establish exclusion areas
- Hose ramps will be used to protect hoses from traffic when working where hoses will be laid where vehicles may need to drive



## 1. Identification

<b>Product identifier</b>	<b>Sodium Hydroxide Solution 10-30%</b>	
<b>Other means of identification</b>		
<b>SDS number</b>	10000014	
<b>Synonyms</b>	Caustic Soda, Caustic, Caustic soda solution, Sodium hydroxide, Caustic alkali, Lye, Caustic lye, Sodium Hydrate.	
<b>Recommended use</b>	Pulping and Bleaching, pH neutralizer, Detergent, Soaps.	
<b>Recommended restrictions</b>	None known.	
<b>Manufacturer / Importer / Supplier / Distributor information</b>		
<b>Company name</b>	Olin Chlor Alkali Products	
<b>Address</b>	490 Stuart Road, NE Cleveland, TN 37312	
<b>Company name</b>	Pioneer Americas, LLC (d/b/a Olin Chlor Alkali Products)	
<b>Address</b>	490 Stuart Road, NE Cleveland, TN 37312	
<b>Company name</b>	Olin Canada ULC (d/b/a Olin Chlor Alkali Products)	
<b>Address</b>	2020 University, Suite 2190 Montreal, Quebec H3A 2A5	
<b>General Information</b>		
<b>Telephone</b>	(888) 658-6SDS (737)	
<b>Website</b>	olinchloralkali.com	
<b>Contact person</b>	ORC SDS Control Group	
<b>Emergency phone number</b>	CHEMTREC	
	US: 1-800-424-9300	Canada: 1-800-567-7455

## 2. Hazard(s) identification

<b>Physical hazards</b>	Corrosive to metals	Category 1
<b>Health hazards</b>	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
<b>OSHA defined hazards</b>	Not classified.	

### Label elements



<b>Signal word</b>	Danger	
<b>Hazard statement</b>	May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage.	
<b>Precautionary statement</b>		
<b>Prevention</b>	Keep only in original container. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product. Do not breathe mist or vapor. Wash thoroughly after handling.	
<b>Response</b>	If swallowed: Rinse mouth. Do NOT induce vomiting. If inhaled: Remove person to fresh air and keep comfortable for breathing. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.	
<b>Storage</b>	Store locked up.	
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.	
<b>Hazard(s) not otherwise classified (HNOC)</b>	Not classified.	
<b>Environmental hazards</b>	Hazardous to the aquatic environment, acute hazard	Category 3



## Supplemental information

<b>Hazard statement</b>	Harmful to aquatic life.
<b>Precautionary statement</b>	
<b>Prevention</b>	Avoid release to the environment.

## 3. Composition/information on ingredients

### Mixtures

Chemical name	CAS number	%
Sodium hydroxide	1310-73-2	10 - 30

## 4. First-aid measures

<b>Inhalation</b>	Move to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.
<b>Skin contact</b>	Take off immediately all contaminated clothing. Wash off IMMEDIATELY with plenty of water for at least 15-20 minutes. Get medical attention immediately! Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
<b>Ingestion</b>	Call a physician or poison control center immediately. Do not induce vomiting. Immediately rinse mouth and drink plenty of water. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Never give anything by mouth to an unconscious person. Do not use mouth-to-mouth method if victim ingested the substance.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Permanent eye damage including blindness could result. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Shortness of breath.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Symptoms may be delayed. Keep victim under observation.
<b>General information</b>	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ). Use extinguishing agent suitable for type of surrounding fire.
<b>Unsuitable extinguishing media</b>	Do not use a solid water stream as it may scatter and spread fire. Do not use halogenated extinguishing agents.
<b>Specific hazards arising from the chemical</b>	The product itself does not burn. May decompose upon heating to produce corrosive and/or toxic fumes. Contact with metal may release flammable hydrogen gas.
<b>Special protective equipment and precautions for firefighters</b>	Fire fighters should enter the area only if they are protected from all contact with the material. Full protective clothing, including self-contained breathing apparatus, coat, pants, gloves, boots and bands around legs, arms, and waist, should be worn. No skin surface should be exposed.
<b>Fire-fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.
<b>Methods and materials for containment and cleaning up</b>	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Following product recovery, flush area with water.  Small Spills: Absorb spill with vermiculite or other inert material. Clean surface thoroughly to remove residual contamination.  Never return spills in original containers for re-use. For waste disposal, see section 13 of the MSDS.
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

### Precautions for safe handling

Use caution when combining with water; DO NOT add water to caustic; ALWAYS add caustic to water while stirring to minimize heat generation. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe mist or vapor. Use only with adequate ventilation. Wear appropriate personal protective equipment. Transfer and storage systems should be compatible and corrosion resistant. Observe good industrial hygiene practices.

### Conditions for safe storage, including any incompatibilities

Keep container tightly closed. Store in a cool, dry, well-ventilated place. Store in corrosive resistant container with a resistant inner liner. Store away from incompatible materials (See Section 10). Store at temperatures not exceeding 40°C/104°F. Compatible storage materials may include, but not be limited to, the following: nickel and nickel alloys, steel, plastics, plastic or rubber-lined steel, FRP, or Derakane vinyl ester resin. Do not allow material to freeze.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	PEL	2 mg/m3

#### US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

#### US NIOSH Pocket Guide to Chemical Hazards: Ceiling Limit Value and Time Period (if specified)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Wear chemical goggles and face shield.

#### Skin protection

##### Hand protection

Wear appropriate chemical resistant gloves.

##### Other

Wear appropriate chemical resistant clothing.

#### Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with organic vapor cartridge and full facepiece.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

Viscous liquid.

#### Physical state

Liquid.

#### Form

Liquid.

#### Color

Water white.

### Odor

Odorless.

### Odor threshold

Not available.

### pH

14 (77°F (25°C)) (0.5% solution)

### Melting point/freezing point

35 °F (1.67 °C) (30% solution)

### Initial boiling point and boiling range

235 °F (112.78 °C) (30% solution)

### Flash point

Not available.

<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	23.76 mm Hg (approximately) (77 °F (25 °C))
<b>Vapor density</b>	Not available.
<b>Relative density</b>	1.33 (30% solution)
<b>Relative density temperature</b>	68 °F (20 °C)
<b>Solubility(ies)</b>	Completely miscible with water.
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Other information</b>	
<b>Density</b>	1.33 g/cm <sup>3</sup> (68 °F (20 °C)) (30% solution)
<b>Molecular formula</b>	NaOH

## 10. Stability and reactivity

<b>Reactivity</b>	Contact with metal may release flammable hydrogen gas.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Reacts violently with strong acids. This product may react with oxidizing agents. Do not mix with other chemicals. Corrosive to aluminum, tin, zinc, copper and most alloys in which they are present including brass and bronze. Corrosive to steels at elevated temperatures above 40°C (104°F).
<b>Incompatible materials</b>	Oxidizing agents. Acids. Phosphorus. Aluminum. Zinc. Tin. Initiates or catalyzes violent polymerization of acetaldehyde, acrolein or acrylonitrile.
<b>Hazardous decomposition products</b>	Contact with metals (aluminum, zinc, tin) and sodium tetrahydroborate liberates hydrogen gas.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	Causes digestive tract burns. Harmful if swallowed.
<b>Inhalation</b>	May cause irritation to the respiratory system.
<b>Skin contact</b>	Causes severe skin burns.
<b>Eye contact</b>	Causes severe eye burns. Causes serious eye damage.
500 Standard Draize test	
Species: Rabbit	
Test Duration: 24 hours	
Severity: Severe	

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Permanent eye damage including blindness could result.

### Information on toxicological effects

**Acute toxicity** Harmful if swallowed.

Product	Species	Test Results
Sodium Hydroxide Solution 10-30%		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2 g/kg
<i>Oral</i>		
LD50	Rat	300 - 500 mg/kg
<i>Other</i>		
LD50	Mouse	40 mg/kg, Intraperitoneal
<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage. Standard Draize Test: 500 mg/24 hour(s) skin - rabbit severe.	
<b>Serious eye damage/eye irritation</b>	Causes severe eye burns. Causes serious eye damage. Standard Draize Test: 400 µg eyes - rabbit mild; 1 percent eyes - rabbit severe.	
<b>Respiratory sensitization</b>	No data available.	
<b>Skin sensitization</b>	No data available.	
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
<b>Reproductive toxicity</b>	No data available.	
<b>Specific target organ toxicity - single exposure</b>	Not available.	
<b>Specific target organ toxicity - repeated exposure</b>	Not available.	
<b>Aspiration hazard</b>	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.	
<b>Chronic effects</b>	Prolonged exposure may cause chronic effects.	

## 12. Ecological information

<b>Ecotoxicity</b>	Harmful to aquatic life.		
<b>Aquatic</b>			
<b>Product</b>	<b>Species</b>	<b>Test Results</b>	
Sodium Hydroxide Solution 10-30%			
Fish	LC50	Bluegill ( <i>Lepomis macrochirus</i> )	99 mg/l, 48 hours
		Mosquitofish ( <i>Gambusia affinis affinis</i> )	125 mg/l, 96 hours
<b>Persistence and degradability</b>	Expected to degrade rapidly in air.		
<b>Bioaccumulative potential</b>	The product is not expected to bioaccumulate.		
<b>Mobility in soil</b>	Not available.		
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.		

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

<b>DOT</b>	
<b>UN number</b>	UN1824

<b>UN proper shipping name</b>	Sodium hydroxide solution
<b>Transport hazard class(es)</b>	8
<b>Subsidiary class(es)</b>	-
<b>Packing group</b>	II
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.
<b>Special provisions</b>	B2, IB2, N34, T7, TP2
<b>Packaging exceptions</b>	154
<b>Packaging non bulk</b>	202
<b>Packaging bulk</b>	242

#### IATA

<b>UN number</b>	UN1824
<b>UN proper shipping name</b>	Sodium hydroxide solution
<b>Transport hazard class(es)</b>	8
<b>Subsidiary class(es)</b>	-
<b>Packaging group</b>	II
<b>Environmental hazards</b>	No
<b>Labels required</b>	8
<b>ERG Code</b>	8L
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

<b>UN number</b>	UN1824
<b>UN proper shipping name</b>	SODIUM HYDROXIDE SOLUTION
<b>Transport hazard class(es)</b>	8
<b>Subsidiary class(es)</b>	-
<b>Packaging group</b>	II
<b>Environmental hazards</b>	
<b>Marine pollutant</b>	No
<b>Labels required</b>	Not available.
<b>EmS</b>	F-A, S-B
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to  
Annex II of MARPOL 73/78 and  
the IBC Code

## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Sodium hydroxide (CAS 1310-73-2) LISTED

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories** Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - Yes

**SARA 302 Extremely hazardous substance** No

**SARA 311/312 Hazardous chemical** Yes

**SARA 313 (TRI reporting)**  
Not regulated.

**Other federal regulations**

**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Food and Drug Administration (FDA)** Not regulated.

#### US state regulations

##### US. Massachusetts RTK - Substance List

Sodium hydroxide (CAS 1310-73-2)

##### US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

##### US. Pennsylvania RTK - Hazardous Substances

Sodium hydroxide (CAS 1310-73-2)

##### US. Rhode Island RTK

Sodium hydroxide (CAS 1310-73-2)

##### US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

##### US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

#### International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

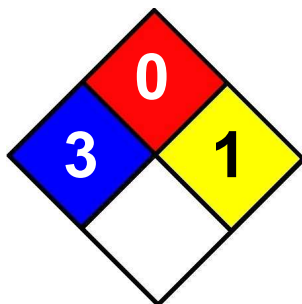
## 16. Other information, including date of preparation or last revision

**Issue date** 20-December-2013

**Revision date** -

**Version #** 01

#### NFPA Ratings



#### List of abbreviations

LD50: Lethal Dose, 50%.  
LC50: Lethal Concentration, 50%.  
EC50: Effective concentration, 50%.  
TWA: Time weighted average.

#### References

EPA: ACQUIRE database  
HSDB® - Hazardous Substances Data Bank  
US. IARC Monographs on Occupational Exposures to Chemical Agents  
IARC Monographs. Overall Evaluation of Carcinogenicity  
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

**Disclaimer**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

# SAFETY DATA SHEET

## Klozur® SP

SDS # : 7775-27-1-12  
Revision date: 2018-07-13  
Format: NA  
Version 1.04



### 1. PRODUCT AND COMPANY IDENTIFICATION

#### Product Identifier

**Product Name** Klozur® SP

**CAS-No** 7775-27-1

**Synonyms** Sodium Persulfate; Sodium Peroxydisulfate; Disodium Peroxydisulfate; Peroxydisulfuric acid, disodium salt; Peroxydisulfuric acid, sodium salt.

**Alternate Commercial Name** Klozur® Persulfate

#### Recommended use of the chemical and restrictions on use

**Recommended Use:** In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

**Restrictions on Use** No uses to be advised against were identified.

#### Manufacturer/Supplier

PeroxyChem LLC  
2005 Market Street  
Suite 3200  
Philadelphia, PA 19103  
Phone: +1 267/ 422-2400 (General Information)  
E-Mail: sdsinfo@peroxychem.com

#### Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:  
1 800 / 424 9300 (CHEMTREC - U.S.A.)  
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)  
1 303/ 389-1409 (Medical - U.S. - Call Collect)

### 2. HAZARDS IDENTIFICATION

#### Classification

#### **OSHA Regulatory Status**

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3



**GHS Label elements, including precautionary statements****EMERGENCY OVERVIEW****Danger****Hazard Statements**

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled  
H335 - May cause respiratory irritation  
H320 - Causes eye irritation  
H315 - Causes skin irritation  
H317 - May cause an allergic skin reaction  
H302 - Harmful if swallowed  
H272 - May intensify fire; oxidizer

**Precautionary Statements - Prevention**

P261 - Avoid breathing dust.  
P285 - In case of inadequate ventilation wear respiratory protection  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear protective gloves/ protective clothing  
P264 - Wash face, hands and any exposed skin thoroughly after handling  
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
P220 - Keep/Store away from clothing/combustible materials  
P221 - Take any precaution to avoid mixing with combustibles

**Precautionary Statements - Response**

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P337 + P313 - If eye irritation persists: Get medical advice/ attention  
P302 + P352 - IF ON SKIN: Wash with plenty of water.  
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention  
P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing  
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor  
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell  
P330 - Rinse mouth  
P370 + P378 - In case of fire: Use water spray for extinction

**Precautionary Statements - Storage**

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

**Hazards not otherwise classified (HNOC)**

No hazards not otherwise classified were identified.

**Other Information**

Risk of decomposition by heat or by contact with incompatible materials

**Unknown acute toxicity**

0% of the mixture consists of ingredient(s) of unknown toxicity

**3. COMPOSITION/INFORMATION ON INGREDIENTS**Formula Na<sub>2</sub>O<sub>8</sub>S<sub>2</sub>

Chemical name	CAS-No	Weight %
Sodium Persulfate	7775-27-1	> 99
Sodium sulfate	7757-82-6	< 2

**4. FIRST AID MEASURES**

<b>General Advice</b>	May produce an allergic reaction.
<b>Eye Contact</b>	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. If symptoms persist, call a physician.
<b>Skin Contact</b>	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.
<b>Inhalation</b>	Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
<b>Ingestion</b>	Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.
<b>Most important symptoms and effects, both acute and delayed</b>	Itching; Redness; Coughing and/ or wheezing.
<b>Indication of immediate medical attention and special treatment needed, if necessary</b>	Treat symptomatically

**5. FIRE-FIGHTING MEASURES**

<b>Suitable Extinguishing Media</b>	Water. Cool containers with flooding quantities of water until well after fire is out.
<b>Unsuitable extinguishing media</b>	Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.
<b>Specific Hazards Arising from the Chemical</b>	Decomposes under fire conditions to release oxygen that intensifies the fire.
<b>Flammable properties</b>	Contact with combustible material may cause fire
<b>Explosion data</b>	
<b>Sensitivity to Mechanical Impact</b>	Not sensitive.
<b>Sensitivity to Static Discharge</b>	Not sensitive.
<b>Protective equipment and precautions for firefighters</b>	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**6. ACCIDENTAL RELEASE MEASURES**

<b>Personal Precautions</b>	Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.
<b>Other</b>	Never add other substances or combustible waste to product residues.
<b>Environmental Precautions</b>	Prevent material from entering into soil, ditches, sewers, waterways, and/or groundwater.

See Section 12, Ecological Information for more detailed information.

**Methods for Containment** Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

**Methods for cleaning up** Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

## 7. HANDLING AND STORAGE

**Handling** Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation. Avoid dust formation. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Avoid breathing dust. Remove and wash contaminated clothing before re-use. Reference to other sections.

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

**Incompatible products** Acids, Alkalis, Halides, Combustible materials, Organic material, Reducing agents. Acids, alkalis, halides (fluorides, chlorides, bromides), combustible materials, reducing agents and organic compounds.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

### Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m <sup>3</sup>	-	-	-
Chemical name	British Columbia	Quebec	Ontario TWAEV	Alberta
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m <sup>3</sup>	-	TWA: 0.1 mg/m <sup>3</sup>	TWA: 0.1 mg/m <sup>3</sup>

### Appropriate engineering controls

**Engineering measures** Provide local exhaust or general ventilation adequate to maintain exposures below permissible exposure limits.

### Individual protection measures, such as personal protective equipment

**Eye/Face Protection** Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

**Skin and Body Protection** Wear long-sleeved shirt, long pants, socks, and shoes.

**Hand Protection** Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

**Respiratory Protection** If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

**Hygiene measures** Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

**General information** Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

Appearance	Crystalline solid
Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.0 (1% solution)
Melting point/freezing point	180 °C (Decomposes)
Boiling Point/Range	Decomposes upon heating
Flash point	Not flammable
Evaporation Rate	No information available
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25°C
Vapor density	No information available
Density	2.59 g/cm <sup>3</sup> (crystal density)
Specific gravity	No information available
Water solubility	42 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available (inorganic)
Autoignition temperature	No evidence of combustion up to 600°C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer
Molecular weight	238.1
VOC content (%)	Not applicable
Bulk density	1.12 g/cm <sup>3</sup> (loose)

## 10. STABILITY AND REACTIVITY

Reactivity	None under normal use conditions. Oxidizer. Contact with other material may cause fire
Chemical Stability	Stable.
Possibility of Hazardous Reactions	None under normal processing.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Heat. Moisture.
Incompatible materials	Acids, alkalis, halides (fluorides, chlorides, bromides), combustible materials, reducing agents and organic compounds. . Acids, Alkalis, Halides, Combustible materials, Organic material, Reducing agents.
Hazardous Decomposition Products	Oxygen which supports combustion

## 11. TOXICOLOGICAL INFORMATION

### Product Information

Unknown acute toxicity	0% of the mixture consists of ingredient(s) of unknown toxicity
LD50 Oral	Sodium Persulfate: 895 mg/kg (rat)
LD50 Dermal	Sodium Persulfate: > 10 g/kg
LC50 Inhalation	Sodium Persulfate: >5.10 mg/L (4h) (rat)
Serious eye damage/eye irritation	Irritating to eyes.
Skin corrosion/irritation	Minimally irritating.

**Sensitization** Sodium Persulfate: May cause sensitization by inhalation and skin contact.**Component Information**

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Sodium Persulfate (7775-27-1)	895 mg/kg ( Rat )	> 10000 mg/kg ( Rabbit )	> 21.6 mg/L ( Rat ) 4 h	
Sodium sulfate (7757-82-6)	> 10000 mg/kg ( Rat )			

**Information on toxicological effects****Symptoms** Symptoms of allergic reaction may include rash, itching, swelling and trouble breathing.**Delayed and immediate effects as well as chronic effects from short and long-term exposure****Irritation** Irritating to eyes, respiratory system and skin.  
**corrosivity** None.**Carcinogenicity** Contains no ingredient listed as a carcinogen.**Mutagenicity** Did not show mutagenic effects in animal experiments**Neurological effects** Not neurotoxic**Reproductive toxicity** This product is not recognized as reprotox by Research Agencies.  
**Developmental toxicity** None known.  
**Teratogenicity** Not teratogenic in animal studies.**STOT - single exposure** May cause respiratory irritation.  
**STOT - repeated exposure** Not classified.**Target organ effects** Eyes, Lungs.**Aspiration hazard** No information available.**12. ECOLOGICAL INFORMATION****Ecotoxicity****Ecotoxicity effects**

<b>Sodium Persulfate (7775-27-1)</b>				
Active Ingredient(s)	Duration	Species	Value	Units
Sodium Persulfate	96 h LC50	Rainbow trout	163	mg/L
Sodium Persulfate	48 h LC50	Daphnia magna	133	mg/L
Sodium Persulfate	96 h LC50	Grass shrimp	519	mg/L
Sodium Persulfate	72 h EC50	Algae Selenastrum capricornutum	116	mg/L

**Persistence and degradability** Biodegradability does not pertain to inorganic substances.**Bioaccumulation** Does not bioaccumulate.**Mobility** Dissociates into ions.**Other Adverse Effects** None known.

### 13. DISPOSAL CONSIDERATIONS

<b>Waste disposal methods</b>	This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.
<b>Contaminated Packaging</b>	Empty remaining contents. Dispose of in accordance with local regulations.

### 14. TRANSPORT INFORMATION

**DOT**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**TDG**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**MEX**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**ICAO**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**ICAO/IATA**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**IMDG/IMO**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**ADR/RID**

<b>UN/ID no</b>	UN 1505
<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

**ADN**

<b>Proper Shipping Name</b>	SODIUM PERSULFATE
<b>Hazard class</b>	5.1
<b>Packing Group</b>	III

### 15. REGULATORY INFORMATION

**U.S. Federal Regulations**

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

**SARA 311/312 Hazard Categories**

This product is not subject to reporting under the Emergency Planning and Community Right-to-Know rule.

**Clean Water Act**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

**CERCLA/EPCRA**

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

**US State Regulations**

**U.S. State Right-to-Know Regulations**

This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium Persulfate		X			
Sodium sulfate	X		X		

**California Proposition 65**

This product does not contain any Proposition 65 chemicals

**CANADA**

**Environmental Emergencies**

This product contains no substances listed under Canada's Environmental Emergency regulations.

**Canadian National Pollutant Release Inventory**

This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

**International Inventories**

Component	TSCA (United States)	DSL (Canada)	EINECS/EL INCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Sodium Persulfate 7775-27-1 (> 99)	X	X	X	X	X	X	X	X	X
Sodium sulfate 7757-82-6 (< 2)	X	X	X	X	X	X	X	X	X

**Mexico**

Mexico - Grade

Slight risk, Grade 1

**16. OTHER INFORMATION**

<b>NFPA</b>	<b>Health Hazards</b> 1	<b>Flammability</b> 0	<b>Stability</b> 1	<b>Special Hazards</b> OX
<b>HMIS</b>	<b>Health Hazards</b> 1	<b>Flammability</b> 0	<b>Physical hazard</b> 1	<b>Special precautions</b> J

**NFPA/HMIS Ratings Legend**

Special Hazards: OX = Oxidizer  
 Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2018-07-13  
Revision note SDS sections updated: 3  
Issuing Date: 2017-03-17

Disclaimer

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Prepared By:

PeroxyChem

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**End of Safety Data Sheet**



<b>SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER</b>
--

**Product Name:** ISOTEC<sup>SM</sup> Catalyst Series 4260 Component-A Powder Mix  
**Recommended Use:** Environmental Remediation  
**Uses advised against:** No information available  
**Details of the supplier of the safety data sheet:**  
**Supplier Name:** ISOTEC Remediation Technologies LLC  
**Supplier Address:** 11 Princess Rd, Suite A Lawrenceville, NJ 08648, USA  
**EMERGENCY TELEPHONE NUMBER(S):** (609) 275-8500 (USA)

**C.A.S. CHEMICAL NAME:** -  
**SYNONYMS:** Iron Catalyst  
**CHEMICAL FAMILY:** Not Applicable  
**EMPIRICAL FORMULA:** MIXT (Proprietary)  
**INTENDED USE:** Catalyst

<b>SECTION 2 – HAZARDS IDENTIFICATION</b>
---

**Classification**

Acute Toxicity, Oral	Category 4
Skin irritation	Category 2
Eye Irritation	Category 2A

**Signal Word**

Warning

**Hazard Statement**

Harmful if swallowed  
 Causes skin irritation  
 Causes serious eye irritation

**Appearance/Odor:** Light green powder with metallic odor.

**Precautionary statement(s):** Wash skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves, eye protection/face protection.

**IF SWALLOWED:** Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

**IF ON SKIN:** Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

**Hazards not otherwise classified (HNOC):** None  
 Specific treatment (see section 4 for more information).

*Applicable properties are relevant to the mixture as a whole when certain proprietary ingredients present at their highest concentrations. Please note that the effects are normally lower for a typical mixture with smaller concentrations of these ingredients present.*

### SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Risk Phrases
Iron Compound	-	>60%	-

### SECTION 4 – FIRST AID MEASURES

**EYE CONTACT:** Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritations persist.

**SKIN CONTACT:** Wash affected area immediately with soap and water.

**INHALATION:** In case of inhalation or suspected inhalation, move patient at once to fresh air and call a physician. Keep patient absolutely quiet. If breathing has stopped or is labored, give assisted respiration (e.g., mouth-to-mouth). Supplemental oxygen may be indicated.

**INGESTION:** If swallowed, call a physician immediately. Induce vomiting or remove stomach contents by gastric suction only as directed by medical personnel. Wash mouth with plenty of water. Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed:** The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

**Indication of any immediate medical attention and special treatment needed:** No data available.

### SECTION 5 – FIRE FIGHTING MEASURES

**CHARACTERISTICS:**

Flash Point	No Data Available
Upper Explosive Limit (UEL)	No Data Available
Lower Explosive Limit (LEL)	No Data Available
Autoignition Temperature	No Data Available
Flash Point Method(s)	No Data Available
Unusual Fire & Explosion Hazards	No Data Available
Fire Hazard Classification (OSHA/NFPA)	No Data Available

**EXTINGUISHING MEDIA:** In case of fire, flood with water.

**SPECIAL FIRE FIGHTING PROCEDURES:** Firefighters should wear butyl rubber boots, gloves, body suit and self-containing breathing apparatus. Use water spray to cool all affected containers. Avoid skin contact. Contain runoff water in dikes. Prevent stream contamination. Expended liquids from fire fighting should be diverted to an active sanitary sewer line.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May emit sulfur oxide vapors under burning conditions. See Section 6 for hazardous combustion products.

**Hazchem Code:** Not applicable

### SECTION 6 – ACCIDENTAL RELEASE MEASURES

**CLEAN-UP PROCEDURES:** Sweep up and repackage or place in receptacle for future disposal.

**OTHER EMERGENCY ADVICE:** Avoid eye and skin contact. Wear protective clothing including gloves, safety goggles, breathing mask and coveralls when handling. Stored materials should be placed in a dry and reasonably temperature area, preferably below 24°C.

**WASTE DISPOSAL:** Remove to properly designated landfill. Observe all federal, state and local environmental regulations.

**ENVIRONMENTAL EFFECTS:** Data not yet available

### SECTION 7 – HANDLING AND STORAGE

**Precautions for safe handling:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see Section 2.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place. Air Sensitive. Hygroscopic. Store in original container. Isolate from strong oxidizers.

**Specific end use(s):** Apart from the uses mentioned in Section 1 no other specific uses are stipulated.

### SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROLS

**EYE PROTECTION:** Splash proof goggles or safety glasses.

**HAND PROTECTION:** Impermeable gloves made of Nitrile or rubber.

**RESPIRATORY PROTECTION:** Wear appropriate full-face respirator with HEPA cartridges for protection against excessive particulate matter/ dust

**PROTECTIVE CLOTHING:** Long sleeved clothing (e.g. cotton coveralls or Tyvek). Do not wear short trousers

**ENGINEERING CONTROLS:** Avoid drafts that may disperse material beyond the work area. Use light water spray for dust suppression

**WORK AND HYGIENIC PRACTICES:** Provide readily accessible eye wash stations. Wash at the end of each work shift and before eating, smoking or using the toilet

### SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

**Physical Properties:**

PHYSICAL FORM	Powder
COLOR	Light Green
ODOR	Metallic
<b>TYPICAL PHYSICAL DATA:</b>	
pH (10% aqueous)	3.5-3.9
VAPOR PRESSURE (mm Hg)	0
VAPOR DENSITY (Air = 1)	Not Applicable
BOILING POINT	Decomposition at 300°C
FREEZING/MELTING POINT	Not Applicable
SOLUBILITY IN WATER	57% by weight @ 158°C
SPECIFIC GRAVITY (Water = 1)	1.899 @ 14°/ 8°C
EVAPORATION RATE (Butylacetate = 1)	Non Volatile
VISCOSITY (CPS)	Not Evaluated

### SECTION 10 – STABILITY AND REACTIVITY

**Reactivity:** No data available.

**Chemical Stability:** Stable under recommended storage conditions.

**Possibility of Hazardous Reactions:** No data available.

**Hazardous: Polymerization:** No data available.

**Conditions to Avoid:** No data available.

**Incompatible Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Other decomposition products – no data available.

## SECTION 11 – TOXICOLOGICAL INFORMATION

### Information on likely routes of exposure

#### **Product Information:**

Inhalation:	No data available
Eye Contact:	No data available
Skin Contact:	No data available
Ingestion:	Harmful if swallowed

#### **Component Information:**

Symptoms:	No data available
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#### **Delayed and immediate effects as well as chronic effects from short & long-term exposure:**

Sensitization:	No data available
Mutagenic effects:	No data available

Carcinogenicity:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC
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STOT-single exposure:	No data available.
STOT-repeated exposure:	No data available.
Chronic toxicity:	No data available.
Target organ exposure:	No data available.
Aspiration hazard:	No data available

### Numerical measure of toxicity product information

The following values are calculated based on Section 3 of the GHS document: No data available.

## SECTION 12 – ECOLOGICAL INFORMATION

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	No data available
<b>Bioaccumulation:</b>	No data available
<b>Other adverse effects:</b>	No data available
<b>Mobility in soil:</b>	No data available

## SECTION 13 – DISPOSAL CONSIDERATIONS

### Waste treatment methods

**Disposal methods:** Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging:** Dispose of as unused product

<b>SECTION 14 – TRANSPORTATION INFORMATION</b>
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<b>UN No.:</b>	Not Regulated
<b>DOT SHIPPING NAME:</b>	Not Regulated
<b>IMO SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>LATA SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>IMDG:</b>	Not dangerous goods
<b>IATA:</b>	Not dangerous goods
<b>ADG Code:</b>	Not dangerous goods

<b>SECTION 15 – REGULATORY INFORMATION</b>
--

**Federal and State Regulations:** No products were found.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):** R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately

**HMIS (U.S.A.):** Health Hazard: 2, Fire Hazard: 0, Reactivity: 0, Personal Protection: E

**National Fire Protection Association (U.S.A.):** Health: 2, Flammability: 0, Reactivity: 0, Specific hazard:0

**Protective Equipment:** Nitrile gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles/safety glasses.

<b>SECTION 16 – OTHER INFORMATION</b>
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The information set forth above is based upon information, which ISOTEC Remediation Technologies, LLC. believes to be accurate. No warranty, express or implied, is intended. The information is provided solely for your information and consideration and ISOTEC Remediation Technologies, LLC. assumes no legal responsibility for use or reliance thereon.

Issuing Date: NEW

Revision Date: June 2016-Rev. 3

<b>SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER</b>
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**Product Name:** ISOTEC<sup>SM</sup> Catalyst Series 4260 Chelopolychempremox-B-2

**Recommended Use:** Environmental Remediation

**Uses advised against:** No information available

**Details of the supplier of the safety data sheet:**

**Supplier Name:** ISOTEC Remediation Technologies  
LLC

**Supplier Address:** 11 Princess Rd, Suite A Lawrenceville,  
NJ 08648, USA

**EMERGENCY TELEPHONE NUMBER(S):** (609) 275-8500 (USA)

**C.A.S. CHEMICAL NAME:** -

**SYNONYMS:** Chelating agent

**CHEMICAL FAMILY:** Not Applicable

**EMPIRICAL FORMULA:** MIXT (Proprietary)

**INTENDED USE:** Catalyst

<b>SECTION 2 – HAZARDS IDENTIFICATION</b>
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**Appearance/Odor:** White powder, odorless.

**Precautionary statement(s):** Wash skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves/eye protection/face protection.

**IF SWALLOWED:** Call a POISON CENTER or doctor/ physician if you feel unwell.

**IF ON SKIN:** Wash with plenty of soap and water.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**Hazards not otherwise classified (HNOC):** None  
Specific treatment (see section 4 for more information).

*Applicable properties are relevant to the mixture as a whole when certain proprietary ingredients present at their highest concentrations. Please note that the effects are normally lower for a typical mixture with smaller concentrations of these ingredients present.*

**SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS**

Components	CAS Number	Proportion	Risk Phrases
Amino poly carboxylic acid	-	>60%	-

**SECTION 4 – FIRST AID MEASURES**

**EYE CONTACT:** Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritations persist.

**SKIN CONTACT:** Wash affected area immediately with soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

**INHALATION:** In case of inhalation or suspected inhalation, move patient at once to fresh air and call a physician. Keep patient absolutely quiet. If breathing has stopped or is labored, give assisted respiration (e.g., mouth-to-mouth). Supplemental oxygen may be indicated.

**INGESTION:** If swallowed, give several glasses of water. If vomiting occurs, keep head below hips to reduce risk of aspiration. Give fluids again. Seek medical attention if health effects occur. Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed:** The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

**Indication of any immediate medical attention and special treatment needed:** No data available.

**SECTION 5 – FIRE FIGHTING MEASURES**
**CHARACTERISTICS:**

Flash Point	No Data Available
Upper Explosive Limit (UEL)	Not Applicable
Lower Explosive Limit (LEL)	Not Applicable
Autoignition Temperature	Not Applicable
Flash Point Method(s)	No Data Available
Unusual Fire & Explosion Hazards	No Data Available
Fire Hazard Classification (OSHA/NFPA)	No Data Available

**EXTINGUISHING MEDIA:** Use water spray, alcohol-resistant foam, dry chemical or Polyvalent foam. ABC powder. Carbon dioxide.

**SPECIAL FIRE FIGHTING PROCEDURES:** Firefighters should wear butyl rubber boots, gloves, body suit and self-containing breathing apparatus. Use water spray to cool all affected



containers. Avoid skin contact. Contain runoff water in dikes. Prevent stream contamination. Expended liquids from fire fighting should be diverted to an active sanitary sewer line.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May emit Carbon oxides, nitrogen oxides(NO<sub>x</sub>), Sodium oxides.

**Hazchem Code:** Not applicable

#### SECTION 6 – ACCIDENTAL RELEASE MEASURES

**CLEAN-UP PROCEDURES:** Sweep up and repackage or place in receptacle for future disposal.

**OTHER EMERGENCY ADVICE:** Avoid eye and skin contact. Wear protective clothing including gloves, safety goggles, breathing mask and coveralls when handling. Stored materials should be placed in a dry and reasonably temperature area, preferably below 24°C.

**WASTE DISPOSAL:** Remove to properly designated landfill. Observe all federal, state and local environmental regulations.

**ENVIRONMENTAL EFFECTS:** Data not yet available

#### SECTION 7 – HANDLING AND STORAGE

**Precautions for safe handling:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see Section 2.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place. Isolate from strong oxidizing agents. Do not store in metal containers.

**Specific end use(s):** Apart from the uses mentioned in Section 1 no other specific uses are stipulated.

#### SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROLS

**EYE PROTECTION:** Splash proof goggles or safety glasses.

**HAND PROTECTION:** Impermeable gloves made of Nitrile or rubber.

**RESPIRATORY PROTECTION:** Wear appropriate full-face respirator with HEPA cartridges for protection against excessive particulate matter/ dust

**PROTECTIVE CLOTHING:** Long sleeved clothing (e.g. cotton coveralls or Tyvek). Do not wear short trousers

**ENGINEERING CONTROLS:** Avoid drafts that may disperse material beyond the work area. Use light water spray for dust suppression

**WORK AND HYGIENIC PRACTICES:** Provide readily accessible eye wash stations. Wash at the end of each work shift and before eating, smoking or using the toilet

**SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES**
**Physical Properties:**

PHYSICAL FORM	Powder
COLOR	White
ODOR	None

**TYPICAL PHYSICAL DATA:**

pH (10% aqueous)	4.0-5.0
VAPOR PRESSURE (mm Hg)	0
VAPOR DENSITY (Air = 1)	Not Applicable
BOILING POINT	Not Applicable
FREEZING/MELTING POINT	Not Applicable
SOLUBILITY IN WATER	10g/100g @ 25°C
SPECIFIC GRAVITY (Water = 1)	Not Evaluated
EVAPORATION RATE (Butylacetate = 1)	Non Volatile
VISCOSITY (CPS)	Not Evaluated

**SECTION 10 – STABILITY AND REACTIVITY**

**Reactivity:** No data available.

**Chemical Stability:** Stable under recommended storage conditions.

**Possibility of Hazardous Reactions:** No data available.

**Hazardous: Polymerization:** No data available.

**Conditions to Avoid:** No data available.

**Incompatible Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Other decomposition products – no data available.

**SECTION 11 – TOXICOLOGICAL INFORMATION**
**Information on likely routes of exposure**
**Product Information:**

Inhalation:	No data available
Eye Contact:	No data available
Skin Contact:	No data available
Ingestion:	Harmful if swallowed

**Component Information:**

Symptoms: No data available

**Delayed and immediate effects as well as chronic effects from short & long-term exposure:**

Sensitization:	No data available
Mutagenic effects:	No data available

Carcinogenicity:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC
STOT-single exposure:	No data available.
STOT-repeated exposure:	No data available.
Chronic toxicity:	No data available.
Target organ exposure:	No data available.
Aspiration hazard:	No data available

#### **Numerical measure of toxicity product information**

The following values are calculated based on Section 3 of the GHS document: No data available.

### SECTION 12 – ECOLOGICAL INFORMATION

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	No data available
<b>Bioaccumulation:</b>	No data available
<b>Other adverse effects:</b>	No data available
<b>Mobility in soil:</b>	No data available

### SECTION 13 – DISPOSAL CONSIDERATIONS

#### **Waste treatment methods**

**Disposal methods:** Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging:** Dispose of as unused product

### SECTION 14 – TRANSPORTATION INFORMATION

<b>UN No.:</b>	Not Regulated
<b>DOT SHIPPING NAME:</b>	Not Regulated
<b>IMO SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>LATA SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>IMDG:</b>	Not dangerous goods
<b>IATA:</b>	Not dangerous goods
<b>ADG Code:</b>	Not dangerous goods

**SECTION 15 – REGULATORY INFORMATION**

**Federal and State Regulations:** No products were found.

**Other Regulations:** This product does not contain any products considered hazardous under the federal OSHA HazCom Standard 29 CFR 1.910.1200

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):** R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately.

**HMIS (U.S.A.):** Health Hazard: 0, Fire Hazard: 0, Reactivity: 0, Personal Protection: E

**National Fire Protection Association (U.S.A.):** Health: 0, Flammability: 0, Reactivity: 0, Specific hazard: 0

**Protective Equipment:** Nitrile gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles/safety glasses.

**SECTION 16 – OTHER INFORMATION**

The information set forth above is based upon information, which ISOTEC Remediation Technologies, LLC. believes to be accurate. No warranty, express or implied, is intended. The information is provided solely for your information and consideration and ISOTEC Remediation Technologies, LLC. assumes no legal responsibility for use or reliance thereon.

Issuing Date: NEW

Revision Date: June 2016. Rev 4.

**SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER**

**Product Name:** ISOTEC<sup>SM</sup> Catalyst-4260 Chelopolychempremox-B-4  
**Recommended Use:** Environmental Remediation  
**Uses advised against:** No information available  
**Details of the supplier of the safety data sheet:**  
**Supplier Name:** ISOTEC Remediation Technologies  
LLC  
**Supplier Address:** 11 Princess Rd, Suite A Lawrenceville,  
NJ 08648, USA

**EMERGENCY TELEPHONE NUMBER(S):** (609) 275-8500 (USA)

**C.A.S. CHEMICAL NAME:** -  
**SYNONYMS:** Chelating agent  
**CHEMICAL FAMILY:** Not Applicable  
**EMPIRICAL FORMULA:** MIXT (Proprietary)  
**INTENDED USE:** Catalyst

**SECTION 2 – HAZARDS IDENTIFICATION**

**Appearance/Odor:** White powder, odorless.

**Precautionary statement(s):** Wash skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves/eye protection/face protection.

**IF SWALLOWED:** Call a POISON CENTER or doctor/ physician if you feel unwell.

**IF ON SKIN:** Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

**Hazards not otherwise classified (HNOC):** None  
Specific treatment (see section 4 for more information).

*Applicable properties are relevant to the mixture as a whole when certain proprietary ingredients present at their highest concentrations. Please note that the effects are normally lower for a typical mixture with smaller concentrations of these ingredients present.*

**SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS**

Components	CAS Number	Proportion	Risk Phrases
Amino poly carboxylate	-	>60%	-

**SECTION 4 – FIRST AID MEASURES**

**EYE CONTACT:** Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritations persist.

**SKIN CONTACT:** Wash affected area immediately with soap and water.

**INHALATION:** In case of inhalation or suspected inhalation, move patient at once to fresh air and call a physician. Keep patient absolutely quiet. If breathing has stopped or is labored, give assisted respiration (e.g., mouth-to-mouth). Supplemental oxygen may be indicated.

**INGESTION:** If swallowed, call a physician immediately. Induce vomiting or remove stomach contents by gastric suction only as directed by medical personnel. Wash mouth with plenty of water. Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed:** The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

**Indication of any immediate medical attention and special treatment needed:** No data available.

**SECTION 5 – FIRE FIGHTING MEASURES**
**CHARACTERISTICS:**

Flash Point	No Data Available
Upper Explosive Limit (UEL)	Not Applicable
Lower Explosive Limit (LEL)	Not Applicable
Autoignition Temperature	Not Applicable
Flash Point Method(s)	No Data Available
Unusual Fire & Explosion Hazards	No Data Available
Fire Hazard Classification (OSHA/NFPA)	No Data Available

**EXTINGUISHING MEDIA:** In case of fire, flood with water.

**SPECIAL FIRE FIGHTING PROCEDURES:** Firefighters should wear butyl rubber boots, gloves, body suit and self-containing breathing apparatus. Use water spray to cool all affected containers. Avoid skin contact. Contain runoff water in dikes. Prevent stream contamination. Expended liquids from fire fighting should be diverted to an active sanitary sewer line.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** May emit oxides of carbon and nitrogen under burning conditions.

**Hazchem Code:** Not applicable

#### SECTION 6 – ACCIDENTAL RELEASE MEASURES

**CLEAN-UP PROCEDURES:** Sweep up and repackage or place in receptacle for future disposal.

**OTHER EMERGENCY ADVICE:** Avoid eye and skin contact. Wear protective clothing including gloves, safety goggles, breathing mask and coveralls when handling. Stored materials should be placed in a dry and reasonably temperature area, preferably below 24°C.

**WASTE DISPOSAL:** Remove to properly designated landfill. Observe all federal, state and local environmental regulations.

**ENVIRONMENTAL EFFECTS:** Data not yet available

#### SECTION 7 – HANDLING AND STORAGE

**Precautions for safe handling:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see Section 2.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place. Isolate from strong oxidizers.

**Specific end use(s):** Apart from the uses mentioned in Section 1 no other specific uses are stipulated.

#### SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROLS

**EYE PROTECTION:** Splash proof goggles or safety glasses.

**HAND PROTECTION:** Impermeable gloves made of Nitrile or rubber.

**RESPIRATORY PROTECTION:** Wear appropriate full-face respirator with HEPA cartridges for protection against excessive particulate matter/ dust

**PROTECTIVE CLOTHING:** Long sleeved clothing (e.g. cotton coveralls or Tyvek). Do not wear short trousers

**ENGINEERING CONTROLS:** Avoid drafts that may disperse material beyond the work area. Use light water spray for dust suppression

**WORK AND HYGIENIC PRACTICES:** Provide readily accessible eye wash stations. Wash at the end of each work shift and before eating, smoking or using the toilet

#### SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

**Physical Properties:**

PHYSICAL FORM	Powder
COLOR	White
ODOR	None

**TYPICAL PHYSICAL DATA:**

pH (10% aqueous)	~11
VAPOR PRESSURE (mm Hg)	Non-Volatile
VAPOR DENSITY (Air = 1)	Non-Volatile
BOILING POINT	Not Applicable
FREEZING/MELTING POINT	~300°C
SOLUBILITY IN WATER	Soluble
SPECIFIC GRAVITY (Water = 1)	Not Evaluated
EVAPORATION RATE (Butylacetate = 1)	Non Volatile
VISCOSITY (CPS)	Not Evaluated

<b>SECTION 10 – STABILITY AND REACTIVITY</b>
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**Reactivity:** No data available.

**Chemical Stability:** Stable

**Possibility of Hazardous Reactions:** No data available.

**Hazardous: Polymerization:** Will not occur

**Conditions to Avoid:** No data available.

**Incompatible Materials:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Other decomposition products – no data available. In the event of a fire see Section 5

<b>SECTION 11 – TOXICOLOGICAL INFORMATION</b>
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**Information on likely routes of exposure****Product Information:**

Inhalation:	No data available
Eye Contact:	No data available
Skin Contact:	No data available
Ingestion:	Harmful if swallowed

**Component Information:**

Symptoms: No data available

**Delayed and immediate effects as well as chronic effects from short & long-term exposure:**

Sensitization:	No data available
Mutagenic effects:	No data available
Carcinogenicity:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible



	or confirmed human carcinogen by IARC
STOT-single exposure:	No data available.
STOT-repeated exposure:	No data available.
Chronic toxicity:	No data available.
Target organ exposure:	No data available.
Aspiration hazard:	No data available

#### **Numerical measure of toxicity product information**

The following values are calculated based on Section 3 of the GHS document: No data available.

### **SECTION 12 – ECOLOGICAL INFORMATION**

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	No data available
<b>Bioaccumulation:</b>	No data available
<b>Other adverse effects:</b>	No data available
<b>Mobility in soil:</b>	No data available

### **SECTION 13 – DISPOSAL CONSIDERATIONS**

#### **Waste treatment methods**

**Disposal methods:** Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging:** Dispose of as unused product

### **SECTION 14 – TRANSPORTATION INFORMATION**

<b>UN No.:</b>	Not Regulated
<b>DOT SHIPPING NAME:</b>	Not Regulated
<b>IMO SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>LATA SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>IMDG:</b>	Not dangerous goods
<b>IATA:</b>	Not dangerous goods
<b>ADG Code:</b>	Not dangerous goods

### **SECTION 15 – REGULATORY INFORMATION**

**Federal and State Regulations:** No products were found.

**Other Regulations:** This product does not contain any products considered hazardous under the federal OSHA HazCom. Standard 29 CFR 1.910.1200

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):** R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately.

**HMIS (U.S.A.):** Health Hazard: 0, Fire Hazard: 0, Reactivity: 0, Personal Protection: E

**National Fire Protection Association (U.S.A.):** Health: 0, Flammability: 0, Reactivity: 0, Specific hazard:

**Protective Equipment:** Nitrile gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles/safety glasses.

## SECTION 16 – OTHER INFORMATION

The information set forth above is based upon information, which ISOTEC Remediation Technologies, LLC. believes to be accurate. No warranty, express or implied, is intended. The information is provided solely for your information and consideration and ISOTEC Remediation Technologies, LLC. assumes no legal responsibility for use or reliance thereon.

Issuing Date: NEW

Revision Date: June 2016-Rev. 5.

**SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER**

**Product Name:** ISOTEC<sup>SM</sup> Stabilizer 0875

**Recommended Use:** Environmental Remediation

**Uses advised against:** No information available

**Details of the supplier of the safety data sheet:**

**Supplier Name:** ISOTEC Remediation Technologies  
LLC

**Supplier Address:** 11 Princess Rd, Suite A Lawrenceville,  
NJ 08648, USA

**EMERGENCY TELEPHONE NUMBER(S):** (609) 275-8500 (USA)

**C.A.S. CHEMICAL NAME:** Mixture  
**SYNONYMS:** None  
**CHEMICAL FAMILY:** Not Applicable  
**EMPIRICAL FORMULA:** MIXT (Proprietary)  
**INTENDED USE:** Stabilizing Agent

**SECTION 2 – HAZARDS IDENTIFICATION**

**Appearance/Odor:** White powder, odorless.

**Precautionary statement(s):** Wash skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves/eye protection/face protection.

**IF SWALLOWED:** Call a POISON CENTER or doctor/ physician if you feel unwell.

**IF ON SKIN:** Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

**Hazards not otherwise classified (HNOC):** None  
Specific treatment (see section 4 for more information).

*Applicable properties are relevant to the mixture as a whole when certain proprietary ingredients present at their highest concentrations. Please note that the effects are normally lower for a typical mixture with smaller concentrations of these ingredients present.*

**SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS**

Components	CAS Number	Proportion	Risk Phrases
Inorganic phosphates	-	>60%	-

**SECTION 4 – FIRST AID MEASURES**

**EYE CONTACT:** Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritations persist.

**SKIN CONTACT:** Wash affected area immediately with soap and water.

**INHALATION:** In case of inhalation or suspected inhalation, move patient at once to fresh air and call a physician. Keep patient absolutely quiet. If breathing has stopped or is labored, give assisted respiration (e.g., mouth-to-mouth). Supplemental oxygen may be indicated.

**INGESTION:** Rinse mouth and dilute stomach contents with water, or preferably with milk if available. Large doses may cause nausea, vomiting and diarrhea. Systematic oral toxicity is extremely rare and has consisted of acidosis and hypocalcemic tetany.

**Most important symptoms and effects, both acute and delayed:** The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

**Indication of any immediate medical attention and special treatment needed:** No data available.

**SECTION 5 – FIRE FIGHTING MEASURES**
**CHARACTERISTICS:**

Flash Point	No Data Available
Upper Explosive Limit (UEL)	Not Applicable
Lower Explosive Limit (LEL)	Not Applicable
Autoignition Temperature	Not Applicable
Flash Point Method(s)	No Data Available
Unusual Fire & Explosion Hazards	No Data Available
Fire Hazard Classification (OSHA/NFPA)	No Data Available

**EXTINGUISHING MEDIA:** Product is noncombustible.

**SPECIAL FIRE FIGHTING PROCEDURES** Not Applicable

**UNUSUAL FIRE AND EXPLOSION HAZARDS** None.

**Hazchem Code:** Not applicable

**SECTION 6 – ACCIDENTAL RELEASE MEASURES**

**CLEAN-UP PROCEDURES:** Sweep up and repackage or place in receptacle for future disposal.

**OTHER EMERGENCY ADVICE:** Avoid eye and skin contact. Wear protective clothing including gloves, safety goggles, breathing mask and coveralls when handling. Stored materials should be placed in a dry and reasonably temperature area, preferably below 24°C.

**WASTE DISPOSAL:** Remove to properly designated landfill. Observe all federal, state and local environmental regulations.

**ENVIRONMENTAL EFFECTS:** Aquatic Toxicity.

**SECTION 7 – HANDLING AND STORAGE**

**Precautions for safe handling:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see Section 2.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place. Hygroscopic.

**Specific end use(s):** Apart from the uses mentioned in Section 1 no other specific uses are stipulated.

**SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROLS**

**EYE PROTECTION:** Splash proof goggles or safety glasses.

**HAND PROTECTION:** Impermeable gloves made of Nitrile or rubber.

**RESPIRATORY PROTECTION:** Wear appropriate full-face respirator with HEPA cartridges for protection against excessive particulate matter/ dust

**PROTECTIVE CLOTHING:** Long sleeved clothing (e.g. cotton coveralls or Tyvek). Do not wear short trousers

**ENGINEERING CONTROLS:** Avoid drafts that may disperse material beyond the work area. Use light water spray for dust suppression

**WORK AND HYGIENIC PRACTICES:** Provide readily accessible eye wash stations. Wash at the end of each work shift and before eating, smoking or using the toilet

### SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

**Physical Properties:**

PHYSICAL FORM	Powder
COLOR	White
ODOR	None

**TYPICAL PHYSICAL DATA:**

pH (10% aqueous)	4.6
VAPOR PRESSURE (mm Hg)	Non volatile
VAPOR DENSITY (Air = 1)	Non volatile
BOILING POINT	Not applicable
FREEZING/MELTING POINT	253° C
SOLUBILITY IN WATER	20% by weight @ 25°C
SPECIFIC GRAVITY (Water = 1)	1.2
EVAPORATION RATE (Butylacetate = 1)	Non volatile
VISCOSITY (CPS)	No data available

### SECTION 10 – STABILITY AND REACTIVITY

**Reactivity:** No data available.

**Chemical Stability:** Stable under recommended storage conditions.

**Possibility of Hazardous Reactions:** No data available.

**Hazardous: Polymerization:** None.

**Conditions to Avoid:** No data available.

**Incompatible Materials:** None.

**Hazardous Decomposition Products:** Other decomposition products – no data available. In the event of a fire see Section 5.

### SECTION 11 – TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure****Product Information:**

Inhalation:	No data available
Eye Contact:	No data available
Skin Contact:	No data available
Ingestion:	Harmful if swallowed

**Component Information:**

Symptoms: No data available

**Delayed and immediate effects as well as chronic effects from short & long-term exposure:**

Sensitization: No data available

Mutagenic effects:	No data available
Carcinogenicity:	This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or suspected" human carcinogens.
STOT-single exposure:	No data available.
STOT-repeated exposure:	No data available.
Chronic toxicity:	No data available.
Target organ exposure:	No data available.
Aspiration hazard:	No data available

#### **Numerical measure of toxicity product information**

The following values are calculated based on Section 3 of the GHS document: No data available.

### SECTION 12 – ECOLOGICAL INFORMATION

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	No data available
<b>Bioaccumulation:</b>	No data available
<b>Other adverse effects:</b>	No data available
<b>Mobility in soil:</b>	No data available

### SECTION 13 – DISPOSAL CONSIDERATIONS

#### **Waste treatment methods**

**Disposal methods:** This product does not present a danger or hazard for disposal. Except for Food applications, salvage and return to container, process or recycle for other uses. May be disposed of in a properly designated landfill if needed.

**Contaminated packaging:** Dispose of as unused product

### SECTION 14 – TRANSPORTATION INFORMATION

<b>UN No.:</b>	Not Regulated
<b>DOT SHIPPING NAME:</b>	Not Regulated
<b>IMO SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>LATA SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>IMDG:</b>	Not dangerous goods
<b>IATA:</b>	Not dangerous goods
<b>ADG Code:</b>	Not dangerous goods

**SECTION 15 – REGULATORY INFORMATION**

**Federal and State Regulations:** No products were found.

**Other Regulations:** This product does not contain any products considered hazardous under the federal OSHA HazCom Standard 29 CFR 1.910.1200

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):** R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately.

**HMIS (U.S.A.):** Health Hazard: 0, Fire Hazard: 0, Reactivity: 0, Personal Protection: E

**National Fire Protection Association (U.S.A.):** Health: 1, Flammability: 0, Reactivity: 0, Specific hazard:

**Protective Equipment:** Nitrile gloves. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles/safety glasses.

**SECTION 16 – OTHER INFORMATION**

The information set forth above is based upon information, which ISOTEC Remediation Technologies, LLC. believes to be accurate. No warranty, express or implied, is intended. The information is provided solely for your information and consideration and ISOTEC Remediation Technologies, LLC. assumes no legal responsibility for use or reliance thereon.

Issuing Date: NEW

Revision Date: June 2016-Rev.5.



**SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER**

**Product Name:** ISOTEC<sup>SM</sup> CH Activator 1000

**Recommended Use:** Environmental Remediation

**Uses advised against:** No information available

**Details of the supplier of the safety data sheet:**

**Supplier Name:** ISOTEC Remediation Technologies  
LLC

**Supplier Address:** 11 Princess Rd, Suite A Lawrenceville,  
NJ 08648, USA

**EMERGENCY TELEPHONE NUMBER(S):** (609) 275-8500 (USA)

**C.A.S. CHEMICAL NAME:** Mixture  
**SYNONYMS:** None  
**CHEMICAL FAMILY:** Not Applicable  
**EMPIRICAL FORMULA:** MIXT (Proprietary)  
**INTENDED USE:** Activating Agent

**SECTION 2 – HAZARDS IDENTIFICATION**

**Classification of the substance or mixture:** Not a hazardous substance or mixture.

**Appearance/Odor:** White powder, odorless.

**Precautionary statement(s):** Wash skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves/eye protection/face protection.

**IF SWALLOWED:** Call a POISON CENTER or doctor/ physician if you feel unwell.

**IF ON SKIN:** Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

**IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

**Hazards not otherwise classified (HNOC):** None  
Specific treatment (see section 4 for more information).

*Applicable properties are relevant to the mixture as a whole when certain proprietary ingredients present at their highest concentrations. Please note that the effects are normally lower for a typical mixture with smaller concentrations of these ingredients present.*

**SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS**

Components	CAS Number	Proportion	Risk Phrases
Carbohydrates	-	>98%	-

**SECTION 4 – FIRST AID MEASURES**

**EYE CONTACT:** Hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritations persist.

**SKIN CONTACT:** Wash affected area immediately with soap and water.

**INHALATION:** In case of inhalation or suspected inhalation, move patient at once to fresh air and call a physician. If breathing has stopped or is labored, give assisted respiration (e.g., mouth-to-mouth).

**INGESTION:** Rinse mouth and dilute stomach contents with water.

**Most important symptoms and effects, both acute and delayed:** The most important known symptoms and effects are described in the labeling (see Section 2.2) and/or in Section 11.

**Indication of any immediate medical attention and special treatment needed:** No data available.

**SECTION 5 – FIRE FIGHTING MEASURES**
**CHARACTERISTICS:**

Flash Point	No Data Available
Upper Explosive Limit (UEL)	Not Applicable
Lower Explosive Limit (LEL)	Not Applicable
Autoignition Temperature	Not Applicable
Flash Point Method(s)	No Data Available
Unusual Fire & Explosion Hazards	No Data Available
Fire Hazard Classification (OSHA/NFPA)	No Data Available

**EXTINGUISHING MEDIA:** Product is noncombustible.

**SPECIAL FIRE FIGHTING PROCEDURES** Not Applicable

**UNUSUAL FIRE AND EXPLOSION HAZARDS** None.

**Hazchem Code:** Not applicable

**SECTION 6 – ACCIDENTAL RELEASE MEASURES**

**CLEAN-UP PROCEDURES:** Sweep up and repackage or place in receptacle for future disposal.

**OTHER EMERGENCY ADVICE:** Avoid eye and skin contact. Wear protective clothing including gloves, safety goggles, breathing mask and coveralls when handling. Stored materials should be placed in a dry and reasonably temperature area, preferably below 24°C.

**WASTE DISPOSAL:** Remove to properly designated landfill. Observe all federal, state and local environmental regulations.

**ENVIRONMENTAL PRECAUTIONS:** No special environmental precautions required.

**SECTION 7 – HANDLING AND STORAGE**

**Precautions for safe handling:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see Section 2.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place. Hygroscopic.

**Specific end use(s):** Apart from the uses mentioned in Section 1 no other specific uses are stipulated.

**SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROLS**

**EYE PROTECTION:** Splash proof goggles or safety glasses.

**HAND PROTECTION:** Impermeable gloves made of Nitrile or rubber.

**RESPIRATORY PROTECTION:** Wear appropriate full-face respirator with HEPA cartridges for protection against excessive particulate matter/ dust

**PROTECTIVE CLOTHING:** Long sleeved clothing (e.g. cotton coveralls or Tyvek). Do not wear short trousers

**ENGINEERING CONTROLS:** Avoid drafts that may disperse material beyond the work area. Use light water spray for dust suppression

**WORK AND HYGIENIC PRACTICES:** Provide readily accessible eye wash stations. Wash at the end of each work shift and before eating, smoking or using the toilet

<b>SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES</b>
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**Physical Properties:**

PHYSICAL FORM	Crystalline, powder
COLOR	White
ODOR	None

**TYPICAL PHYSICAL DATA:**

pH	No data available
VAPOR PRESSURE (mm Hg)	No data available
VAPOR DENSITY (Air = 1)	No data available
BOILING POINT	No data available
FREEZING/MELTING POINT	No data available
SOLUBILITY IN WATER	Soluble
SPECIFIC GRAVITY (Water = 1)	No data available
EVAPORATION RATE (Butylacetate = 1)	Non volatile
VISCOSITY (CPS)	No data available

<b>SECTION 10 – STABILITY AND REACTIVITY</b>
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**Reactivity:** No data available.

**Chemical Stability:** Stable under recommended storage conditions.

**Possibility of Hazardous Reactions:** No data available.

**Hazardous: Polymerization:** None.

**Conditions to Avoid:** No data available.

**Incompatible Materials:** Strong oxidizing agents

**Hazardous Decomposition Products:** Other decomposition products – no data available. In the event of a fire - Carbon oxides.

<b>SECTION 11 – TOXICOLOGICAL INFORMATION</b>
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**Information on likely routes of exposure****Product Information:**

Inhalation:	No data available
Eye Contact:	No data available
Skin Contact:	No data available
Ingestion:	Harmful if swallowed

**Component Information:**

Symptoms: No data available

**Delayed and immediate effects as well as chronic effects from short & long-term exposure:**

Sensitization: No data available

Mutagenic effects:	No data available
Carcinogenicity:	This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or suspected" human carcinogens.
STOT-single exposure:	No data available.
STOT-repeated exposure:	No data available.
Chronic toxicity:	No data available.
Target organ exposure:	No data available.
Aspiration hazard:	No data available

#### **Numerical measure of toxicity product information**

The following values are calculated based on Section 3 of the GHS document: No data available.

### SECTION 12 – ECOLOGICAL INFORMATION

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	No data available
<b>Bioaccumulation:</b>	No data available
<b>Other adverse effects:</b>	No data available
<b>Mobility in soil:</b>	No data available

### SECTION 13 – DISPOSAL CONSIDERATIONS

#### **Waste treatment methods**

**Disposal methods:** This product does not present a danger or hazard for disposal. Offer surplus and non-recyclable solutions to a licensed disposal company.

**Contaminated packaging:** Dispose of as unused product

### SECTION 14 – TRANSPORTATION INFORMATION

<b>UN No.:</b>	Not Regulated
<b>DOT SHIPPING NAME:</b>	Not Regulated
<b>IMO SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>LATA SHIPPING NAME:</b>	Not Regulated as dangerous goods
<b>IMDG:</b>	Not dangerous goods
<b>IATA:</b>	Not dangerous goods
<b>ADG Code:</b>	Not dangerous goods

**SECTION 15 – REGULATORY INFORMATION**

**Federal and State Regulations:** No products were found.

**Other Regulations:** This product does not contain any products considered hazardous under the federal OSHA HazCom Standard 29 CFR 1.910.1200

**Other Classifications:**

**HMIS (U.S.A.):** Health Hazard: 0, Flammability: 0, Physical Hazard: 0

**National Fire Protection Association (U.S.A.):** Health: 0, Fire: 0, Reactivity: 0,

**Protective Equipment:** Nitrile gloves. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles/safety glasses.

**SECTION 16 – OTHER INFORMATION**

The information set forth above is based upon information, which ISOTEC Remediation Technologies, LLC. believes to be accurate. No warranty, express or implied, is intended. The information is provided solely for your information and consideration and ISOTEC Remediation Technologies, LLC. assumes no legal responsibility for use or reliance thereon.

Issuing Date: NEW

Revision Date: June 2018.



## Univar USA Inc Safety Data Sheet

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3075 Highland Pkwy, Ste 200, Downers Grove, IL 60515  
(425) 889 3400

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### Emergency Assistance

For emergency assistance involving chemicals call  
Chemtrec - (800) 424-9300



Univar  
3075 Highland Pkwy STE 200  
Downers Grove, IL 60515  
425-889-3400

# SAFETY DATA SHEET

## 1. Identification

**Product identifier:** - HYDROGEN PEROXIDE 20-34%

### Other means of identification

**SDS number:** 000100000012

### Recommended use and restriction on use

**Recommended use:** Reserved for industrial and professional use.

**Restrictions on use:** Not known.

**Emergency telephone number:** For emergency assistance Involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

## 2. Hazard(s) identification

### Hazard Classification

#### Physical Hazards

Oxidizing liquids Category 2

#### Health Hazards

Acute toxicity (Oral) Category 4

Skin Corrosion/Irritation Category 2

Serious Eye Damage/Eye Irritation Category 2A

### Label Elements

#### Hazard Symbol





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<b>Signal Word</b>	Danger
<b>Hazard Statement</b>	Causes serious eye damage. Harmful if swallowed. Harmful if inhaled. May cause irritation to the respiratory system. Causes skin irritation. May intensify fire; oxidizer.
<b>Precautionary Statements</b>	
<b>Prevention</b>	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep away from clothing and other combustible materials. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product.
<b>Response</b>	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. IF SWALLOWED: Call a POISON CENTER/doctor/ if you feel unwell. Rinse mouth. Take off contaminated clothing.
<b>Storage</b>	Store in a closed container. Keep container tightly closed. Store in a well-ventilated place. Store in a dry place. Store away from other materials.
<b>Disposal</b>	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other hazards which do not result in GHS classification**      None.

### 3. Composition/information on ingredients

#### Substances

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )		7722-84-1	>=20 - <=34%
Water		7732-18-5	>=66 - <=80%

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

### 4. First-aid measures

- Ingestion:** Do NOT induce vomiting. Never give liquid to an unconscious person. Get medical attention immediately. Do NOT induce vomiting. Never give liquid to an unconscious person. Get medical attention immediately. Rinse mouth thoroughly.
- Inhalation:** Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped. Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped. Get medical attention immediately.
- Skin Contact:** Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and wash the skin thoroughly with soap and water after work.
- Eye contact:** If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor. If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor. Get medical attention immediately. Rinse immediately with plenty of water.
- Most important symptoms/effects, acute and delayed**  
**Symptoms:** No data available.

**Indication of immediate medical attention and special treatment needed**

**Treatment:** No data available.

**5. Fire-fighting measures**

**General Fire Hazards:** No data available.

**Suitable (and unsuitable) extinguishing media**

**Suitable extinguishing media:** Use: Water Spray or Fog. Use: Water Spray or Fog. Use fire-extinguishing media appropriate for surrounding materials.

**Unsuitable extinguishing media:** No data available.

**Specific hazards arising from the chemical:** Strong oxidizer. Heat may cause the containers to explode. Oxidizer. Not combustible. Reaction with combustible materials, ammonium salts, or foreign substances may increase the fire hazard. Thermally unstable. Decomposes at fire temperature and is self-sustaining even if heat source is removed. Closed containers may rupture violently when heated.

**Special protective equipment and precautions for firefighters**

**Special fire fighting procedures:** No data available.

**Special protective equipment for fire-fighters:** Use water spray to keep fire-exposed containers cool.

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures:** Use personal protective equipment. Keep unauthorized personnel away. Use personal protective equipment. Avoid breathing mist.

**Methods and material for containment and cleaning up:** Absorb spillage with non-combustible, absorbent material. Dike for later disposal. Absorb spillage with non-combustible, absorbent material. Dike for later disposal.

**7. Handling and storage**

**Precautions for safe handling:** Use personal protective equipment as required. Wash thoroughly after handling. Use only with adequate ventilation. Wash contaminated clothing before reuse. Use personal protective equipment as required. Wash thoroughly after handling. Use only with adequate ventilation. Wash contaminated clothing before reuse.

**Conditions for safe storage, including any incompatibilities:** Keep container tightly closed. Keep containers closed when not in use. Store in a cool, dry place with adequate ventilation. Keep away from incompatible materials, open flames, and high temperatures. Protect from light, including direct sunrays.

**8. Exposure controls/personal protection**

**Control Parameters**

**Occupational Exposure Limits**

Chemical Identity	type	Exposure Limit Values	Source
Hydrogen peroxide (H2O2)	TWA	1 ppm 1.4 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	ST ESL	14 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	ST ESL	10 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	1.4 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	1 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
Hydrogen peroxide (H2O2) - as H2O2	TWA PEL	1 ppm 1.4 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
Hydrogen peroxide (H2O2)	TWA	1 ppm	US. ACGIH Threshold Limit Values (03 2013)
	REL	1 ppm 1.4 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 ppm 1.4	US. OSHA Table Z-1 Limits for Air

		mg/m3	Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 ppm 1.4 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
<b>Chemical Identity</b>	<b>type</b>	<b>Exposure Limit Values</b>	<b>Source</b>
Hydrogen peroxide (H2O2)	TWA	1 ppm 1.4 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	ST ESL	14 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	ST ESL	10 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	1.4 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
	AN ESL	1 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (02 2013)
Hydrogen peroxide (H2O2) - as H2O2	TWA PEL	1 ppm 1.4 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
Hydrogen peroxide (H2O2)	TWA	1 ppm	US. ACGIH Threshold Limit Values (03 2013)
	REL	1 ppm 1.4 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 ppm 1.4 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 ppm 1.4 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

**Appropriate Engineering Controls**

No data available.

### Individual protection measures, such as personal protective equipment

<b>General information:</b>	Use personal protective equipment as required. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned. Practice good housekeeping. Do not eat, drink or smoke when using the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.
<b>Eye/face protection:</b>	Wear tight-fitting goggles or face shield.
<b>Skin Protection</b>	
<b>Hand Protection:</b>	Use suitable protective gloves if risk of skin contact.
<b>Other:</b>	Wear suitable protective clothing as protection against splashing or contamination.
<b>Respiratory Protection:</b>	In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Seek advice from supervisor on the company's respiratory protection standards. If ventilation is insufficient, suitable respiratory protection must be provided.
<b>Hygiene measures:</b>	No data available.

## 9. Physical and chemical properties

<b>Physical state:</b>	liquid liquid
<b>Form:</b>	Clear Liquid
<b>Color:</b>	Colorless
<b>Odor:</b>	Odorless
<b>Odor threshold:</b>	No data available.
<b>pH:</b>	3.7 3.7
<b>Melting point/freezing point:</b>	-33 - -15 °C -33 - -15 °C
<b>Initial boiling point and boiling range:</b>	100 - 176 °C 100 - 176 °C
<b>Flash Point:</b>	Does not flash
<b>Evaporation rate:</b>	> 1
<b>Flammability (solid, gas):</b>	No data available.
<b>Upper/lower limit on flammability or explosive limits</b>	
<b>Flammability limit - upper (%):</b>	No data available.

<b>Flammability limit - lower (%):</b>	No data available.
<b>Explosive limit - upper (%):</b>	No data available.
<b>Explosive limit - lower (%):</b>	No data available.
<b>Vapor pressure:</b>	30.664 hPa
<b>Vapor density:</b>	No data available.
<b>Relative density:</b>	1.13
<b>Solubility(ies)</b>	
<b>Solubility in water:</b>	No data available.
<b>Solubility (other):</b>	No data available.
<b>Partition coefficient (n-octanol/water):</b>	1.5
<b>Auto-ignition temperature:</b>	No data available.
<b>Decomposition temperature:</b>	No data available.
<b>Viscosity:</b>	No data available.

## 10. Stability and reactivity

<b>Reactivity:</b>	No data available.
<b>Chemical Stability:</b>	No data available.
<b>Possibility of hazardous reactions:</b>	No data available.
<b>Conditions to avoid:</b>	No data available.
<b>Incompatible Materials:</b>	Strong oxidizer - avoid contact with reducing agents.
<b>Hazardous Decomposition Products:</b>	No data available.

## 11. Toxicological information

### Symptoms related to the physical, chemical and toxicological characteristics

<b>Ingestion:</b>	No data available.
<b>Inhalation:</b>	No data available.
<b>Skin Contact:</b>	No data available.
<b>Eye contact:</b>	No data available.

### Information on toxicological effects

#### Acute toxicity (list all possible routes of exposure)

##### Oral

<b>Product:</b>	ATEmix ( ): 1,026 mg/kg ATEmix ( ): 1,026 mg/kg
-----------------	--

**Dermal**

**Product:**

Not classified for acute toxicity based on available data.

**Inhalation**

**Product:**

LC 50 (Rat, 4 h):  $\geq 0.17$  mg/l

**Repeated dose toxicity**

**Product:**

No data available.

**Skin Corrosion/Irritation**

**Product:**

No data available.

**Serious Eye Damage/Eye Irritation**

**Product:**

No data available.

**Respiratory or Skin Sensitization**

**Product:**

No data available.

**Carcinogenicity**

**Product:**

No data available.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**

No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**

No carcinogenic components identified

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**

No carcinogenic components identified

**Germ Cell Mutagenicity**

**In vitro**

**Product:**

No data available.

**In vivo**

**Product:**

No data available.

**Reproductive toxicity**

**Product:**

No data available.

**Specific Target Organ Toxicity - Single Exposure**

**Product:**

No data available.

**Specific Target Organ Toxicity - Repeated Exposure**

**Product:**

No data available.

**Aspiration Hazard**

**Product:**

No data available.

**Other effects:**

No data available.



## 12. Ecological information

### Ecotoxicity:

#### Acute hazards to the aquatic environment:

##### Fish

**Product:** No data available.

##### Specified substance(s):

Hydrogen peroxide LC 50 (Chameleon goby (Tridentiger trigonocephalus), 24 h): 155 mg/l  
(H<sub>2</sub>O<sub>2</sub>) Mortality LC 50 (Jack Mackerel (Trachurus japonicus), 24 h): 89 mg/l  
Mortality

##### Aquatic Invertebrates

**Product:** No data available.

#### Chronic hazards to the aquatic environment:

##### Fish

**Product:** No data available.

##### Aquatic Invertebrates

**Product:** No data available.

##### Toxicity to Aquatic Plants

**Product:** No data available.

#### Persistence and Degradability

##### Biodegradation

**Product:** No data available.

##### BOD/COD Ratio

**Product:** No data available.

#### Bioaccumulative Potential

##### Bioconcentration Factor (BCF)

**Product:** No data available.

##### Partition Coefficient n-octanol / water (log K<sub>ow</sub>)

**Product:** Log K<sub>ow</sub>: 1.5

**Mobility in Soil:** No data available.

##### Known or predicted distribution to environmental compartments

Hydrogen peroxide No data available.

Water No data available.

##### Known or predicted distribution to environmental compartments

Water No data available.

##### Known or predicted distribution to environmental compartments

Hydrogen peroxide No data available.

##### Known or predicted distribution to environmental compartments

Water

No data available.

### 13. Disposal considerations

**Disposal instructions:** Dispose of waste and residues in accordance with local authority requirements. Since emptied containers retain product residue, follow label warnings even after container is emptied.

**Contaminated Packaging:** No data available.

### 14. Transport information

#### DOT

UN Number: UN 2014  
UN Proper Shipping Name: Hydrogen peroxide, aqueous solutions  
Transport Hazard Class(es)  
Class: 5.1  
Label(s): 5.1, 8  
Packing Group: II  
Marine Pollutant: Not regulated.  
Special precautions for user: –

#### IMDG

UN Number: UN 2014  
UN Proper Shipping Name: Hydrogen peroxide, aqueous solution  
Transport Hazard Class(es)  
Class: 5.1  
Label(s): 5.1, 8  
EmS No.: F-H, S-Q  
Packing Group: II  
Marine Pollutant: Not regulated.  
Special precautions for user: –

#### IATA

UN Number: UN 2014  
Proper Shipping Name: Hydrogen peroxide, aqueous solution  
Transport Hazard Class(es):  
Class: 5.1  
Label(s): 5.1, 8  
Packing Group: II  
Environmental Hazards: Not regulated.  
Special precautions for user: –  
Other information

Passenger and cargo aircraft: Allowed.  
Cargo aircraft only: Allowed.

## 15. Regulatory information

### US Federal Regulations US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

None present or none present in regulated quantities.

### CERCLA Hazardous Substance List (40 CFR 302.4):

None present or none present in regulated quantities.

None present or none present in regulated quantities.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Not listed.

#### SARA 302 Extremely Hazardous Substance

Chemical Identity	RQ	Threshold Planning Quantity
Hydrogen peroxide (H2O2)	1000 lbs.	1000 lbs.

Chemical Identity	RQ	Threshold Planning Quantity
Hydrogen peroxide (H2O2)	1000 lbs.	1000 lbs.

#### SARA 304 Emergency Release Notification

Chemical Identity	RQ
-------------------	----

Hydrogen peroxide  
(H2O2)

Chemical Identity	RQ
-------------------	----

Hydrogen peroxide  
(H2O2)

#### SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
-------------------	-----------------------------

Chemical Identity	Threshold Planning Quantity
-------------------	-----------------------------

Hydrogen peroxide  
(H2O2) 500lbs

Hydrogen peroxide  
(H2O2) 500lbs

#### SARA 313 (TRI Reporting)

None present or none present in regulated quantities.

None present or none present in regulated quantities.

### Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

None present or none present in regulated quantities.

### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

---

## US State Regulations

### US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

### US. New Jersey Worker and Community Right-to-Know Act

Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) Listed

Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) Listed

### US. Massachusetts RTK - Substance List

Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) Listed

Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) Listed

### US. Pennsylvania RTK - Hazardous Substances

Hydrogen peroxide  
(H<sub>2</sub>O<sub>2</sub>) Listed

Hydrogen peroxide  
(H<sub>2</sub>O<sub>2</sub>) Listed

### US. Rhode Island RTK

Hydrogen peroxide  
(H<sub>2</sub>O<sub>2</sub>) Listed

Hydrogen peroxide  
(H<sub>2</sub>O<sub>2</sub>) Listed

<b>Inventory Status:</b> Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EU EINECS List:	On or in compliance with the inventory
EU ELINCS List:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory

**16. Other information, including date of preparation or last revision**

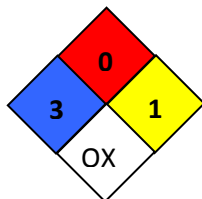
**HMIS Hazard ID**





<b>Health</b>	*	<b>3</b>
<b>Flammability</b>		<b>0</b>
<b>Physical Hazards</b>		<b>1</b>
<b>PERSONAL PROTECTION</b>		<b>B</b>

B - Safety Glasses & Gloves

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; \*Chronic health effect

**NFPA Hazard ID**



	Flammability
	Health
	Reactivity
	Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible  
OX: Oxidizing agent

<b>Issue Date:</b>	10/12/2016
<b>Revision Date:</b>	No data available.
<b>Version #:</b>	1.4
<b>Further Information:</b>	No data available.

# Univar USA Inc Safety Data Sheet

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For Additional Information contact SDS Coordinator during business hours, Pacific time: (425) 889-3400

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## Appendix G

# QUALITY ASSURANCE PROJECT PLAN

## 1,4-DIOXANE REMEDIATION

Stericycle Georgetown Facility Downgradient Area  
Seattle, Washington

*Prepared for:*

**Burlington Environmental, LLC**

A wholly owned subsidiary of PSC Environmental Services, LLC,  
which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc.  
Kent, Washington

*Prepared by:*

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March 2016

Project No. 0087700013.7092





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**QUALITY ASSURANCE PROJECT PLAN**  
**1,4-DIOXANE REMEDIATION**  
Stericycle Georgetown Facility Downgradient Area  
Seattle, Washington

## **1.0 ABSTRACT**

This Quality Assurance Project Plan (QAPP) was prepared on behalf of Burlington Environmental, LLC, a wholly owned subsidiary of PSC Environmental Services, LLC (PSC), which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc. (Stericycle). This QAPP supplements the 1,4-Dioxane Remedial Design – Remedial Action (RD/RA) Work Plan (Amec Foster Wheeler, 2015a), which was prepared for the area downgradient of the Stericycle Georgetown facility located in the Georgetown area of Seattle, Washington. The RD/RA Work Plan was approved by the Washington State Department of Ecology (Ecology) in a letter dated October 28, 2015 (Ecology, 2015). The 1,4-dioxane remedial design includes in situ chemical oxidation (ISCO) and potentially in situ bioremediation (ISB) of groundwater downgradient of the closed Stericycle Georgetown facility (the downgradient area).

The purpose of the remedial action is to attain groundwater cleanup standards for 1,4-dioxane in the downgradient area within a reasonable restoration time frame. The full-scale ISCO remedial action was designed to aggressively reduce 1,4-dioxane mass in the most contaminated areas of the groundwater plume in order to accelerate the attenuation of 1,4-dioxane and decrease concentrations to cleanup levels within the restoration time frame, as discussed in the RD/RA Work Plan.

This QAPP describes the methods, data quality procedures, design implementation procedures, and other project details related to implementation (construction) and monitoring of the ISCO portion of the remedy and generally follows Ecology's Generic QAPP Template.<sup>1</sup> The implementation plan and associated monitoring plan are included in the Revised ISCO Pilot Study Work Plan (Amec Foster Wheeler and DOF, 2016) and the ISCO Full Scale Implementation Work Plan (to be completed after the ISCO Pilot Study is complete).

## **2.0 BACKGROUND**

Stericycle owns a closed waste treatment, storage, and disposal facility, which was operated under a Resource Conservation and Recovery Act (RCRA) permit. The facility is located at 734 South Lucile

---

1 <http://www.ecy.wa.gov/programs/eap/qa/docs/nepqapp/index.html>.



Street, Seattle, King County, Washington, in the Georgetown neighborhood of south Seattle. This QAPP was prepared to support implementation of the selected remedial action for treatment of 1,4-dioxane in groundwater downgradient of the facility, in accordance with Stericycle's Agreed Order Number DE 7347 with Ecology.

The project description, regulatory background, site history, site characterization, and site conditions were described in preceding documents, including the Focused Feasibility Study (FFS) (Amec Foster Wheeler, 2015b, 2015c) and the RD/RA Work Plan (Amec Foster Wheeler, 2015a). The monitoring plans associated with the remedial action are included in the relevant work plans, including the Revised ISCO Pilot Study Work Plan (Amec Foster Wheeler and DOF, 2016) and subsequent plans to be prepared as the remediation program is implemented.

This QAPP outlines quality assurance (QA) and quality control (QC) protocols to be followed as part of implementing the 1,4-dioxane remediation program. A QAPP was previously prepared as part of the Long Term Monitoring Plan for the Stericycle Georgetown Facility and included as Appendix D of the Engineering Design Report (EDR) (AMEC Geomatrix, 2011). Many of the objectives and protocols discussed in that earlier QAPP apply to the monitoring tasks associated with the 1,4-dioxane remedial action and will be followed. Therefore information provided in the Long Term Monitoring Plan QAPP is generally not repeated in this QAPP. Rather, this QAPP addresses those specific monitoring requirements that will be used as part of the 1,4-dioxane remedial action but were not considered in the Long Term Monitoring Plan.

### **3.0 PROJECT DESCRIPTION**

Evaluations performed to date indicate that natural attenuation of 1,4-dioxane in groundwater did not achieve cleanup levels by 2015; thus, a contingent remedy is required. A combination of ISCO and enhanced ISB were selected as the contingent remedy.

The remedy selected for the downgradient area will consist of the following main components (more information, including figures and design details, may be found in the relevant work plans):

- Injecting chemical oxidant in a pilot study area adjacent to monitoring well cluster CG-122, followed by full-scale ISCO injections adjacent to monitoring well cluster CG-127;
- Potential injection of microorganisms and substrate into two monitoring wells or direct-push borings for ISB evaluation;
- Potential injection of substrate and/or microorganisms into a broader area if ISB is determined to be an effective remedy; and

- Groundwater monitoring during implementation of the remedy and during the two years following ISB injections, prior to reverting to the long-term monitoring program for the site (which may be amended to account for performance monitoring requirements of this cleanup action).

This QAPP mainly addresses the ISCO elements of the remedy and may be revised or amended in the future to address components of the ISB component of cleanup.

### **3.1 PROJECT GOALS**

The purpose of the ISCO cleanup action is to reduce 1,4-dioxane mass in the area with the highest 1,4-dioxane mass (as defined in the FFS). Mass removal could hasten the attainment of 1,4-dioxane cleanup levels throughout the area downgradient of the Stericycle facility. If feasible, ISCO would be followed by ISB injections to address the more diffuse plume upgradient of the area surrounding the CG-127 monitoring well cluster. The site-specific cleanup level for groundwater set forth by Ecology for 1,4-dioxane at the site is 78.5 micrograms per liter ( $\mu\text{g/L}$ ).

### **3.2 PROJECT OBJECTIVES**

The project objectives are divided into the different stages of the cleanup action. The specific objectives of the ISCO and ISB pilot studies are to:

- Determine the radius of influence of injection wells.
- Evaluate potential side effects of ISCO on metals mobilization, changes in pH and geochemical parameters, and sulfate migration.
- Evaluate the survival of selected biota and substrate requirements in the area targeted for ISB (ISB study).
- Evaluate the extent of destruction/degradation of 1,4-dioxane.
- Evaluate whether concentrations of 1,4-dioxane may rebound following treatment within the ISCO and ISB treatment areas and to what extent.

The specific objectives of the full-scale ISCO and ISB implementation are to:  
Address the downgradient target area for ISCO and ISB treatment of 1,4-dioxane.

- Meet the cleanup goals of reducing 1,4-dioxane mass and attaining the groundwater cleanup level.



### 3.3 TASKS REQUIRED

The 1,4-dioxane cleanup includes the following specific tasks:

- Site preparation,
- Setup of ISCO/ISB spill prevention controls;
- ISCO/ISB injection skid and trailer setup
- Injection of chemical oxidant/substrate and/or microorganisms in all required locations;
- Waste handling, transportation, and disposal;
- Site restoration/capping construction; and
- Performance groundwater monitoring.

### 3.4 PRACTICAL CONSTRAINTS

The area targeted by this remediation is located in a dense, built-up, mixed-use urban area. Several of the streets running through the area are primary arterials for traffic. As a result, the remedial action must be able to address the objectives discussed above while minimizing impacts to residents and businesses. Field work for implementation of ISCO and ISB will take place in the public right-of-way to avoid Department of Planning and Development permitting and private property access agreements. Work taking place on City of Seattle property and in the public right-of-way will require permitting through the Seattle Department of Transportation (SDOT).

## 4.0 ORGANIZATION AND SCHEDULE

### 4.1 KEY INDIVIDUALS AND THEIR RESPONSIBILITIES

All fieldwork will be completed in accordance with the project-specific Health and Safety Plan (HASP). The specific tasks of key personnel involved with the 1,4-dioxane remediation are summarized below.

**Ecology Project Manager** – Ecology is the regulatory authority and responsible agency for overseeing and authorizing the remedial action. In this capacity, Ecology will review implementation and monitoring plans and this QAPP to ensure that the implementation and monitoring are consistent with the remedial design.

**Stericycle Corrective Actions Project Manager** – Stericycle is the signatory on the Agreed Order and will manage the project. Specific functions of this role are to:

- Maintain correspondence between regulatory agencies and Stericycle.

- Act as the Stericycle representative for interaction with the public or media.
- Manage the engineering team implementing the remedial action.
- Review and verify project requirements are met.

**Engineering Team** – The functions of the engineering team are to:

- Review and follow relevant aspects of the applicable work plans and this QAPP.
- Implement the remedial action as described in the work plans, including managing subcontractors performing construction activities, such as drilling and injection.
- Document completed implementation and monitoring tasks.
- Verify ISCO/ISB injection locations via global positioning system (GPS) and hand measurements.
- Verify injection depths during ISCO/ISB.
- Notify the Stericycle Corrective Actions Project Manager of any unresolved problems or deviations from approved procedures.
- Provide field technical guidance for sampling and maintenance procedures.
- Take neat and complete field notes.
- Conduct health and safety meeting, and implement safety requirements.
- Maintain lines of communication between those personnel involved in the field sampling activities, the Stericycle Corrective Actions Project Manager, and the analytical laboratory.

**Sampling Team** – The functions of the sampling team are to:

- Review and follow all relevant aspects of the applicable work plans and this QAPP.
- Perform monitoring tasks during and after implementation of the remedial action.
- Take neat and complete field notes.
- Obtain, maintain, and inspect all equipment used to fulfill the responsibilities.
- Calibrate equipment.
- Verify or arrange for the shipment of sample bottles and sample transport containers, both from the analytical laboratory to the field, and from the field to the laboratory.
- Examine sample bottles, preservatives, and sample transport containers.





- Work to prevent sample contamination.
- Assume responsibility for storage and provide security of sample transport containers and sample equipment.
- Schedule sample analysis services with the analytical laboratory.
- Collect and preserve samples.
- Check that samples are correctly identified and packed securely with ice in the sample transport container(s).
- Conduct health and safety meeting, and implement safety requirements.

**Drilling Contractors**– The drilling contractor will be required to perform the construction activities of drilling borings for the purposes of injection of material to treat groundwater (during both ISCO and ISB) and for installing permanent and temporary groundwater monitoring wells.

**Laboratories**– Analytical Laboratory Services (ALS) in Kelso, Washington, and Analytical Resources, Inc. (ARI), in Tukwila, Washington, will provide analytical services for the soil and groundwater monitoring program. Laboratory QA officers will ensure that appropriate procedures are followed during sample analysis and preparation of the data packages and electronic deliverables.

ALS and ARI QA manuals are available upon request and include descriptions of the laboratory organization, personnel, and responsibilities; facilities and equipment, analytical methods, and QA/QC protocols; and routine procedures for sample custody and data handling.

## 4.2 PROJECT SCHEDULE

It is anticipated that implementation of the active remedies (i.e., on-site injections and/or installation of groundwater and soil monitoring push probes) for the cleanup action will take two to three years to implement, followed by two years of performance monitoring. A schedule in the form of a Gantt chart has been provided to Ecology on a regular basis, updated to reflect changes that occur during implementation, and will continue to be updated and provided to Ecology since dates are subject to change. Detailed phasing for implementation of ISCO and ISB are provided in the individual work plans for each component of the remedial action.

## 5.0 QUALITY OBJECTIVES

The remedial and sampling design, field procedures, laboratory procedures, and QC procedures are set up to:

- Implement the remedial action consistent with the design assumptions and specifications, and
- Provide high-quality data for use in evaluating the remedial action.

Specific data quality factors that may affect data usability include quantitative factors (precision, bias, accuracy, completeness, and reporting limits) and qualitative factors (representativeness and comparability). The quality objectives associated with implementation of the action are discussed in this section.

Data generated for this project will be deemed to satisfy the quality objectives if these data are sufficient to validate that the project objectives outlined in Section 3.2 have been met or that the outcome of the action is deficient. If a project objective has not been met, the data and information recorded will be used in identifying which particular objectives have not been met and why.

## 5.1 MEASUREMENT QUALITY OBJECTIVES

Measurement quality objectives (MQOs) specify how good the data must be in order to meet project objectives. Most parameters monitored for this project are monitored as part of the Long Term Monitoring Plan (Appendix D of the EDR; AMEC Geomatrix, 2011) and will similarly apply for monitoring conducted as part of this project. Additional considerations that go beyond those anticipated as part of the Long Term Monitoring Plan are discussed in this section and the relevant 1,4-dioxane remediation work plans.

### 5.1.1 Targets for Precision, Bias, and Sensitivity

#### 5.1.1.1 Precision

Precision is a measure of the variability in the results of replicate measurements due to random error. Precision is optimized by collecting data at multiple locations and adhering to strict procedural guidelines that minimize possible sample contamination. Specific protocols utilized in this project are described in Section 7.

In addition, semi-permanent wells will be used for groundwater monitoring instead of temporary direct-push sampling at locations where groundwater samples will be collected multiple times from the same



location over the course of the 1,4-dioxane remedial action. Multiple rounds of data will be collected during the course of each phase of the remedial action to allow for comparison across events and over time.

### **5.1.1.2 Bias**

Bias is the difference between the population mean and the true value. ISCO treatment requires particular consideration. Groundwater samples containing commingled organic contaminants and oxidants (binary samples) have the potential for oxidative transformation of contaminants to occur after the sample is collected. In such samples, analytical results may be nonrepresentative of in situ conditions at the time of sampling. Consequently, the quality of the groundwater sample may be compromised, and a false negative result may occur (EPA, 2012). EPA has recommended specific sample collection, preservation, and analysis protocols for binary samples at ISCO sites in their document *Groundwater Sample Preservation at In-situ Chemical Oxidation Sites – Recommended Guidelines* (EPA, 2012). These protocols are included in the relevant work plans and are discussed below in Section 7.

Bias may also be unintentionally introduced during implementation of ISCO injections into groundwater as a result of heterogeneity in aquifer soils, uncertainty in strength of the chemical oxidant being injected, and uncertainty in the total volumes of chemical oxidant solution delivered into the aquifer. Bias as a result of ISCO injections will be minimized using the following measures:

- A conservative dose of chemical oxidant will be delivered into the aquifer to account for the potential heterogeneity of aquifer soils by applying a safety factor of 1.5 to the target dose identified in ISCO bench-scale studies.
- The sodium persulfate solution delivered to the site for ISCO injections will be assessed to verify the required solution strength by requesting a certificate of analysis or other appropriate documentation indicating the strength of the sodium persulfate solution. In addition, a premade solution of sodium persulfate will be delivered to the site to eliminate the need for on-site mixing and prevent potential inconsistency in solution strength.
- The volume of sodium persulfate solution delivered into the aquifer will be carefully controlled. The ISCO injection pump will be carefully controlled using a hand valve, while the flow meter and flow totalizer are closely monitored. To account for potential variability in volumes that may be delivered into the aquifer, an acceptable range of volumes was derived by assuming a safety factor of 1.25 to 1.75 applied to the calculated sodium persulfate dose is acceptable for each injection point, as described in the appropriate work plans.

### **5.1.1.3 Sensitivity**

Sensitivity is a measure of the capability of a method to detect a substance. Sensitivity will be accounted for by the following measures:

- The injection skid will contain appropriate control valves to adjust the flow rate to and from the centrifugal pump. The flow rate will be monitored with a flow meter that can measure flow within the expected flow ranges with a reported accuracy of  $\pm 2\%$ . The flow meter will totalize the cumulative injected volume to within 1 gallon to monitor and control the volume injected into each injection location.
- The injection pressure will be monitored with a glycerin-filled stainless steel pressure gauge that may be measured to within 1 pound per square inch gauge pressure. The pressure gauges will aid in maintaining the injection pressures within the design ranges.
- A field test kit for persulfate will be used during ISCO injections to evaluate the distribution and concentration of persulfate at different locations and in different media (soil and groundwater).

## **5.1.2 Targets for Comparability, Representativeness, and Completeness**

### **5.1.2.1 Comparability**

To help achieve comparability, standardized injection and sampling techniques and methods will be used, as described in the relevant work plans.

The pressures and flow rates during each injection event will be monitored continuously to document variation from design, and adjustments will be made in the field as discussed in the relevant work plans. Control valves will be adjusted so that the pressure does not exceed the design pressure. Flow rates and total flow quantities will be logged to monitor the total amount of oxidant added at each injection location.

### **5.1.2.2 Representativeness**

Representativeness will be optimized for this project by using general historical and investigative information to determine proper locations for new sampling and injection points that represent the areas of concern. Sampling and measurement methods detailed in the relevant work plans are designed so that representative data are collected with minimal disturbance of the environment from which they are collected.

To be considered representative, a data set should accurately and precisely represent the actual field conditions. Representativeness of the data will be evaluated by:

- Comparing actual sampling procedures to those prescribed in the work plans;



- Comparing actual field conditions encountered to conditions assumed during design;
- Comparing analytical results from field duplicates to determine variation in the analytical results; and
- Flagging nonrepresentative data or field conditions as invalid or identifying data that are noncompliant with project specifications.

Only representative data will be used in subsequent data reduction, validation, reporting, and remedial planning activities.

### **5.1.2.3 Completeness**

The data quality objective (DQO) for completeness for this project is 100% useable data for samples/analyses planned. If the completeness goal is not achieved, an evaluation will be made to determine if the data are adequate to meet project objectives. This evaluation will be done in cooperation with Ecology as part of the iterative process of this remedial action. Results will be presented for discussion with Ecology following each stage of the remediation implementation (ISCO pilot study injections, ISCO pilot study monitoring events, ISCO full implementation, etc.).

## **6.0 SAMPLING PROCESS DESIGN**

The sampling design, including figures showing fieldwork locations, samples to be collected, and the sample collection schedules, are included in the relevant monitoring plans.

## **7.0 FIELD PROCEDURES**

Procedures for all field activities are described in the relevant work plans. This section describes specific QA/QC protocols that will be implemented to meet project objectives and comply with requirements specified under Washington Administrative Code (WAC) section 173-340-400(4)(a)(xiii) and 173-340-400(4)(b)(v). QA/QC protocols related to monitoring activities that were included in the Long Term Monitoring Plan QAPP (Appendix D of EDR; Amec Geomatrix, 2011) or relevant work plans also apply to the 1,4-dioxane cleanup activities but are not repeated here.

All field personnel will have completed 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Site Operations (HAZWOPER) training, as specified in the HASP.

## 7.1 FIELD MEASUREMENT AND FIELD SAMPLING PROTOCOLS

Implementation and monitoring of the remedial action will include the following specific field measurements:

- Location measurement:
  - A GPS with an accuracy of  $\pm 0.5$  foot will be used to located injection and monitoring points.
  - The injection locations will be identified in the field prior to the start of work using the GPS unit and marked using paint and/or a nailed flag.
  - Locations in the field will be verified by measuring the distance from existing site features using a measuring tape.
  - The depth of the injections will be checked by counting known 5-foot drill rod lengths as the injection screens are pushed to the specified depth.
- Injections:
  - To avoid fracturing of the formation during injections, and to provide adequate pressure to distribute solution into the formation, injection pressures will be kept within a pressure range that uses an 80% safety factor in the calculation for the maximum allowable injection pressure.
  - Injections will be conducted at two to four locations at a time as specified in the relevant work plans. The injection skid and/or trailer used to deliver chemical oxidant or substrate/microorganisms will allow for adjustments to solution strength, injection volumes, or injection rates during implementation to maximize the radius of influence of distribution and the mass of chemical/microorganisms injected into the target zones.
- Soil samples will be evaluated visually and field tested for persulfate during ISCO implementation to evaluate oxidant distribution along the target depth interval.
- Groundwater sample analyses: Standard protocols will be used to collect groundwater samples for characterization and compliance sampling at the site (as described in the Long Term Monitoring Plan QAPP). However, monitoring at ISCO/ISB treatment sites will include the following additional tasks:
  - Persulfate will be measured using a colorimetric field test kit at the time of sample collection.
  - Groundwater samples will be preserved with ascorbic acid to maintain the binary nature of the sample (i.e., sample contains both 1,4-dioxane and oxidant) at the time of collection and avoid low-biased results for 1,4-dioxane. Sample bottles will come pre-preserved from the analytical laboratory to support this method.



## **7.2 EQUIPMENT, CONTAINERS, PRESERVATION METHODS, HOLDING TIMES**

Specific equipment and containers are described in the relevant work plans and the Long Term Monitoring Plan QAPP (Appendix D of EDR; Amec Geomatrix, 2011).

The addition of oxidant does not alter the collection methods or containers that will be used during groundwater sampling. Other than the targeted constituents, the selected oxidant is not anticipated to react with materials used for sample collection and analysis it will contact, including those contained in the permanent and temporary monitoring wells and also the various hoses and pumps that will be utilized during injection. If oxidants other than sodium persulfate are proposed for portions of the remedial implementation, the issue of compatibility will be reassessed.

## **7.3 EQUIPMENT DECONTAMINATION**

Equipment decontamination methods will follow those outlined in Stericycle's Decontamination SOP 200, included in the Long Term Monitoring Plan QAPP. All nondedicated equipment will be decontaminated prior to use.

## **7.4 OTHER ACTIVITIES**

Results will be presented for discussion with Ecology following each stage of the remediation implementation (ISCO pilot study injections, ISCO pilot study monitoring events, ISCO full implementation, etc.). Alterations to methods and data collection will be discussed at each stage to improve effectiveness of the remedial measure.

## **8.0 MEASUREMENT METHODS**

The specific location and number of samples to be collected are described in the relevant Work Plans, along with the analyses to be completed. Methods will be selected to meet project objectives of detecting treatment indicators and indicators of potential side-effects, such as pH, metals, sulfate, and persulfate, at measurable levels within the range of baseline conditions. Monitoring for 1,4-dioxane will be done utilizing methods that attain reporting limits consistent with historically detected concentrations and the applicable cleanup level.

## **9.0 QUALITY CONTROL (QC) PROCEDURES**

### **9.1 FIELD AND LAB QC REQUIRED**

QC procedures for aspects of sampling or monitoring conducted during the remedial action will follow those outlined in the Long Term Monitoring Plan QAPP. Field and laboratory QC samples will be collected and analyzed at the frequency specified in the Long Term Monitoring Plan QAPP. Field

duplicates and field blanks will be analyzed for field-tested parameters, such as persulfate, at the same frequency as for the parameters analyzed at the laboratory in accordance with the Long Term Monitoring Plan QAPP.

## **9.2 CORRECTIVE ACTION PROCESSES**

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or QC performance outside established criteria. Corrective action can occur during field activities, laboratory analyses, data validation, or data assessment.

Corrective actions should be designed to correct the problem and to minimize the possibility of recurrence. Examples of corrective actions include modifying nonconforming procedures, forms, or worksheets; instituting a quality check; and the like. Proposed corrective actions should be reviewed and approved by the consultant team and/or Engineering Team lead prior to implementation.

Significant noncompliance and corrective actions will be discussed in QA reports to the Stericycle Corrective Actions Project Manager and Ecology, as appropriate. Such reporting will be completed as part of the scheduled routine conference calls to be conducted between injection and monitoring rounds during implementation of the remedy.

Project personnel will be responsible for reporting technical or QA nonconformances or deficiencies of any activity or issued document to the consultant team and the Engineering Team lead. The Engineering Team lead will consult with the Stericycle Corrective Actions Project Manager to determine whether the situation warrants a reportable nonconformance and subsequent corrective action. If so, a Corrective Action Report (CAR) will be initiated by the Engineering Team lead.

Corrective actions will be implemented and documented in the field record log. No staff member will initiate corrective action without prior communication of findings using the process described above.

## **10.0 DATA MANAGEMENT PROCEDURES**

### **10.1 DATA RECORDING/REPORTING REQUIREMENTS**

Field logbooks, chemical injection logging forms (logging flow rates and quantities), station/sample forms, and chain-of-custody/sample analysis request forms are prepared by the field team while sample collection activities are in progress. Field sampling information, such as water elevation data, is entered manually. Data from the laboratories are entered directly into a project database from the electronic data deliverables (EDDs).





Project tables and reports are prepared using customized retrievals that filter and sort the data according to criteria specified by the user. The data are automatically formatted for direct use with statistics software packages and various geographic information systems (GIS) software.

## **10.2 ACCEPTANCE CRITERIA FOR EXISTING DATA**

Field logbooks and forms will be reviewed to assess compliance of the implementation with the specified design. Deviations will be noted and considered as part of progressing to the next step in remediation implementation. This information will be discussed during the scheduled conference calls for the project team (Ecology, Stericycle, and the engineering team) held between events.

## **11.0 REPORTS AND DATA VERIFICATION**

Reporting schedules and contents are described in the relevant work plans. All chemical data generated for the project will be validated and reviewed consistent with the process described in the Long Term Monitoring Plan QAPP.

## **12.0 DATA QUALITY ASSESSMENT**

The goals of data verification and validation are to determine the quality of each data point and identify data points that do not meet measurement performance criteria and other project DQOs. Nonconforming data may be qualified as estimated (J) or rejected (R) as unusable during data validation if criteria for data quality are not met. Rejected data (R) will be flagged as unreportable in the project database and will be excluded from all data retrievals. These data will not be used for any purpose. An explanation of the rejected data will be included in a data validation report. If the rejected data are needed to make a decision, then it may be necessary to resample. Any decision to resample would be based on discussions among the project management team and Ecology.

The 1,4-dioxane remediation approach was designed to allow for continuous assessment of remediation performance and adjustment to the design as additional data are collected and evaluated. For each of the components of the remedial action, predesign studies have been or will be performed to evaluate the ability of the remedial technologies to attain remedial action objectives and to identify any potential adverse side effects that the remedy may have on human and ecological health or the environment. The results of predesign studies will be used to design the full-scale remedial action that will be detailed in deliverables to Ecology.

### 13.0 REFERENCES

- Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2015a, 1,4-Dioxane Remedial Design – Remedial Action (RD/RA) Work Plan, Stericycle Georgetown Facility, Seattle, Washington. October.
- Amec Foster Wheeler, 2015b, 1,4-Dioxane Remediation Approach Focused Feasibility Study, Stericycle Georgetown Site, Seattle, Washington. January.
- Amec Foster Wheeler, 2015c, 1,4-Dioxane Remediation Approach Focused Feasibility Study Response to Comments, Stericycle Georgetown Site, Agreed Order DE 7347, Seattle, Washington. March.
- Amec Foster Wheeler Environment & Infrastructure, Inc., and Dalton, Olmsted, & Fuglevand (Amec Foster Wheeler and DOF), 2016, Revised in Situ Chemical Oxidation Pilot Study Work Plan, Stericycle Georgetown Facility Downgradient Area, Seattle, Washington: Prepared for: Burlington Environmental, LLC, March.
- AMEC Geomatrix, Inc. (AMEC Geomatrix), 2011, Revised Engineering Design Report, PSC Georgetown Facility, Seattle, Washington. September.
- Ecology, see Washington State Department of Ecology
- EPA, see U.S. Environmental Protection Agency
- U.S. Environmental Protection Agency (EPA), 2012, Ground Water Sample Preservation at In-Situ Chemical Oxidation Sites – Recommended Guidelines, EPA Ground Water Issue Paper. US Environmental Protection Agency, National Risk Management Research Laboratory, R.S. Kerr Environmental Research Center, Ada, OK. EPA/600/R-12/049.
- Washington State Department of Ecology (Ecology), 2015, PSC-Georgetown Facility 1,4-Dioxane Remedial Design/Remedial Action Work Plan, Ecology/EPA ID#: WAD 00081 2909. October.

## Appendix H

## Method

Persulfate is a strong oxidizer that is commonly used for clarifying swimming pools and spas and for the destruction of a broad range of soil and groundwater contaminants. Sodium persulfate is frequently used for environmental applications.

### The Ferric Thiocyanate Method

**Reference:** D.F. Boltz and J.A. Howell, eds. **Colorimetric Determination of Nonmetals, 2<sup>nd</sup> Ed., Vol. 8, p. 304 (1978).**

CHEMetrics' persulfate test kit employs the ferric thiocyanate method. In an acidic solution, persulfate oxidizes ferrous iron. The resulting ferric ion reacts with ammonium thiocyanate to form ferric thiocyanate, a red-orange colored complex, in direct proportion to the persulfate concentration. Chlorine does not interfere with this chemistry. Ferric iron, hydrogen peroxide, and ozone will interfere. Results are expressed in ppm (mg/L) sodium persulfate ( $\text{Na}_2\text{S}_2\text{O}_8$ ).

## Visual Kit

**Range: 0-5.6 & 7-70 ppm as  $\text{Na}_2\text{S}_2\text{O}_8$**   
**MDL: 0.35 ppm / Method: Ferric Thiocyanate**

	Cat#
<b>CHEMets Kit</b>	<b>K-7870</b>
CHEMets Refill, 30 ampoules	R-7870
Low Range Comparator 0, 0.7, 1.4, 2.1, 2.8, 3.5, 4.2, 5.6 ppm	C-7807
High Range Comparator 7, 14, 21, 28, 35, 42, 49, 56, 70 ppm	C-7870

Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Low and High Range Comparators, 25 mL sample cup and instructions.

### Kit Components common to Persulfate

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013

*Instructions and SDSs are posted on our website.  
 If no shelf-life is listed for a product, then the shelf-life is at least 2 years.*

