Technical Memorandum:
Revised 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 for injection and target treatment 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 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 methantropic 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 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 anerobic 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, currently 2032, may be appropriate depending on the results of the full scale ISCO injections. The remedial action, as designed, includes ISCO and natural attenuation to achieve 1,4-dioxane cleanup levels.

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 1,4-dioxane sampling locations between these points along 6th 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 6th 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).

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 well clusters, and CG-161-60, 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. Injection locations were placed in order to streamline injection permitting by staying within public rights of way, avoiding known utilities, and limiting impacts on nearby businesses when possible.

For the CG-122 and the CG-128 well clusters injection locations were placed in the right of way and do not significantly impact business access. The injections near CG-127 and CG-161-60 surround the parking lot and cross both driveways for businesses at 5600 to 5620 6th Ave South. Average 1,4-dioxane concentrations are estimated to be much higher between 161-60 and CG-127 (491 μg/L to 320/705 μg/L) as compared to the area between CG-127 and CG-162-80 (2 μg/L Figure 2). To limit the impacts to access to the parking lot, injections were placed across only one driveway (the one near 161-60 with the higher 1,4-dioxane concentrations) and injection locations cease approximately 25 feet south of the CG-127 cluster to avoid blocking the second driveway to the businesses from 5600 to 5620 6th Ave S. .

Vertical injection intervals 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. Given the length of the vertical treatment area ISOTEC recommended splitting the injection depths for treatment Area 4 (CG-127 cluster) to distribute the injectate over the 40-foot (35-75' bgs) target treatment depth resulting in two rows of injections.

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 (Table 2) adjacent to wells that have shown the highest concentrations (averaging more than 300 μg/L) of 1,4-dioxane at depths of ranging from 35 to 75 feet bgs (Figure 2).

The treatment locations are in the center of the 1,4-dioxane plume. Treatment Area #1 (near CG-122-60) at the upgradient edge of the center of the plume and Treatment Areas #2, 3, and 4 along 6th Ave South all closer to the leading edge of the center of the plume (Figure 2). Concentrations of 1,4-dioxane upgradient of CG-122-60 are typically less than 10 μg/L with a few locations at approximately 50 μg/L. Concentrations at 5th Ave South are typically 100 to 200 μg/L. Target treatment areas with potential downgradient and cross gradient monitoring wells are listed in Table 2.

The EDR (AMEC Geomatrix, 2011) provided a hydraulic conductivity of 5.1 x 10-3 centimeters per second and a hydraulic gradient of 0.0016 for the intermediate aquifer unit. Assuming an effective porosity of 20%, the groundwater seepage velocity is approximately 0.8 feet per week or 42 feet per year.

Reagent solutions (activation chemicals, stabilizers, and sodium persulfate) will be injected using pneumatically operated double-diaphragm pumps, powered by a 185-cubic feet per minute compressor, into the temporary screens installed in the direct push borings using a dedicated injection system for each injection point that will provide flow control, flow measurements, and pressure indicators (see ISOTEC procedures in Appendix F for details and Figure 3 for a process and instrumentation diagram). ISOTEC's procedures include 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 10-12% and a hydrogen peroxide dosage of 6-10%, 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 6-10%, 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, drilling from previous investigations in the project area, 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, target injection pressures to distribute the activation chemicals and sodium persulfate solution into the formation will not exceed 45 pounds per square inch (psi) due to the potential for fracturing the subsurface formation and creating preferential pathways (Appendix F). If pressures are too high at one interval, any remaining amount will be injected at the next injection interval as pressures allow. The 2016 pilot study illustrated that pressures below 20 psi were capable of delivering the designed volumes of oxidant to the subsurface. In general, ISOTEC will use this target pressure of 0-20 psi (Appendix F) as the optimal injection pressure range to distribute reagents into the subsurface. It is unlikely pressures greater than 20 psi will be necessary to complete injections, but if pressures increase to 45 psi, injections will cease and screens will be repositioned to continue the injection. Pressures will not be allowed to exceed 45 psi due to potential for fracturing the subsurface formation at or above this pressure.

6. A 10-15-foot radius of influence (effective area of oxidant distribution) is assumed based on ISOTEC's previous experience. As indicated in Section 2.3, ISCO injections will target four treatment areas adjacent to CG-122, CG-127, and CG-128 well clusters as well as CG-161-60 over varying depth intervals (approximately 35-75 feet bgs). Table 2 lists target treatment areas and depths. Figure 2 shows the target treatment areas. For the purpose of estimating sodium persulfate mass requirements areas of treatment were estimated by ISOTEC using the above stated ROI (ISTOEC Proposal Appendix F, Table 3).

7. The proposed 10-12% 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 injected in total (varying per injection point based on target treatment area, target treatment depth and injection interval), and the injected solution volume will occupy approximately 17--19% of the effective pore space. The percentage of effective pore space increase from the pilot study is intended to improve delivery, increase contact with 1,4-dioxane, and allow for greater treatment radius of influence (ROI) while locating injection points to accessible right of way areas. The estimated pore volume per treatment area was calculated by ISOTEC and is provided as part of ISOTEC's proposal Table A in Appendix F.

8. A flow rate range of 1-2 gpm will be targeted per injection point over each 2 foot injection interval. Based on ISOTEC's previous experience and field conditions during implementation, adjustments to flow rate and screen length may be necessary. A decision tree for adjustment of injection procedures is provided as Figure 4. 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 10-12% 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 locations. Perform One-Call and a private locate to confirm utility locations for areas with proposed push probe injections. Known utilities are provided as part of Figure 5.
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. Install new monitoring well CG-131-75 and develop the well.
7. Remove the wax candles from the three semi-permanent wells (IP-5, -6, and -7) upgradient of CG-122-60.
8. Perform baseline groundwater monitoring per the performance monitoring plan (Section 5.1).
9. 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.

10. Coordinate Ecology site visit prior to commencement of injections.
11. Perform ISCO injections at IP-5, 6, and 7.
12. Perform ISCO direct push injections at the other target areas.
13. Perform groundwater monitoring #2 per the performance monitoring plan (Section 5.1).
14. 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.
15. Perform steps 13 and 14 for groundwater monitoring event #3
16. Meet with Ecology to review preliminary results and assess if a secondary injection is necessary or continued monitoring is warranted.
17. Perform steps 13 and 14 for groundwater monitoring events 4 through 7.

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 6th, 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 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 and a single new monitoring well (CG-131-75 Figure 2). 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 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. Secondary containment will be chemically compatible (Polyethylene) with injection compounds and appropriately sized to completely contain the contents of the largest vessel within the containment area. The containment structure will be comprised of a shallow, open top, box-like structure approximately 10 feet by 20 feet in area, or smaller. Polyethylene material was selected because it will not be readily degraded by the chemicals in use for this project. 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 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 after completion of the injections to evaluate the objectives defined in Section 1 and to ensure that downgradient receptors are protected during and after implementation of the remedy. Monitoring is broken into four stages:

- Baseline monitoring conducted prior to injections;
- Monitoring during injections, to evaluate if injection is proceeding per design and if injection methods can be optimized;
- Short term Post injection monitoring, to evaluate conditions during the active oxidation phase; and
- Long Term Post Injection Monitoring, to evaluate conditions once the oxidant is most likely spent.

Monitoring during injections will be performed by ISOTEC in wells within the target treatment areas (Table 2). Primary monitoring parameters will be pressure and flow with secondary monitoring parameters detailed on Table 4. ISOTEC and DOF will evaluate the results as per the decision tree shown on Figure 4 to assess if injections are proceeding per design and if any changes can be made to improve injection performance. Additional details are provided in section 5.1.2.3.

Short term and long term post injection monitoring will be assessed per criteria listed on Tables 5 and 6. The primary parameter evaluated will be 1,4-dioxane concentration trends, but sulfate, metals, and pH will also be tracked and compared against design expectations.

A summary of the non-injection monitoring events is described below with details provided on Table 3 and monitoring locations shown on Figure 6.

- 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), including a new well CG-131-75 per Ecology request, during the third quarter 2019 monitoring event.
- Event 2: Within 48 hours after injection, groundwater samples will be collected to measure immediate 1,4-dioxane degradation and persulfate distribution in the wells nearest to target treatment areas (CG-122, IMW-1, IMW-2, CG-127, CG-128, CG-161 clusters).Sampling is expected to show 1,4-dioxane degradation greater than 50 percent and persulfate concentrations greater than 250 ppm.

- Event 3: Two to four weeks after injections in targeted treatment areas (CG-122, IMW-1, IMW-2, CG-127, CG-128 clusters and CG-161-60), as well as several direct push borings (with one sample collected every 10 feet from 35 to 75 feet bgs, approximate depths are shown in Table 3) 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 treatment areas 2 and 4. Locations were chosen which would show if persulfate oxidation was still occurring, if oxidant had reached these monitoring locations, and will be measured against criteria shown in Table 4. However, ROI for areas where conditions for degradation have been enhanced, is anticipated to vary and given the heterogeneity of the aquifer monitoring values could range from low to high response as shown in Table 4.
- A review of initial results (after monitoring Events 1 through 3) approximately 60 to 90 days after the last injection has been completed (pending laboratory receipt of laboratory results) will be done and results provided to Ecology to assess if conditions demonstrate that a second injection is warranted.
- 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 treatment 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 injections. 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.

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 for handling persulfate, hydrogen peroxide, sodium hydroxide, and chelated iron and general safety procedures for the injection compounds including a summarized injection approach (Appendix F). The work area will be controlled to prevent members of the public from being exposed to any liquid leaks or spills. Prior to the start of injections, pressure checks will be completed on the injection system per ISOTEC protocols

provided in Appendix F. PPE and safe working areas (hot zones) to eliminate pubic 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. Secondary containment will be chemically compatible with injection compounds and appropriately sized to completely contain the contents of the largest vessel within the containment area. The containment structure will be comprised of a shallow, open top, box-like structure approximately 10 feet by 20 feet in area, or smaller. Polyethylene material was selected because it will not be readily degraded by the chemicals in use for this project. Spill kits will contain appropriate materials for cleanup of spills, including but not limited to absorbent, protective clothing, disposable bags, and a waste container.

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. Wells within the treatment area should behave differently than those that are listed as cross-gradient or downgradient (Table 2). The specific monitoring objectives include:

- Estimating the performance of ISCO for 1,4-dioxane mass destruction by comparing mass of 1,4-dioxane in treatment area wells from baseline monitoring event to subsequent monitoring events;
- Observing oxidant distribution and persistence over space and time (expected to be seen for up to six weeks in treatment area wells with no detection in downgradient wells);
- Observing the degree and persistence of any metals mobilization associated with ISCO (expected to be seen up to several months in treatment area wells with little to no change from baseline levels in downgradient wells);
- Observing the degree and persistence of changes in groundwater pH and other geochemical parameters associated with ISCO (expected to be seen up to a year in treatment area wells with little to no change from baseline levels in downgradient wells); and
- Observing the degree and persistence of increased levels of dissolved sulfate (expected to be seen up to a year in treatment area wells with little to no change from baseline levels in downgradient wells).

A summary of indicator levels for various parameters are provided in Table 4. Mass removal will be estimated using the Thiessen Polygon method used in Appendix A of the FFS (Amec Foster Wheeler 2015). Results from the baseline sampling will be used to calculate mass before ISCO injections for comparison to results from later monitoring events.

More immediate destruction of 1,4-dioxane mass in groundwater will be measured as part of the short term monitoring (Events 2 and 3). Destruction of mass in the less permeable zones will be measured as part of longer term monitoring (Events 4 through 7) and indications of rebound will be assessed via trend analysis. If 1,4-dioxane concentrations rebound after initial decline, it may due to back diffusion from less permeable zones or from upgradient sources. For Target Treatment Area 1, there are no upgradient sources, so any rebound would most likely be due to back diffusion processes. For Target Treatment Areas 2, 3, and 4 trend analysis will be more complicated given their location in the plume but analysis of seepage velocity may help clarify the likely cause of rebound.

5.1.2.2 Monitoring Approach

The monitoring approach will include a pre-injection baseline sampling event, followed by six 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 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, specific conductance, and major cations/anions.

During injections, continuous monitoring of primary injection indicators, including flow rate and pressure, will occur while injections are in progress. Daily grab sampling of secondary injection indicators, including ORP, iron, specific conductivity, DO, hydrogen peroxide, sulfate, and persulfate, (Table 4) will be performed in wells CG-122-60, CG-122-75, CG-161-60, CG-127-40, CG-127-75 when injections are actively occurring within the treatment area associated with these wells (Table 2).

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, identified as two to four weeks (Event 3) based on a combination of ISOTEC bench scale study results and field experience, 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 6 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 (Appendix G). 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).

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 (Appendix G). If samples collected during Event 4 exhibit the presence of chemical oxidant, the samples will be quenched using the same procedures as Event 3. 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.
- 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 listed in Table 3. 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.

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 2016 QAPP has been updated for full scale implementation and is included in Appendix G.

6.0 Demobilization 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 ISCO 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 sodium persulfate reagent cylinders;
- Empty stabilized hydrogen peroxide drums and carbohydrate activator drums or buckets;
- Decontamination rinse water (minimal generation because injection equipment is flushed as part of injection operations); 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 September 2019 if permitting is expedited.

Prior to the start of the injections in the first treatment area, Stericycle will coordinate an inspection with Ecology.

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. As data from interim sampling events becomes available, the data will be provided to Ecology. A review of initial results (after monitoring Events 1 through 3) approximately 60 to 90 days after the last injection has been completed (pending laboratory receipt of laboratory results) will be done and results provided to Ecology to assess if conditions are apparent that a second injection is warranted. 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 (Event 7), 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).

At the conclusion of ISCO injections, Stericycle will prepare and submit a Construction Completion Report. The report will document aspects of the injection field work and provide conclusions based on analytical results and inspections to document the remedial action was implemented in accordance with this Work Plan.

An estimated project schedule is provided as Figure 7.

8.0 References

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

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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.

Tasya Gray, LG

Principal Geologist

This report was prepared by the staff of Dalton, Olmsted, & Fuglevand, Inc., under the supervision of the engineer whose seal and signature appear hereon.

The findings, recommendations, specifications, or professional opinions have been prepared in are presented within the limits described by the client, in accordance with generally accepted professional engineering and geologic practices in Western Washington for the nature of services authorized by the client at the time the services were provided. No warranty is expressed or implied.

July 15, 2019

Patrick Hsieh, PE

Senior Engineer

Tables

Table 1
DP-167 and Bench Sample Results
Stericycle Georgetown
Seattle, Washington

Location ID	Media	Date	Depth	Pumping rate	Volume Purged	pH	Conductivity	Temperature	Turbidity	Dissolved Oxygen	Redox Potential	Ferric Fe3+	Ferrous Fe2+	Total Fe	Total Fe	Total Organic Carbon	Total Organic Carbon	1,4-Dioxane	1,4-Dioxane
			ft bgs	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

Fe	Iron
ft	feet
bgs	below ground surface
-	no sample collected
µg/L	micrograms per liter
mg/L	milligrams per liter
mL/min	milliliters per minute
mV	millivolts
ppm	parts per million
NTU	nephelometric turbidity units
mS/cm	millisiemens per centimeter

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Table 2
Target Injection Locations, Target Treatment Depths, and Injection Intervals
Stericycle Georgetown
Seattle, Washington

Treatment Area #	Treatment Area/Location Description	Injection Points [1]	Surface Area (square ft)	Monitoring locations Inside Target Treatment Volume	Injection Intervals	Target Treatment Depths	Upgradient Monitoring Locations	Cross Gradient Monitoring Locations	Down Gradient Monitoring Locations	Additional Down Gradient Monitoring Locations	Average 1,4-Dioxane Concentration
		#			(ft bgs)	(ft bgs)					µg/L
1	Right of Way West side of Maynard Ave. north of S. Lucile St.	3	200	CG-122-60, IMW-1, IMW-2	50-60	50-60	CG-113-I, CG-123-90, CG-124-70, CG-124-40	CG-122-75, CG-165-45, CG-164-60	CG-128-45, CG-128-70, CG-161-60	CG-160-45, CG-160-65	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	2,200	CG-161	50-60	50-60	CG-122-60, IMW-1, IMW-2	None	DP-169, CG-160-45, CG-160-65, CG-131-40, CG-131-75	BDC-10-60, BDC-10-40, CG-134-40	491
3	Right of Way on east side of 6th Ave. S. (North Row, South of Lucile St.)	5-7	1,000	CG-128-45	35-45	35-45	CG-165-45	None	DP-169, CG-160-45, CG-160-65, CG-135-40, CG-135-50	ABP-MW-6-30	342
4	Right of Way on east side of 6th Ave. S. (East Row Near and South of Findlay St.)	10-13	2,900	CG-127-40, CG-127-75	35-43, 50-60, 65-75	35 - 75	CG-125-40	CG-162-80	DP-168, CG-162-80, CG-159-45, CG-131-40, CG-131-75	CG-166-80, BDC-10-60, BDC-10-40, CG-134-40, CI-8-40, CI-8-60	324
	Right of Way on east side of 6th Ave. S. (West Row South of Findlay St.)	5-7			38-52, 58-72						705
	Total number of points	35-45									

Notes:
1 Number of injection points and exact injection intervals to be determined based on subsurface utilities and injection pressures and flow rates.

Abbreviations
ft feet
bgs below ground surface
µg/L micrograms per liter

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Table 3
Monitoring Plan Requirements
Stericycle Georgetown
Seattle, Washington

Monitoring Event	Event Timing	Monitoring Well	Location	Sample Depth	Lab Sample Parameters[1]	Field Sample Parameters[2]
Monitoring Event #1	Prior to First Injection Event	CG-122-60	Treatment Area	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-122-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		IMW-1		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		IMW-2		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-127-40		30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-127-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-128-45		35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-161-60		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-131-40	Downgradient	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-131-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-160-45		35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-160-65		55-65 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
Monitoring Event #2	Within 48 Hours After Injection	CG-122-60	Treatment Area	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
Monitoring Event #3	Two to Four Weeks After Injection	CG-122-60	Treatment Area	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 [4]		35-39, 45-49, 55-59, 65-69 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 [4]		35-39, 45-49, 55-59, 65-69 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.
3 Major cation/anion includes Na+, K+, Ca+2, Cl-, NO3-, CO3, and HCO3
4 Depths for direct push grab samples are approximate and may be modified to account for field constraints (heaving sands, etc.)

Abbreviations:

ft bgs	feet below ground surface	Cl-	Chlorine ion
MTCA	Model Toxics Control Act	NO3-	Nitrate ion
Na+	Sodium ion	CO3	Carbonate
K+	Potassium ion	HCO3	Bicarbonate
Ca+2	Calcium ion		

DALTON OLMSTED FUGLEVAND

Table 3
Monitoring Plan Requirements
Stericycle Georgetown
Seattle, Washington

Monitoring Event	Event Timing	Monitoring Well	Location	Sample Depth	Lab Sample Parameters[1]	Field Sample Parameters[2]
Monitoring Events #4 and #5	Two Months and Four Months After Injection	CG-122-60	Treatment Area	50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-122-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		IMW-1		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		IMW-2		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-127-40		30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-127-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-128-45		35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-161-60		50-60 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	persulfate, pH, ORP, DO, temperature, and specific conductance
		CG-131-40	Downgradient	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-131-75		65-75 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-160-45		35-45 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
		CG-160-65		55-65 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide, major cation/anions[3]	pH, ORP, DO, temperature, and specific conductance
Monitoring Events #6 and #7	Coincide with Long-Term Semi-Annual Sampling Events Following Monitoring Event #5	CG-122-60	Treatment Area	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	Downgradient	30-40 ft bgs	1,4-dioxane, dissolved MTCA metals, sulfate, sulfide	pH, ORP, DO, temperature, and specific conductance
		CG-131-75		65-75 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

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.
3 Major cation/anion includes Na+, K+, Ca+2, Cl-, NO3-, CO3, and HCO3

Abbreviations:

ft bgs	feet below ground surface	Cl-	Chlorine ion
MTCA	Model Toxics Control Act	NO3-	Nitrate ion
Na+	Sodium ion	CO3	Carbonate
K+	Potassium ion	HCO3	Bicarbonate
Ca+2	Calcium ion		

DALTON OLMSTED FUGLEVAND

Table 4

Site-Specific Definitions for Assessment of Secondary Injection Indicators

Stericycle Georgetown

Seattle, Washington

Response	Persulfate	Hydrogen Peroxide	Dissolved Oxygen	Iron	ORP	Sulfate	Specific Conductance
High	> 250 mg/L	> 10 mg/L	BL + 5 mg/L	> BL + 5 mg/L	>BL + 200 mV	> 500 mg/L	> 5 x BL (µS/cm)
Medium	> 50 mg/L	> 2 mg/L	BL + 3 mg/L	> BL + 2 mg/L	>BL + 100 mV	> 100 mg/L	> 2 x BL (µS/cm)
Low	> BL <50 mg/L	> 0.5 mg/L	BL + 1 mg/L	BL + 2 mg/L	>BL + 25 mV	> BL ≤ 100 mg/L	≤ 2 x BL (µS/cm)

Abbreviations:

BL	base line
mg/L	milligrams per liter
mV	millivolts
µS/cm	microsiemens per centimeter

DOF DALTON OLMSTED FUGLEVAND

Table 5
Performance Monitoring Criteria
Stericycle Georgetwon
Seattle, Washington

Performance Monitoring Parameters		Treatment Area 1 CG-122-60 Area		Treatment Area 2 CG-161-60 Area		Treatment Area 3 CG-128-45 Area		Treatment Area 4 CG-127 Area	
		Design/Target	Actual	Design/Target	Actual	Design/Target	Actual	Design/Target	Actual
During Injection Performance									
A	Were the number of injections in range with target?	3 Injection Wells		12 to 15 DPT points		5 to 7 DPT points		15 to 20 DPT points	
B	Were the depth of injections in range with target?	50 to 60 ft bgs		50 to 60 ft bgs		35 to 45 ft bgs		35 to 75 ft bgs	
C	Was the dose of chemicals in range with target?								
	Persulfate	10 to 12 %		10 to 12 %		10 to 12 %		10 to 12 %	
	Iron	2.5 to 3.5 g/L		2.5 to 3.5 g/L		2.5 to 3.5 g/L		2.5 to 3.5 g/L	
	Hydrogen Peroxide	6 to 10 %		6 to 10 %		6 to 10 %		6 to 10 %	
	Sodium Hydroxide	0.25 % to 0.5% of persulfate solution		0.25 % to 0.5% of persulfate solution		0.25 % to 0.5% of persulfate solution		0.25 % to 0.5% of persulfate solution	
	Carbohydrate	3 to 5 wt % of persulfate solution		3 to 5 wt % of persulfate solution		3 to 5 wt % of persulfate solution		3 to 5 wt % of persulfate solution	
D	Was the total volume of injection chemicals on target with design?	700 gallons		7,700 gallons		3,500 gallons		28, 400 gallons	
E	Was radius of influence within design targets? [1]	10 to 15 ft		10 to 15 ft		10 to 15 ft		10 to 15 ft	
	Persulfate	> BL < 50 mg/L		> BL < 50 mg/L		> BL < 50 mg/L		> BL < 50 mg/L	
	Hydrogen Peroxide	> 0 mg/L		> 0 mg/L		> 0 mg/L		> 0 mg/L	
	Dissolved Oxygen	> BL (mg/L)		> BL (mg/L)		> BL (mg/L)		> BL (mg/L)	
	Iron	> BL (mg/L)		> BL (mg/L)		> BL (mg/L)		> BL (mg/L)	
	ORP	> BL (mV)		> BL (mV)		> BL (mV)		> BL (mV)	
	Sulfate	> BL mg/L		> BL mg/L		> BL mg/L		> BL mg/L	
	Specific Conductance	> BL (µS/cm)		> BL (µS/cm)		> BL (µS/cm)		> BL (µS/cm)	

Notes:
1 See Table 4 to determine level of response

Abbreviations:

DPT	direct push tooling	bgs	below ground surface	mg/L	milligrams per liter
ft	feet	BL	base line	µS/cm	microsiemens per centimeter
s.u.	standard unit				

DALTON OLMSTED FUGLEVAND

Table 5
Performance Monitoring Criteria
Stericycle Georgetwon
Seattle, Washington

	Performance Monitoring Parameters	Treatment Area 1 CG-122-60 Area		Treatment Area 2 CG-161-60 Area		Treatment Area 3 CG-128-45 Area		Treatment Area 4 CG-127 Area	
		Design/Target	Actual	Design/Target	Actual	Design/Target	Actual	Design/Target	Actual
Short-Term Post Injection Performance (Events 2 & 3)									
F	Was short term monitoring indicative of good performance of oxidant?								
	1,4-dioxane Concentration Decline?	> 50 %		> 50 %		> 50 %		> 50 %	
G	Was short term monitoring indicative of negative impacts on groundwater quality?								
	Sulfate Concentration?	> 500 mg/L		> 500 mg/L		> 500 mg/L		> 500 mg/L	
	Elevated metals?	> 10 x BL (mg/L)		> 10 x BL (mg/L)		> 10 x BL (mg/L)		> 10 x BL (mg/L)	
	Changes in pH?	> 1 unit change		> 1 unit change		> 1 unit change		> 1 unit change	
Long-Term Post Injection Performance (Events 4 through 7)									
H	Was long term monitoring indicative of good performance of oxidant?								
	1,4-dioxane Concentration Decline?	> 50 %		> 50 %		> 50 %		> 50 %	
I	Was long term monitoring indicative of negative impacts on groundwater quality?								
	Sulfate Concentration?	> 100 mg/L		> 100 mg/L		> 100 mg/L		> 100 mg/L	
	Elevated metals?	> 5 x BL (mg/L)		> 5 x BL (mg/L)		> 5 x BL (mg/L)		> 5 x BL (mg/L)	
	Changes in pH?	< 5.5 s.u. or > 0.5 unit change		< 5.5 s.u. or > 0.5 unit change		< 5.5 s.u. or > 0.5 unit change		< 5.5 s.u. or > 0.5 unit change	

Notes:
1 See Table 4 to determine level of response

Abbreviations:

DPT	direct push tooling	bgs	below ground surface	mg/L	milligrams per liter
ft	feet	BL	base line	µS/cm	microsiemens per centimeter
s.u.	standard unit				

DALTON OLMSTED FUGLEVAND

Table 6
Post Injection Response Criteria
Stericycle Georgetown
Seattle, Washington

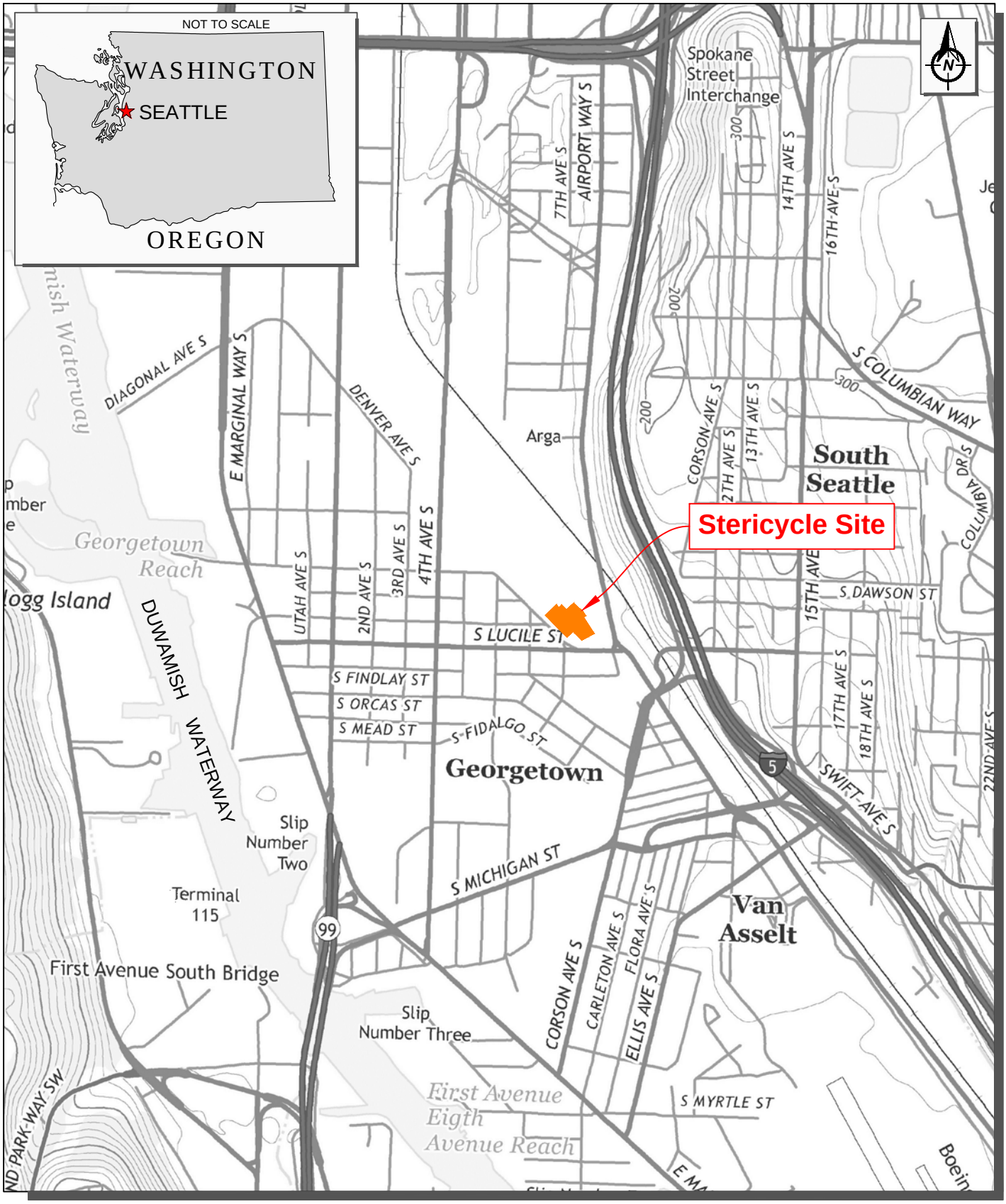
Response	Persulfate	ORP	Sulfate	Sodium	Specific Conductance	Increased Metals Concentrations	Decreased COC Concentration
High	> 1,000 mg/L	> 200 mV	> 500 mg/L	> 1,000 mg/L	> 5 x BL (µS/cm)	> 10 x BL (mg/L)	> 80 %
Medium	> BL + 200 mg/L	≥ 0 mV	> 100 mg/L	> 10 x BL mg/L	> 2 x BL (µS/cm)	> 2 x BL (mg/L)	>50 %
Low	≤ BL + 200 mg/L	< 0 mV	≤100 mg/L	≤ 10 x BL mg/L	≤ 2 x BL (µS/cm)	≤ 2 x BL (mg/L)	≤ 30 %

Notes:

BL = Base Line
mg/L =milligrams per liter
mV = millivolts
µS/cm = microsiemens per centimeter

DOF DALTON OLMSTED FUGLEVAND

Figures



Stericycle - Georgetown
Seattle, Washington

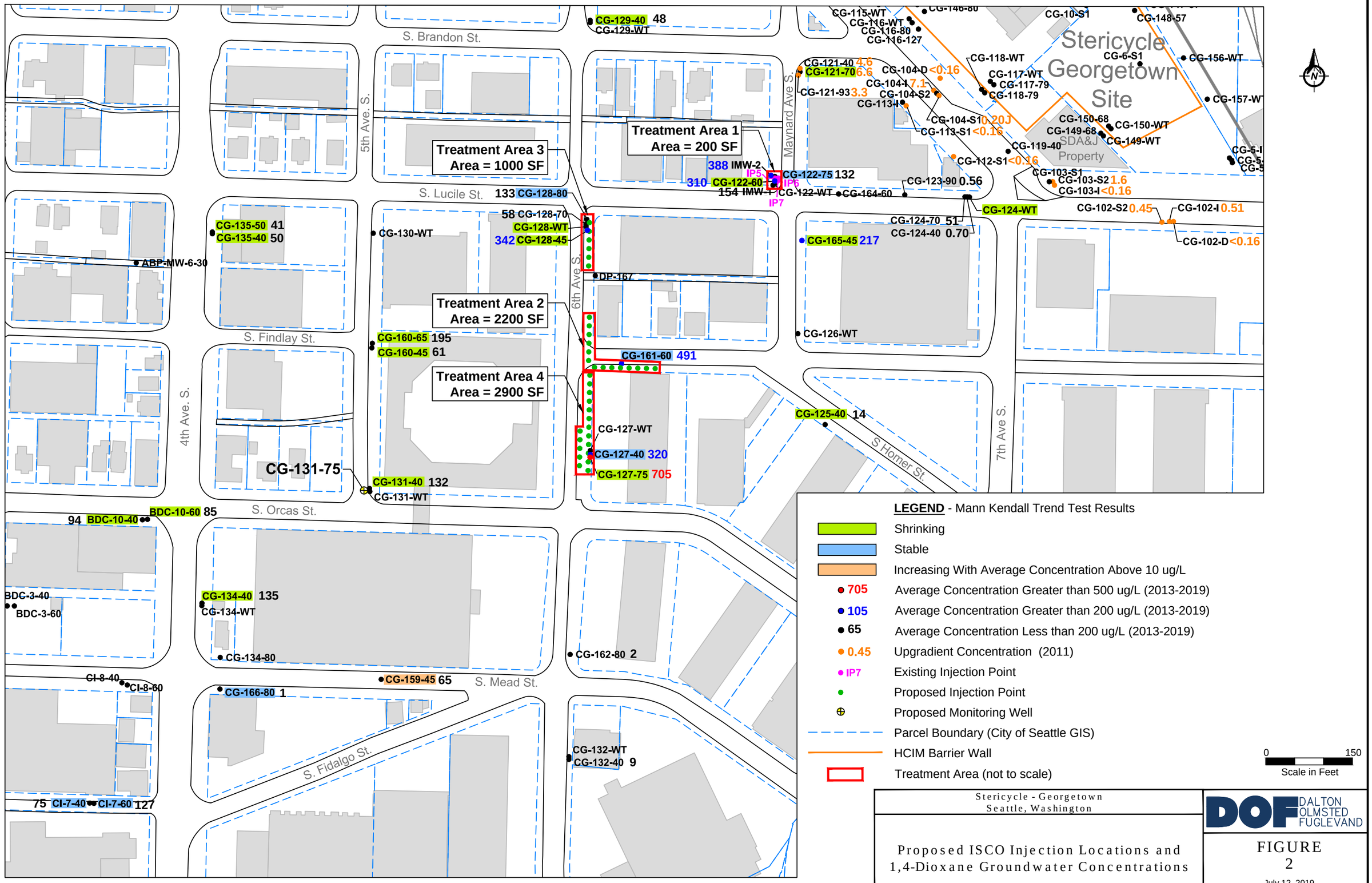
Site Location

DALTON OLMSTED FUGLEVAND

Figure 1

July 12, 2019

PLOT TIME: 7/12/2019 1:31 PM MOD TIME: 7/12/2019 1:31 PM USER: Kelley Begley DWG: P:\Stericycle\Georgetown\CADFigures\2019-07\2019-07 GT ISCO F1 Site Loc.dwg



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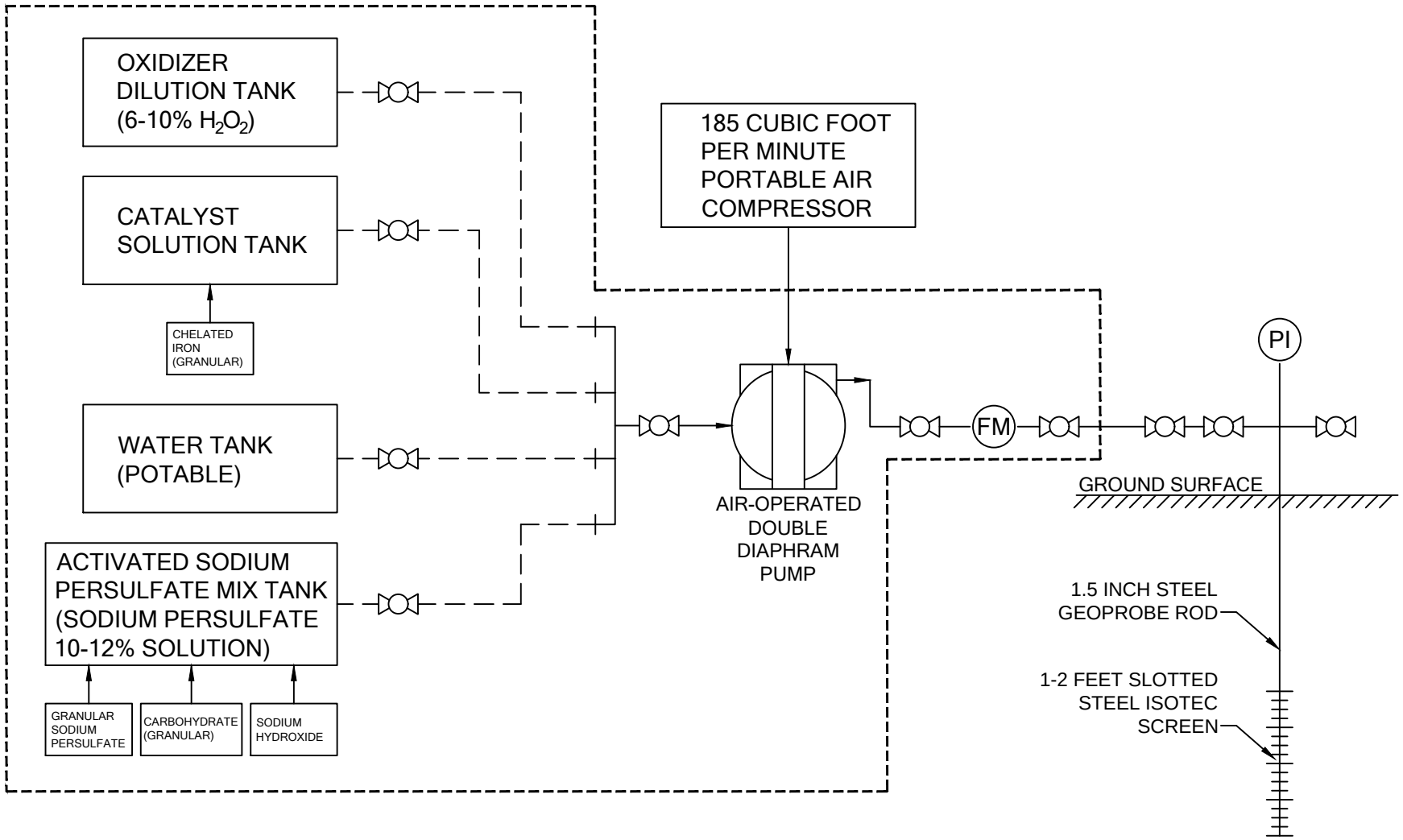
Stericycle - Georgetown
Seattle, Washington

Proposed ISCO Injection Locations and 1,4-Dioxane Groundwater Concentrations

DOF DALTON OLMSTED FUGLEVAND

FIGURE
2

July 12, 2019



LEGEND

- FM — 3/4-INCH FLOW METER WITH TOTALIZER
- PI — PRESSURE INDICATOR
- 3/4-INCH BALL VALVE WITH CAM LOCK COUPLINGS
- SECONDARY CONTAINMENT (POLYPROPYLENE)
- 3/4-INCH RIGID HOSE

NOTES

1. Flow Path from tanks is dependent on step of the injection process.
2. Not to scale.

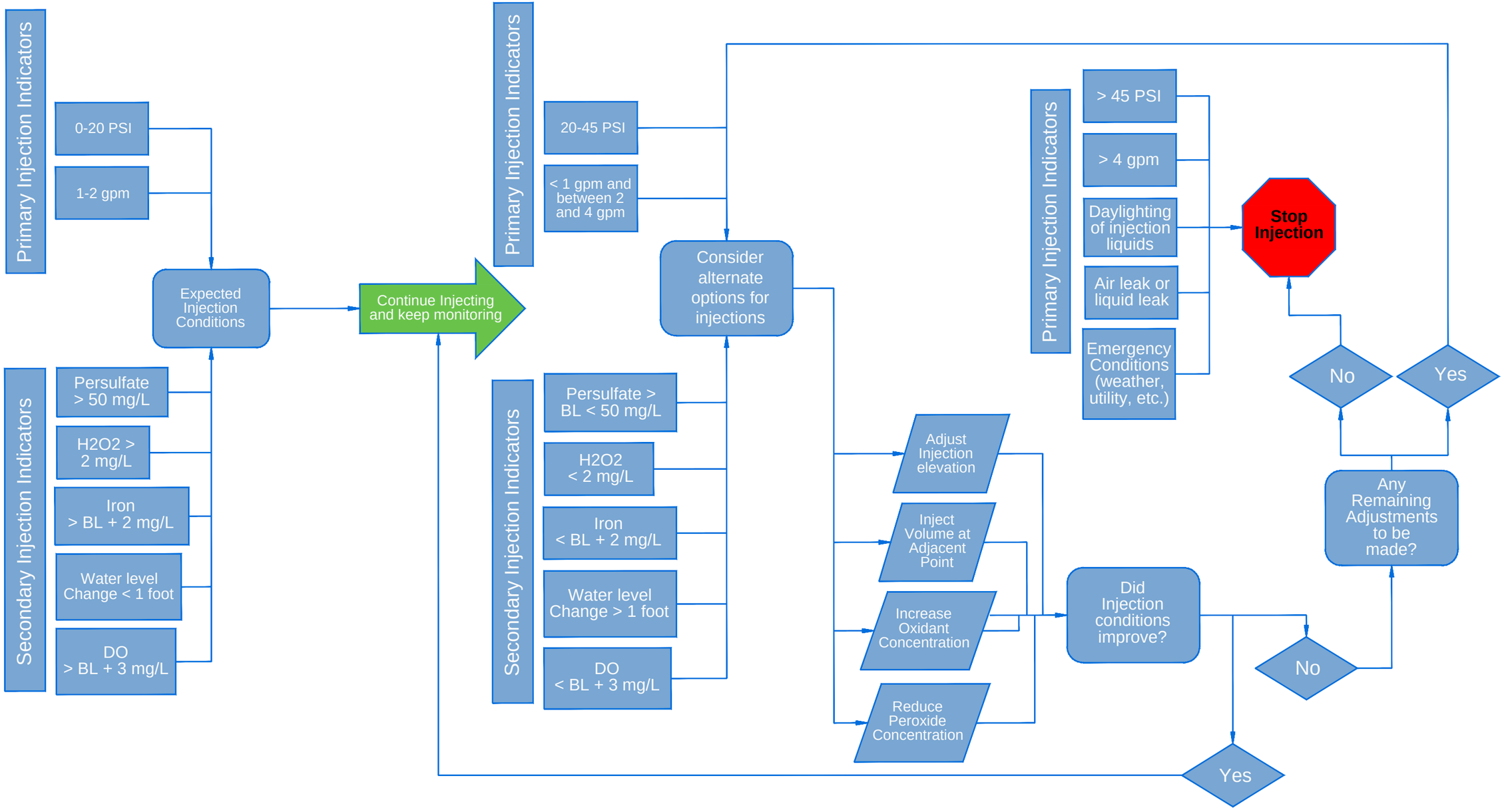
Stericycle - Georgetown
Seattle, Washington

Process and Instrumentation Diagram

DALTON OLMSTED FUGLEVAND

FIGURE 3

July 12, 2019



Note: Logic based on medium response from Table 4. See Table 4 for a more detailed descriptions of secondary injection indicators.
BL = baseline result

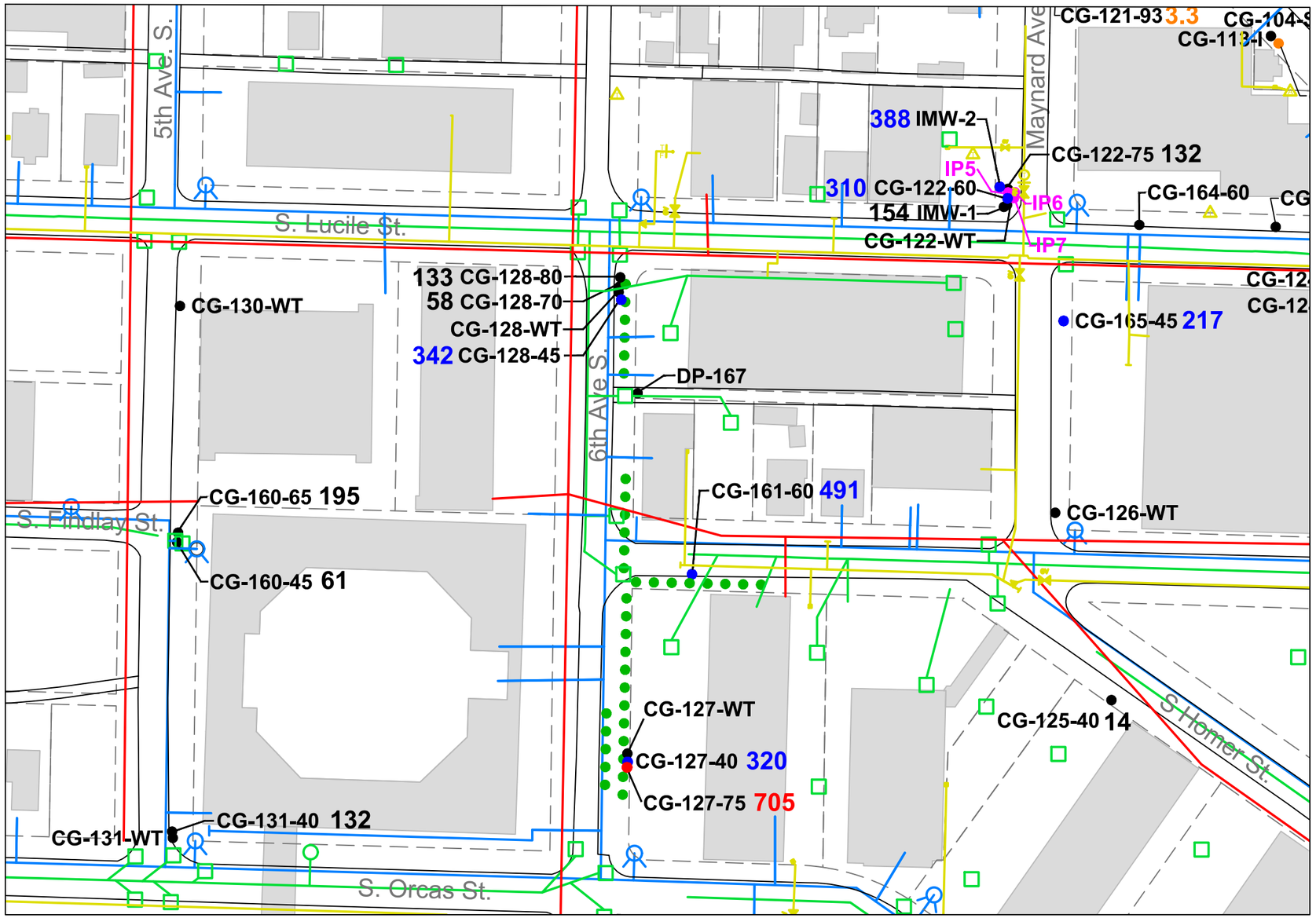
Stericycle - Georgetown
Seattle, Washington

Injection Decision Chart

DALTON OLMSTED FUGLEVAND

FIGURE
4

July 12, 2019



NOTE:

Utility locations are approximate.

LEGEND

- 705 — Average Concentration Greater than 500 ug/L (2013-2019)
- 105 — Average Concentration Greater than 200 ug/L (2013-2019)
- 65 — Average Concentration Less than 200 ug/L (2013-2019)
- IP7 — Existing Injection Point
- Proposed Injection Point

- Parcel Boundary (City of Seattle GIS)
- Water Line (City of Seattle GIS)
- Combined Sewer Line (City of Seattle GIS)
- Gas Line (Puget Sound Energy)
- Overhead Power Line
- Catch Basin (City of Seattle GIS)
- Hydrant (City of Seattle GIS)
- Gas Valve (Puget Sound Energy)

0 100
Scale in Feet

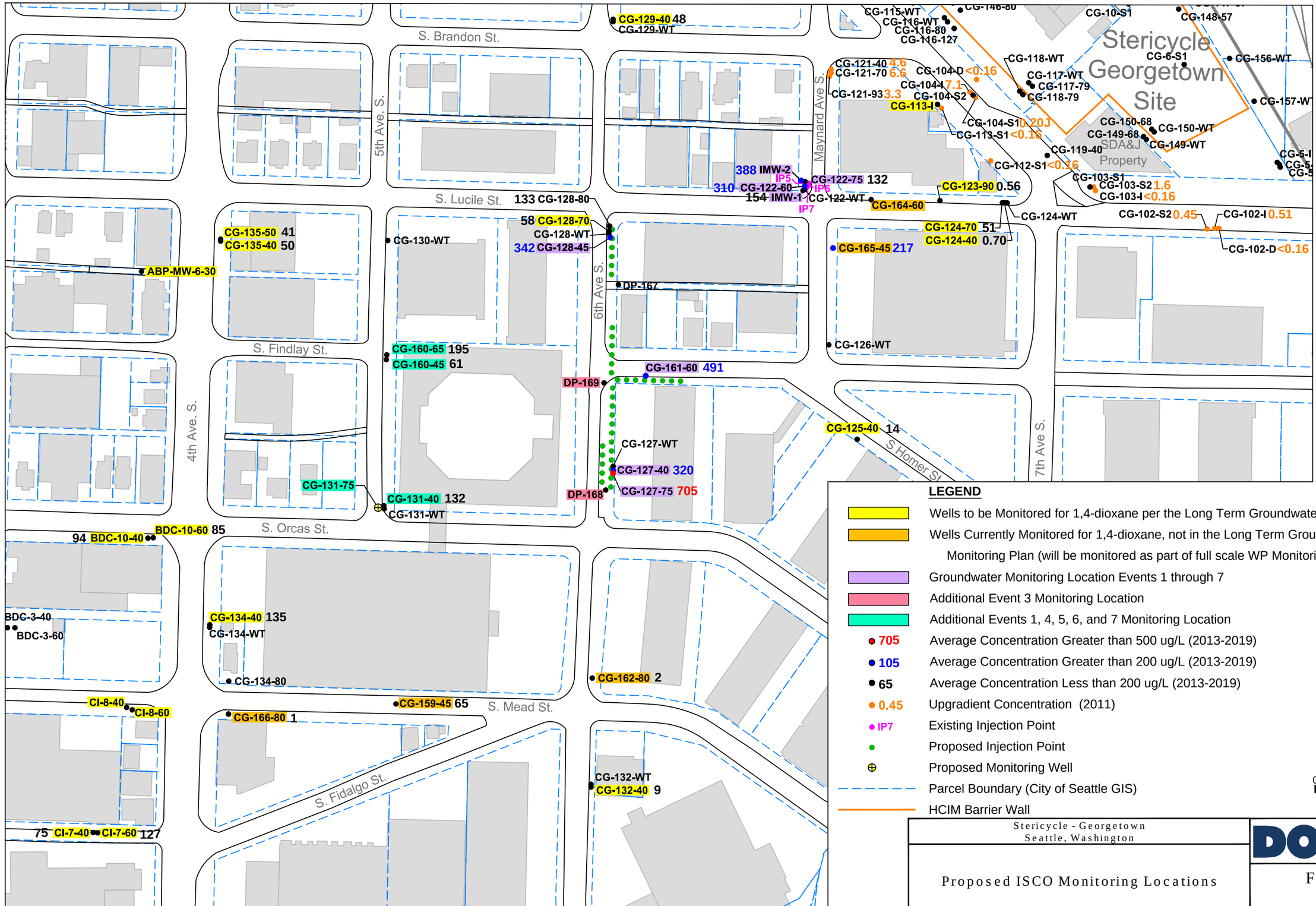
Stericycle - Georgetown
Seattle, Washington

Known Utilities

DOF DALTON OLMSTED FUGLEVAND

FIGURE
5

July 12, 2019



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Stericycle - Georgetown
Seattle, Washington

Proposed ISCO Monitoring Locations

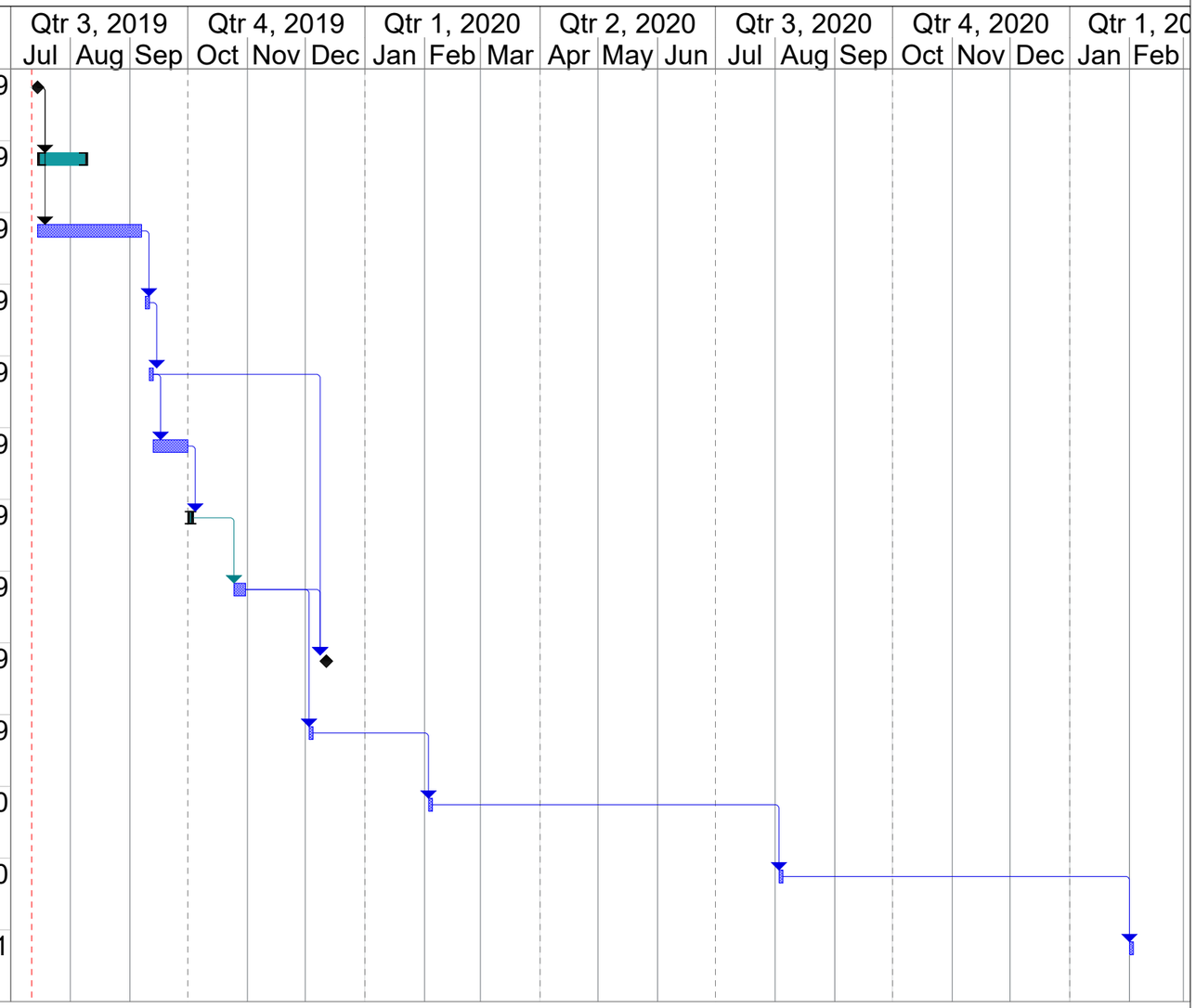
DALTON OLMSTED FUGLEVAND

FIGURE
6

July 12, 2019

Figure 7
Estimated Project Schedule
Stericycle Georgetown
Seattle, Washington

ID	Task Name	Start	Finish
1	Submittal of Revised ISCO FSWP to Ecology	Mon 7/15/19	Mon 7/15/19
2	Ecology Review of ISCO FSWP	Mon 7/15/19	Fri 8/9/19
3	Permitting	Mon 7/15/19	Fri 9/6/19
4	Monitoring Well Installation and Development	Mon 9/9/19	Tue 9/10/19
5	Monitoring Event #1 (Baseline)	Wed 9/11/19	Thu 9/12/19
6	ISCO Injections	Thu 9/12/19	Mon 9/30/19
7	Monitoring Event #2	Tue 10/1/19	Thu 10/3/19
8	Monitoring Event #3	Fri 10/25/19	Wed 10/30/19
9	Preliminary Data Review with Ecology	Wed 12/11/19	Wed 12/11/19
10	Monitoring Event #4	Tue 12/3/19	Wed 12/4/19
11	Monitoring Event #5	Mon 2/3/20	Tue 2/4/20
12	Monitoring Event #6	Mon 8/3/20	Tue 8/4/20
13	Monitoring Event #7	Mon 2/1/21	Tue 2/2/21



Project: Full Scale ISCO
Date: Fri 7/12/19

Task | Milestone | Summary | Regulatory Task

Appendix A

Slow Release ISCO Pilot Study Data

Dalton, Olmsted & Fuglevand, Inc.
Environmental Consultants

Stericycle GT

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'

Depth(ft.)

SUMMARY LOG

0
- Ground water @ ~9'

0 - 40' Not sampled per SAP

40
- Trace organics

Poorly Graded SAND (SP)

54 - Trace organics

60 - thin silt lense @ 59.9'

(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: 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

Dalton, Olmsted & Fuglevand, Inc.
Environmental Consultants

Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

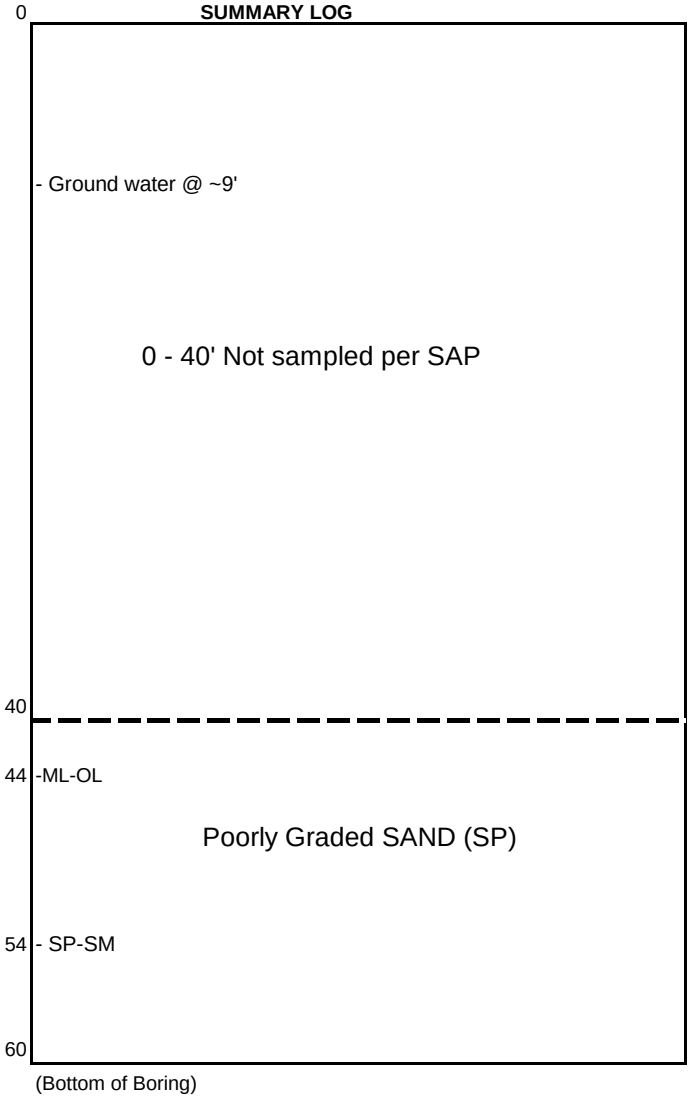
DP2

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

Depth(ft.)

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.

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

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Environmental Consultants

Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

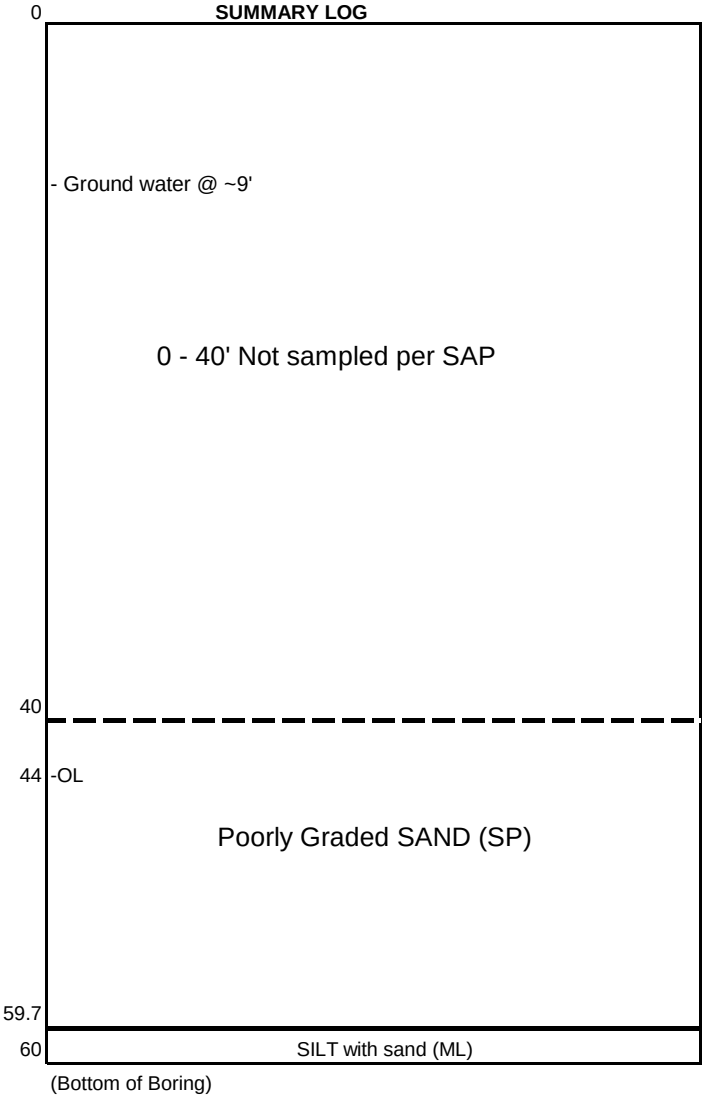
DP3

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

Depth(ft.)

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.

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

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Environmental Consultants

Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

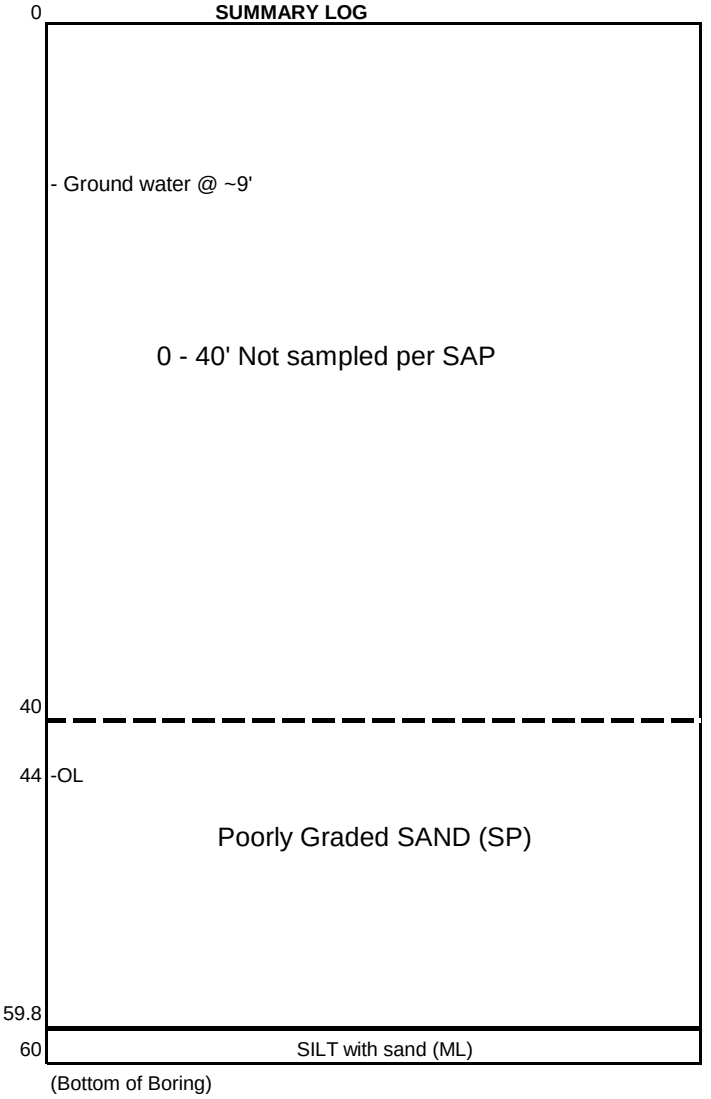
DP4

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				

Depth(ft.)

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.

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

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Stericycle GT

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.)
0

SUMMARY LOG

No Sampling due to Time limitations
Groundwater Sampling Only

(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: 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

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Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

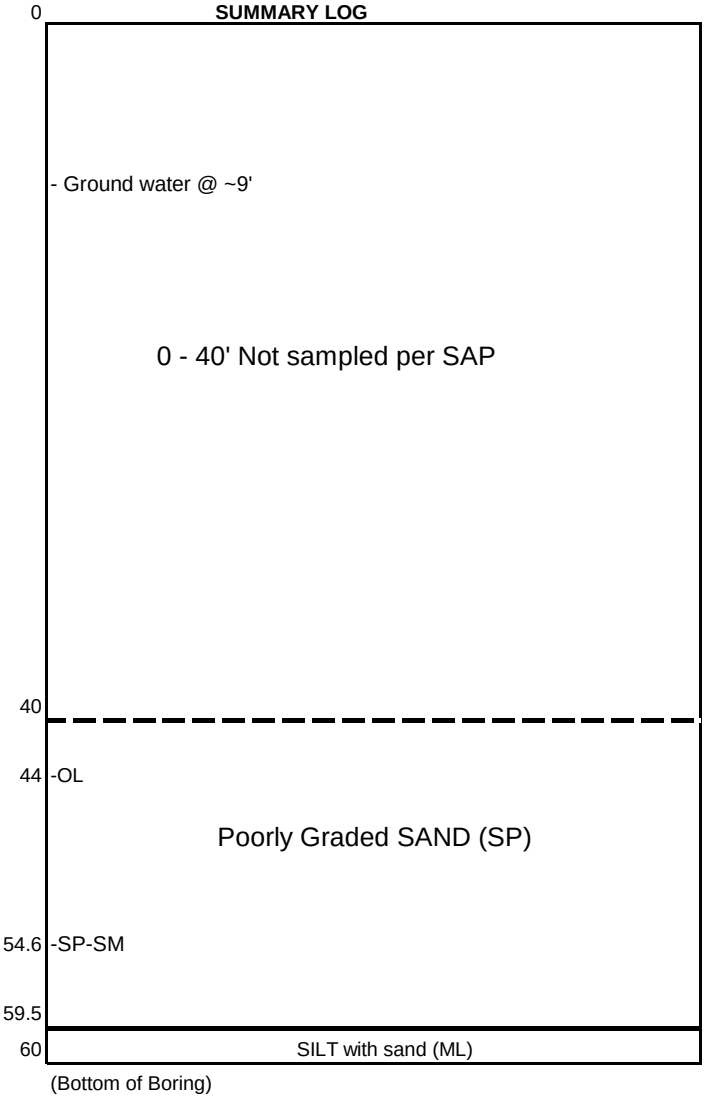
DP6

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

Depth(ft.)

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.

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

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Environmental Consultants

Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

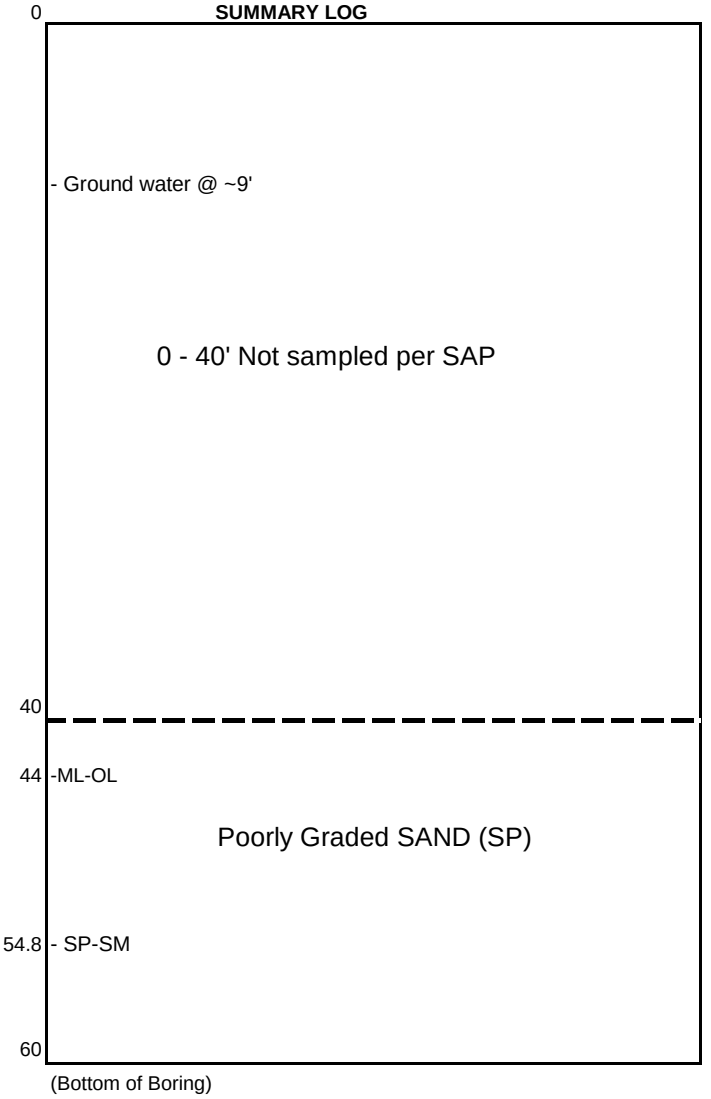
DP7

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.' 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				

Depth(ft.)

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.

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

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Stericycle GT

BORING - DESCRIPTION OF SAMPLES & DATA

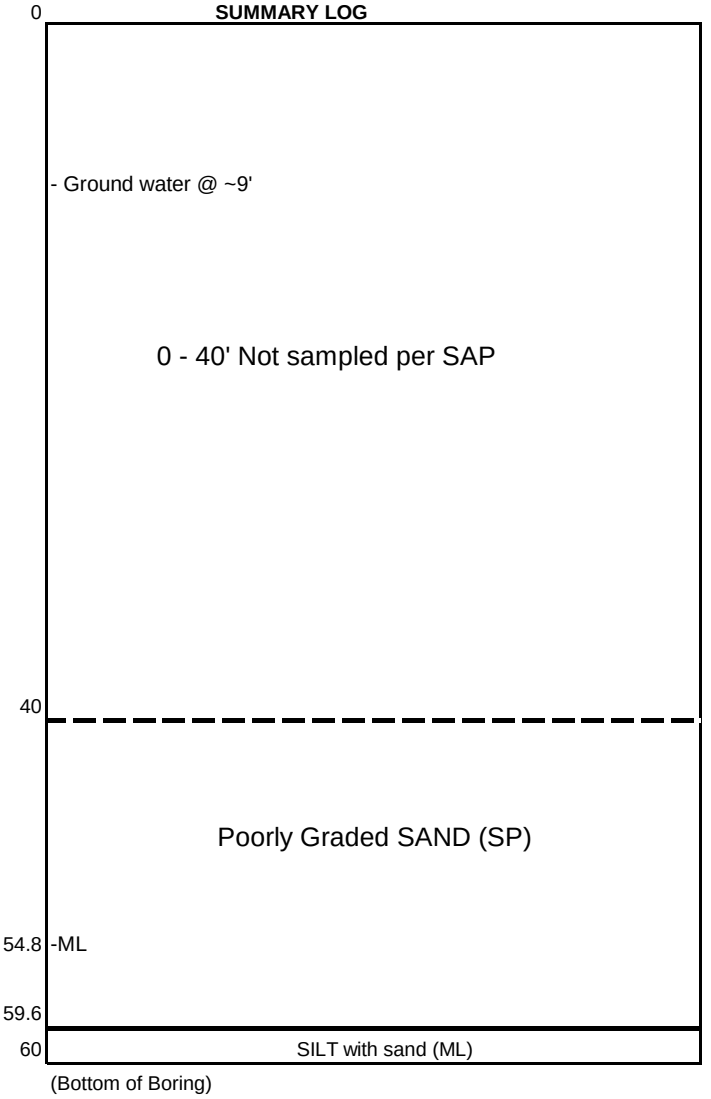
DP8

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				

Depth(ft.)

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.

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

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Stericycle GT

DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION - MONITORING WELL NO. **IMW-1**

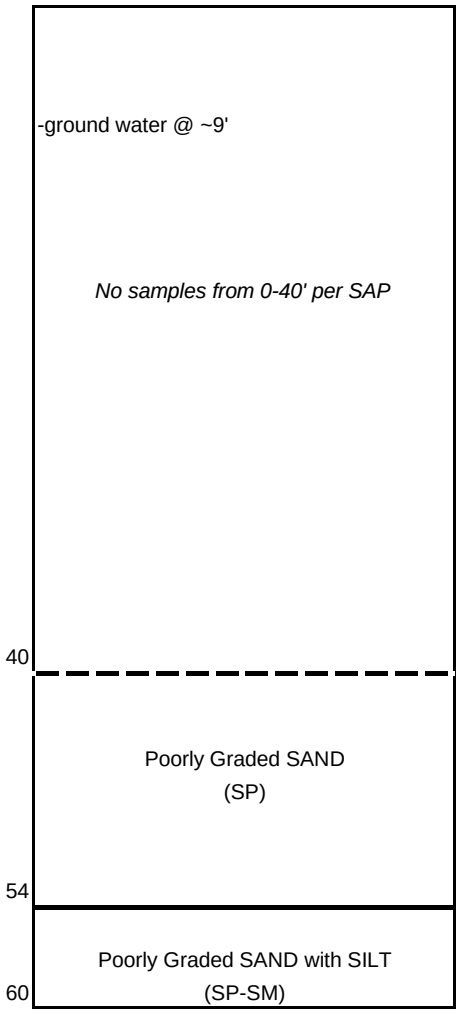
Field Rep: D. Cooper | Reviewed by: D. Cooper, LG, LHG
Drilling Co.: Cascade | Location: N205475.6 E1271970.6 NAD83
Driller: Kyle | Ground surface elevation: 20.05 NAVD 88 Ground Surface:
Drill Type: GeoProbe 7730DT | Date Completed: 6/16/2016
Size/Type Casing: 2" | Drill Type: Direct-Push | Sampler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

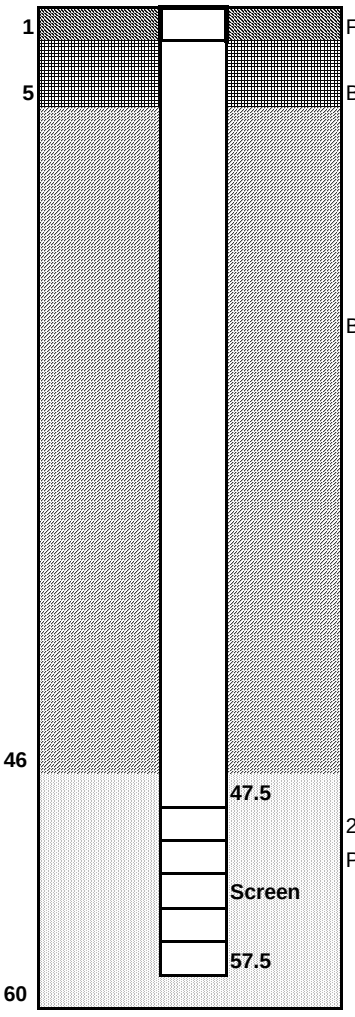
Depth(ft.)

0 **SUMMARY LOG**



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# 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

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Stericycle GT

DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION - MONITORING WELL NO. **IMW-2**

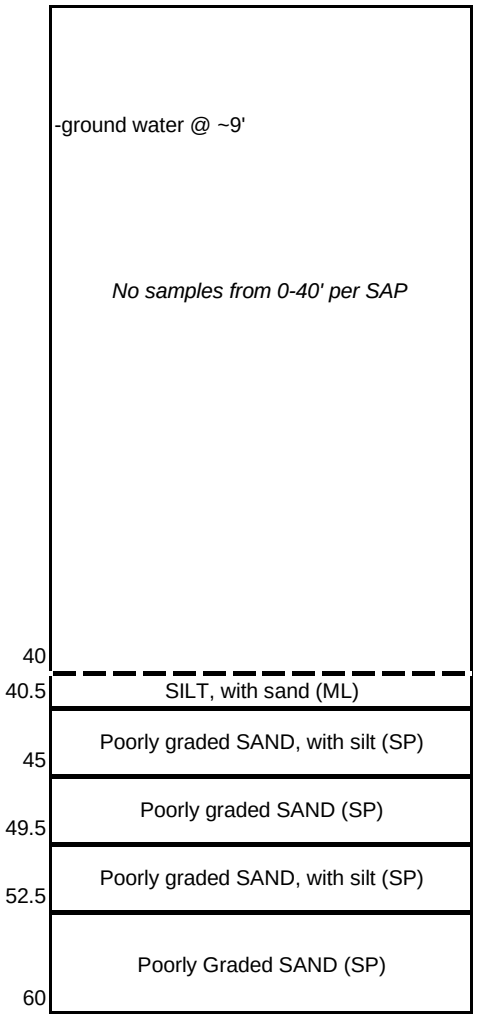
Field Rep: D. Cooper | Reviewed by: D. Cooper, LG, LHG
Drilling Co.: Cascade | Location: N205474.5 E1271967.1 NAD83
Driller: Kyle | Ground surface elevation: 20.14 NAVD 88 Ground Surface:
Drill Type: GeoProbe 7730DT | Date Completed: 6/16/2016
Size/Type Casing: 2" | Drill Type: Direct-Push | Sampler 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
			NO/NS				
	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.)

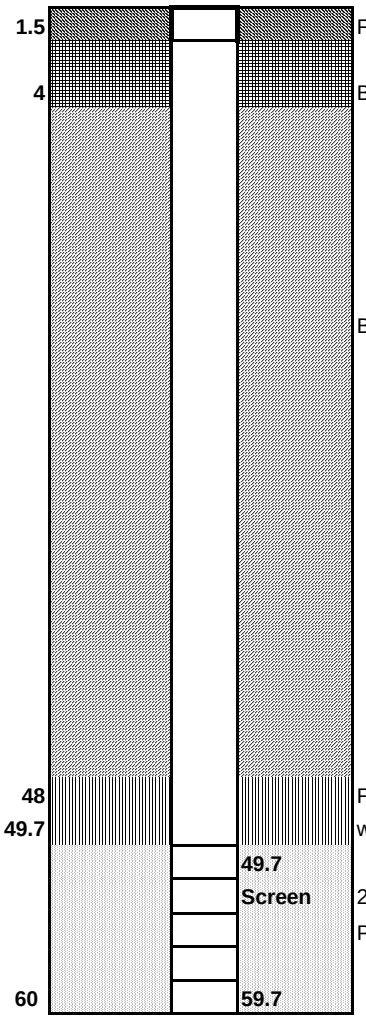
0 **SUMMARY LOG**



(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

DALTON OLMSTED FUGLEVAND

LOG OF IP-5

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
Ecology Tag #BKA-142		

DEPTH (feet)	SAMPLES: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: Blows/Foot	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other discriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
5					Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East	Mounument Type: 8" Diameter Morris Flush Mount Concrete to 3.0'
10						Riser Material: 2" diameter SCH 40 PVC
15						Grout Type: 3-45', CETCO Pure Gold medium bentonite chip
20						
25						
30					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%	
35						
40						
45						
50						Riser Bottom Depth: 50.0' Screen Top: 50' Screen Material/Diameter: 10'-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: 60.0' End Cap Bottom: 60.4'

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.

DOF DALTON OLMSTED FUGLEVAND

LOG OF IP-6

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: Lab Sample	SAMPLES: Sample Recovery	SAMPLES: Blows/Foot	SAMPLES: PID (ppm)	VISUAL SOIL DESCRIPTION Soil Group Name (USCS): color, moisture, density/consistency, grain size, other discriptors	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0						Mounument Type: 8" Diameter Morris Flush Mount
						Concrete to 3.0'
5						
10						Riser Material: 2" diameter SCH 40 PVC
15					Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East	
20						
25						Grout Type: 3-45', CETCO Pure Gold medium bentonite chip
30					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 to medium sand (SP) on auger flights	
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.

DOF DALTON OLMSTED FUGLEVAND

LOG OF IP-7

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		

SAMPLES

DEPTH (feet) | Lab Sample | Sample Recovery | Blows/Foot | PID (ppm)

VISUAL SOIL DESCRIPTION

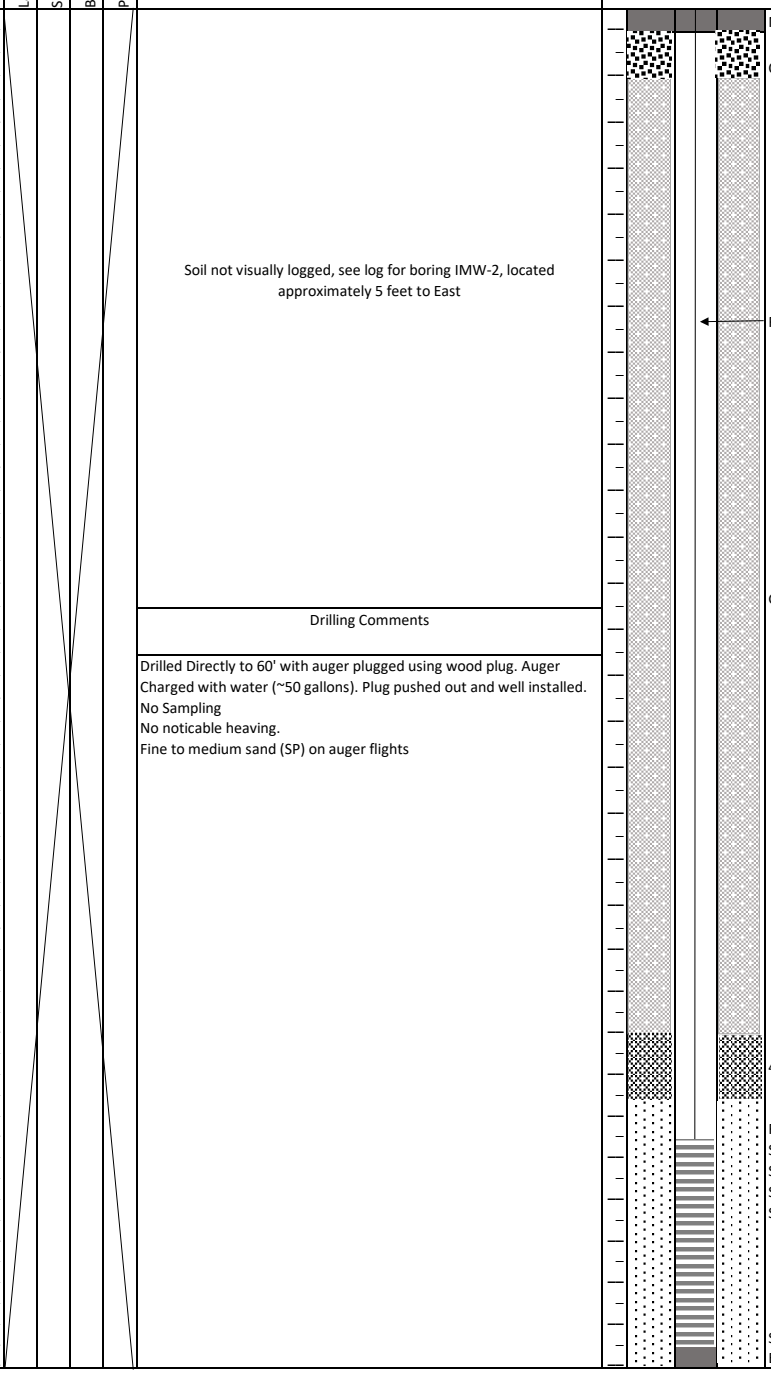
Soil Group Name (USCS): color, moisture, density/consistency, grain size, other discriptors

Soil not visually logged, see log for boring IMW-2, located approximately 5 feet to East

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 to medium sand (SP) on auger flights

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



Mounument 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

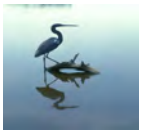
45'-48', Pel Plug TR30 bentonite pellets

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

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 tin 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:

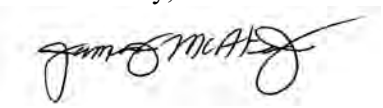
- A total of nine (9) results reported as undetected and/or detected were qualified as estimated (*J*) because the analysis was completed slightly past the method-specific holding time criterion of 48 hrs. from the date and time of sampling.

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.

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.

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.

U.S. EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, 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.

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 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
Service Request No. K1704506											
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	✓	✓					
Service Request No. K1705839											
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	✓	✓	✓	✓	✓		
Service Request No. K1706268											
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		✓		✓		✓	✓
Service Request No. K1706565											
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		✓		✓			✓
Service Request No. K1706876											
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
Service Request No. K1707384											
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		✓					
Service Request No. K1707614											
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	✓	✓		✓			✓
Service Request No. K1709181											
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	✓	✓		✓			✓
Service Request No. K1709916											
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		✓		✓		✓	✓
Service Request No. K1712610											
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	✓	✓		✓			✓
Service Request No. K1713453											
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		✓		✓		✓	✓
Service Request No. K1801813											
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	✓	✓		✓			✓
Service Request No. K1804907											
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	✓	✓		✓	✓		✓
Notes:		**Total Number of Samples:**			58	86	9	74	18	23	71

Table 2. Summary of Qualified Data for Georgetown Revised In Situ Chemical Oxidation Pilot Study Sampling Event[a]

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias[b,c,d]
Conventional Parameters											
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
Metals											
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	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias[b,c,d]
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	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias[b,c,d]
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	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias[b,c,d]
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 metk 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 metk 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	0.00043	mg/L	0.0005	8E-05	J	J	Concentration >MDL, <MRL	NA	Low or high
		Chromium, Hexavalent		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-7-58-BL-060617	K1705839-005	Chromium, Hexavalent	0.01	mg/L	0.05	0.004	J	J	Method-specific holding time criterion not metk 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 metk 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	0.00017	mg/L	0.00050	0.00008	J	J	Concentration >MDL, <MRL	NA	Low or high
		Chromium, Hexavalent	0.013	mg/L	0.050	0.004	J	J	Method-specific holding time criterion not metk and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
IP-D-BL-060617	K1705839-008	Arsenic, Dissolved	0.00046	mg/L	0.00050	0.00008	J	J	Concentration >MDL, <MRL	NA	Low or high
		Chromium, Hexavalent	0.011	mg/L	0.050	0.004	J	J	Method-specific holding time criterion not metk and concentration >MDL, <MRL	Sample analyzed >24 hrs. from date and time of collection and NA	Low or high
IP-FB-BL-060617	K1705839-009	Chromium, Dissolved	0.00007	mg/L	0.00020	0.00004	J	J	Concentration >MDL, <MRL	NA	Low or high
		Chromium, Hexavalent	ND	mg/L	0.050	0.004	U	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	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	0.00004	mg/L	0.00020	0.00003	J	J	Concentration >MDL, <MRL	NA	Low or high
		Iron	0.0016	mg/L	0.0020	0.0003	J	J	Concentration >MDL, <MRL	NA	Low or high
1,4-Dioxane											
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

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

Notes:

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

[a] Summary of qualified data is for natural and field quality control samples only
[b] Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported
[c] High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported
[d] False positive - compound is likely not present

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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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kurt Clarkson
Client Services
Manager

ALS Environmental
ALS Group USA, Corp
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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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.:**	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 4ºC/frozen at –20ºC 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 Kurt Clawson

Chain of Custody

ALS Environmental—Kelso Laboratory
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ALS Environmental

CHAIN OF CUSTODY
79991

003

SR# K1705839

COC Set____of____

COC#_____

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Project Name	PSC GEORGETOWN
Project Number	STTCL-001
Project Manager	TASYA GRAY
Company	DOF
Address	10827 NE 68TH ST, SUITE B, KIRKLAND WA
Phone #	206-375-0211
email	NGRAY@DOFNW.COM
Sampler Signature	
Sampler Printed Name	N. COOPER

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H 7196A / Cr6	24H ApplEnvMic7-87-1536-1540 /	7D 8270D / 1,4-Dioxane	28D 300.0 / SO4	180D 6020A / Metals D	1	2	3	4	5	Remarks
1. IMW1-55-BL-060617		6/6/17	1100	WATER	4	X	X	X	X	X						
2. IMW-2-57.5-BL-060617			1140		4	X	X	X	X	X						
3. IP-5-5B-BL-060617			1240		4	X	X	X	X	X						
4. IP-6-5B-BL-060617			1330		4	X	X	X	X	X						
5. IP-7-5B-BL-060617			1420		4	X	X	X	X	X						
6. CG122-60-BL-060617			1525		4	X	X	X	X	X						
7. CG122-75-BL-060617			1700		4	X	X	X	X	X						
8. IP-D-BL-060617			1335		4	X	X	X	X	X						
9. IP-FB-BL-060617			1730		4	X	X	X	X	X						
10.					4											

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
STANLEY CLE

Turnaround Requirements

___ 24 hr. ___ 48 hr.
___ 5 Day
X 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 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

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

- DISSOLVED METALS SAMPLES FIELD FILTERED 0.45µm
- USE EXTRA SAMPLE VOLUME TO PERFORM MS/MSD

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name N. COOPER	Printed Name FEDEX LABOR CUSTODY	Printed Name	Printed Name	Printed Name	Printed Name
Firm DOF	Firm STL	Firm	Firm 6/8/17 0830	Firm	Firm
Date/Time 6/7/17 1200	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

PC KC

Cooler Receipt and Preservation Form

Client DOF Service Request K17 05839

Received: 6/8/17 Opened: 6/8/17 By: [illegible] Unloaded: 6/8/17 By: [illegible]

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 NA	Tracking Number NA	Filed
4.8	4.6	5.8	5.6	-0.2	381		7868 2636 9637	

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: No extra volume rec'd for QC.

SHORT HOLD TIME

7/25/16 *Page____of____*

General Chemistry

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/6/17
Sample Matrix:	Water	**Date Received:**	06/8/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-55-BL-060617	K1705839-001	**906**	20	2	200	06/26/17 17:14	6/26/17	
IMW-2-57.5-BL-060617	K1705839-002	**686**	10	1	100	06/26/17 17:24	6/26/17	
IP-5-58-BL-060617	K1705839-003	**1170**	20	2	200	06/26/17 17:34	6/26/17	
IP-6-58-BL-060617	K1705839-004	**328**	5.0	0.5	50	06/26/17 17:44	6/26/17	
IP-7-58-BL-060617	K1705839-005	**497**	10	1	100	06/26/17 17:55	6/26/17	
CG122-60-BL-060617	K1705839-006	**167**	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	**333**	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	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project	PSC Georgetown/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Replicate Sample Summary

Sulfate

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
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.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike			Duplicate Matrix Spike					
		K1705942-001MS			K1705942-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike			Duplicate Matrix Spike					
		K1705942-002MS			K1705942-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Sulfate	12.7	23.2	10.0	105	23.0	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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Analyzed:**	06/26/17
Sample Matrix:	Water	**Date Extracted:**	06/26/17

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	551488

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1705839
Project: PSC Georgetown/STRCL-001

Continuing Calibration Blank (CCB) Summary
Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/6/17
Sample Matrix:	Water	**Date Received:**	06/8/17
Analysis Method:	7196A	**Units:**	mg/L
Prep Method:	None	**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.	**Service Request:**	K1705839
Project	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**Date Received:**	06/08/17
		Date Analyzed:	06/08/17

Replicate Sample Summary

General Chemistry Parameters

Sample Name:	IMW-1-55-BL-060617	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1705839-001DUP Result	Average	RPD	RPD Limit
Chromium, Hexavalent	7196A	0.050	0.004	0.039 J	0.008 J	0.0232	135 *	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:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA
Analysis Method:	7196A		
Prep Method:	None		

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

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ALS Group USA, Corp.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Analyzed:**	06/08/17
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Chromium, Hexavalent

Analysis Method:	7196A	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	548901

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Continuing Calibration Verification (CCV) Summary

Chromium, Hexavalent

Analysis Method: 7196A **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1705839
Project: PSC Georgetown/STRCL-001

Continuing Calibration Blank (CCB) Summary
Chromium, Hexavalent

Analysis Method: 7196A **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/6/17
Sample Matrix:	Water	**Date Received:**	06/8/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-55-BL-060617	K1705839-001	**0.25**	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	**1.30**	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.	**Service Request:**	K1705839
Project	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**Date Received:**	06/08/17
		Date Analyzed:	06/08/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	IMW-1-55-BL-060617	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1705839-001DUP Result	Average	RPD	RPD Limit
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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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1705839-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron, Divalent (Ferrous Iron)	0.25	2.48	2.00	112	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. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1705839
Project: PSC Georgetown/STRCL-001

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 11:00
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IMW-1-55-BL-060617	**Basis:**	NA
Lab Code:	K1705839-001		

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 09:42	06/19/17	
Chromium	6020A	**0.00043**	mg/L	0.00020	0.00004	1	06/21/17 09:42	06/19/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 11:40
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IMW-2-57.5-BL-060617	**Basis:**	NA
Lab Code:	K1705839-002		

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	**0.00040**	mg/L	0.00020	0.00004	1	06/21/17 10:06	06/19/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 12:40
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IP-5-58-BL-060617	**Basis:**	NA
Lab Code:	K1705839-003		

Dissolved Metals

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 13:30
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IP-6-58-BL-060617	**Basis:**	NA
Lab Code:	K1705839-004		

Dissolved Metals

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 14:20
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IP-7-58-BL-060617	**Basis:**	NA
Lab Code:	K1705839-005		

Dissolved Metals

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 15:25
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	CG122-60-BL-060617	**Basis:**	NA
Lab Code:	K1705839-006		

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 10:20	06/19/17	
Chromium	6020A	**0.00032**	mg/L	0.00020	0.00004	1	06/21/17 10:20	06/19/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 17:00
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	CG122-75-BL-060617	**Basis:**	NA
Lab Code:	K1705839-007		

Dissolved Metals

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 13:35
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IP-D-BL-060617	**Basis:**	NA
Lab Code:	K1705839-008		

Dissolved Metals

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17 17:30
Sample Matrix:	Water	**Date Received:**	06/08/17 09:30
Sample Name:	IP-FB-BL-060617	**Basis:**	NA
Lab Code:	K1705839-009		

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 10:29	06/19/17	
Chromium	6020A	**0.00007 J**	mg/L	0.00020	0.00004	1	06/21/17 10:29	06/19/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1708083-01		

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 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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**Date Received:**	06/08/17
		Date Analyzed:	06/21/17

Replicate Sample Summary
Dissolved Metals

Sample Name:	IMW-1-55-BL-060617	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1708083-03 Result	Average	RPD	RPD Limit
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

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ALS Group USA, Corp.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1705839-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1708083-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

Printed 6/28/2017 4:55:23 PM Superset Reference:

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

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

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1705839
Project: PSC Georgetown/STRCL-001
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**290868
Analytical Method: 6020A

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
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. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
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. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

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. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

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. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSA **Concentration Units:** ug/L

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
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. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

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.

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839

Project: PSC Georgetown/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Detection Limits

Matrix: Water

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-05

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **550473**

Sample	Dilution Factor	Date/Time	As	Cr
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **550473**

Sample	Dilution Factor	Date/Time	As	Cr
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IMW-1-55-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IMW-2-57.5-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IP-5-58-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IP-6-58-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IP-7-58-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-005	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	CG122-60-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-006	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	CG122-75-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-007	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IP-D-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-008	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	06/06/2017
Sample Matrix:	Water	**Date Received:**	06/08/2017

1,4-Dioxane by GCMS

Sample Name:	IP-FB-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-009	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1704847-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**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	**Lab Code:**	KWG1704892-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1704892
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	21,255	5.23
	Upper Limit ==>	42,510	5.73
	Lower Limit ==>	10,628	4.73
	ICAL Result ==>	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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**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	**Lab Code:**	KWG1705179-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705179
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	17,723	5.23
	Upper Limit ==>	35,446	5.73
	Lower Limit ==>	8,862	4.73
	ICAL Result ==>	15,677	5.23
Associated Analyses			
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Extracted:**	06/13/2017
Sample Matrix:	Water	**Date Analyzed:**	06/14/2017

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

Sample Name:	IP-FB-BL-060617	**Units:**	ug/L
Lab Code:	K1705839-009	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1704847

		IP-FB-BL-060617MS KWG1704847-1 Matrix Spike			IP-FB-BL-060617DMS KWG1704847-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Extracted:**	06/13/2017
Sample Matrix:	Water	**Date Analyzed:**	06/14/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1704847

	Lab Control Sample KWG1704847-3 Lab Control Spike			Duplicate Lab Control Sample KWG1704847-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Extracted:**	06/13/2017
Sample Matrix:	Water	**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.	**Service Request:**	K1705839
Project:	PSC Georgetown/STRCL-001	**Date Extracted:**	06/13/2017
Sample Matrix:	Water	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001 **Calibration Date:** 03/06/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15235 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001 **Calibration Date:** 03/06/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15235 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1705839
Project: PSC Georgetown/STRCL-001

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kurt Clarkson
Client Services
Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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.:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Received:**	06/16/17
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 06/16/17. 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 4ºC 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 Kent Claussen

Chain of Custody

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CHAIN OF CUSTODY

79991

003

SR#______ COC Set____of____ COC#______

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K1706268

Environmental

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
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GEORGETOWN LSB | Project Number: STRCL-001

Manager: TASYA GRAY

DOF

10827 NE 68TH KIRKLAND, WA 98033

Phone # 206-375-0211 | email

Sampler Signature: [signature] | Sampler Printed Name: D COOPER

Analyses: NUMBER OF CONTAINERS; 24H 7196A / Cr6; ApplEnvMic7-87-1536-1540 / 8270D / 1,4-Dioxane; 7D 300.0 / SO4; 28D 6020A / Metals D; 180D; 1 NITRATE/NITRITE; 2 FERROUS/FERRIC; 3 TOTAL Fe; 4 1,4 DIOXANE; 5; Remarks

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	1 NITRATE/NITRITE	2 FERROUS/FERRIC	3 TOTAL Fe	4 1,4 DIOXANE	5	Remarks
1. GG127-40-BL-061517		6/15/17	1045	WATER	4	X	X	X	X		
2. GG127-75-BL-061517		↓	0950	↓	4	X	X	X	X		
3. GG-DU-061517		↓	0955	↓	4	X	X	X	X		
4. GG-FB-061517		↓	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
X 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 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

Special Instructions/Comments: FERROUS IRON FIELD FILTERED 0.45μm

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____(Circle One)

	Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	[signature]	FEDEX WAYBILL		[signature] CODY GRAVES		
Printed Name	D. COOPER	CUSTODY SEAL		ALS		
Firm	DOF			6/16/17 0950		
Date/Time	6/15/17 1600					

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

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 NA	Tracking Number NA	Filed
5.2	5.3	—	—	+0.1	308	79991	7868 9590 3136	

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 6/16
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:
CG (40ml vial)	CG-FB-061517	Elimination / Sample time

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

7/25/16

Page ____ of ____

General Chemistry

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**Date Received:**	06/16/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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	

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706239-001	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1706239-001MS			Duplicate Matrix Spike K1706239-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706274-004	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1706274-004MS			**Duplicate Matrix Spike** K1706274-004DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Analyzed:**	06/29/17
Sample Matrix:	Water	**Date Extracted:**	06/29/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	552129

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1706268
Project: Georgetown ISB/STRCL-001

Continuing Calibration Blank (CCB) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

Continuing Calibration Verification (CCV) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**Date Received:**	06/16/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**Date Received:**	06/16/17
		Date Analyzed:	06/16/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	CG-FB-061517	**Units:**	mg/L
Lab Code:	K1706268-004	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1706268-004DUP Result	Average	RPD	RPD Limit
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706268-004	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1706268-004MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron, Divalent (Ferrous Iron)	ND U	2.64	2.00	132 *	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. **Service Request:**K1706268
Project: Georgetown ISB/STRCL-001

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17 10:45
Sample Matrix:	Water	**Date Received:**	06/16/17 09:50
Sample Name:	CG127-40-BL-061517	**Basis:**	NA
Lab Code:	K1706268-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17 09:50
Sample Matrix:	Water	**Date Received:**	06/16/17 09:50
Sample Name:	CG127-75-BL-061517	**Basis:**	NA
Lab Code:	K1706268-002		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17 09:55
Sample Matrix:	Water	**Date Received:**	06/16/17 09:50
Sample Name:	CG-DU-061517	**Basis:**	NA
Lab Code:	K1706268-003		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17 11:00
Sample Matrix:	Water	**Date Received:**	06/16/17 09:50
Sample Name:	CG-FB-061517	**Basis:**	NA
Lab Code:	K1706268-004		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1708247-02		

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.	**Service Request:**	K1706268
Project	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**Date Received:**	06/16/17
		Date Analyzed:	06/27/17

Replicate Sample Summary

Total Metals

Sample Name:	CG127-40-BL-061517	**Units:**	ug/L
Lab Code:	K1706268-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1708247-03 Result	Average	RPD	RPD Limit
Iron	6010C	21	3	13500	13500	13500	<1	20

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/17
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1706268-001	**Basis:**	NA
Analysis Method:	6010C		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1708247-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron	13500	14600	1000	104 #	75-125

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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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6010C	2420	2500	97	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1706268
Project: Georgetown ISB/STRCL-001
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**291113
Analytical Method: 6010C

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	551434	2500	2510	100	10000	10000	100	10000	10100	101

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	551434				10000	10200	102	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	551434				10000	10200	102	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

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	551434	3	U	3	U	3	U	3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

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	551434			3	U	3	U	3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSA **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	551434	188000	-	-	-	06/27/17 14:14

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	551434	189000	-	-	-	06/27/17 14:17

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268

Project: Georgetown ISB/STRCL-001

Detection Limits

Matrix: Water

Analyte	Wavelength (nm)	Units	MRL	MDL	Method
Iron	2599	ug/L	20	3	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

ICP Linear Range (Quarterly)

Instrument: K-ICP-AES-04

Analyte	Concentration (ug/L)	Method
Iron 2599	360000	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-04** **Analytical BatchID:** **551434**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-04** **Analytical BatchID:** **551434**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-04** **Analytical BatchID:** **551434**

Sample	Dilution Factor	Date/Time	Fe
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	

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Al 167.079 {502}	☒	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}	☒	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}	☒	2	Cr	0.015072	0.000000	No
			Ti	0.000755	0.000000	No
Sb 217.581 {455}	☒	2	Pb	-0.000725	0.000000	No
			V	0.002284	0.000000	No
As 189.042 {478}	☒	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}	☒	None				
Be 234.861 {144}	☒	3	Fe	0.000019	0.000000	No
			Mn	-0.000049	0.000000	No
			Mo	-0.000388	0.000000	No
B 249.678 {135}	☒	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}	☒	2	Al	-0.000004	0.000000	No
			Fe	0.000024	0.000000	No
Cd 226.502 {449}	☒	3	Fe	0.000133	0.000000	No
			Mo	-0.000048	0.000000	No
			Ti	0.000044	0.000000	No
Ca 315.887 {107}	☒	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}	☒	1	Fe	0.000024	0.000000	No
Cr 267.716 {126}	☒	3	Cd	-0.000298	0.000000	No
			V	-0.000104	0.000000	No
			Fe	0.000026	0.000000	No
Co 228.616 {447}	☒	5	Cr	-0.000170	0.000000	No
			Fe	0.000013	0.000000	No
			Mo	-0.000104	0.000000	No
			Ni	0.000167	0.000000	No
			Ti	0.002048	0.000000	No
Co 230.786 {446}	☒	5	Al	-0.000007	0.000000	No
			Cr	-0.000046	0.000000	No
			Fe	0.000033	0.000000	No
			Mo	0.000989	0.000000	No
			Ni	-0.001619	0.000000	No
Cu 224.700 {450}	☒	5	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

Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
Cu 327.396 {103}	☒	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}	☒	1	Mo	-0.000793	0.000000	No
Pb 220.353 {453}	☒	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}	☒	None				
Mg 279.079 {121}	☒	None				
Mg 279.553 {121}	☒	1	Fe	0.000022	0.000000	No
Mg 285.213 {118}	☒	2	V	-0.000221	0.000000	No
			Fe	0.000028	0.000000	No
Mn 257.610 {131}	☒	1	Fe	0.000014	0.000000	No
Mn 260.569 {129}	☒	None				
Mo 202.030 {467}	☒	None				
Ni 221.647 {452}	☒	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}	☒	1	Fe	0.000044	0.000000	No
P 178.284 {489}	☒	None				
P 214.914 {457}	☒	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}	☒	None				
Se 196.090 {472}	☒	3	Al	-0.000055	0.000000	No
			Co	-0.000472	0.000000	No
			Fe	-0.000335	0.000000	No
Si 251.611 {134}	☒	1	Mo	0.007431	0.000000	No
Ag 328.068 {103}	☒	None				
Na 589.592 { 57}	☒	None				
Sr 407.771 { 83}	☒	None				
Tl 190.856 {477}	☒	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}	☒	None				
Ti 336.121 {100}	☒	1	Ni	0.000091	0.000000	No
V 292.402 {115}	☒	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}	☒	3	Cr	-0.000138	0.000000	No
			Fe	-0.000019	0.000000	No
			Mo	0.000270	0.000000	No
Zn 213.856 {458}	☒	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

	Element, Wavelength and Order	Use?	# IECs	IEC	k1	k2	Calc-in-fit?
	Y 224.306 {450}*	☒	None				
	Y 360.073 { 94}*	☒	None				
	Y 360.073 { 94}2*	☒	None				
	Bi 223.061 {451}	☒	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}	☒	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/2017
Sample Matrix:	Water	**Date Received:**	06/16/2017

1,4-Dioxane by GCMS

Sample Name:	CG127-40-BL-061517	**Units:**	ug/L
Lab Code:	K1706268-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/2017
Sample Matrix:	Water	**Date Received:**	06/16/2017

1,4-Dioxane by GCMS

Sample Name:	CG127-75-BL-061517	**Units:**	ug/L
Lab Code:	K1706268-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/2017
Sample Matrix:	Water	**Date Received:**	06/16/2017

1,4-Dioxane by GCMS

Sample Name:	CG-DU-061517	**Units:**	ug/L
Lab Code:	K1706268-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/15/2017
Sample Matrix:	Water	**Date Received:**	06/16/2017

1,4-Dioxane by GCMS

Sample Name:	CG-FB-061517	**Units:**	ug/L
Lab Code:	K1706268-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1705098-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**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	**Lab Code:**	KWG1705811-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705711
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	56,062	5.22
	Upper Limit ==>	112,124	5.72
	Lower Limit ==>	28,031	4.72
	ICAL Result ==>	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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/21/2017
Sample Matrix:	Water	**Date Analyzed:**	07/10/2017

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

Sample Name:	CG-FB-061517	**Units:**	ug/L
Lab Code:	K1706268-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705098

		CG-FB-061517MS KWG1705098-1 Matrix Spike			CG-FB-061517DMS KWG1705098-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/21/2017
Sample Matrix:	Water	**Date Analyzed:**	07/10/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1705098

	Lab Control Sample KWG1705098-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705098-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/21/2017
Sample Matrix:	Water	**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.	**Service Request:**	K1706268
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/21/2017
Sample Matrix:	Water	**Date Analyzed:**	07/10/2017
		Time Analyzed:	20:22

Lab Control Sample Summary
1,4-Dioxane by GCMS

Sample Name:	Lab Control Sample	**Instrument ID:**	MS26
Lab Code:	KWG1705098-3	**File ID:**	J:\MS26\DATA\071017A\0710F025.D
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705098

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
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. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706268
Project: Georgetown ISB/STRCL-001

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kurt Clarkson
Client Services
Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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.:**	K1706565
Project:	Georgetown IJB/STRCL-001	**Date Received:**	06/23/17
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

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 4ºC 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 Kurt Clawson

Chain of Custody

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CHAIN OF CUSTODY

ALS Environmental

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PAGE 1 OF 1 SR# K1706565 COC#

PROJECT NAME: Georgetown ISB
PROJECT NUMBER: STRCL-001
PROJECT MANAGER: TASYA GRAY
COMPANY NAME: DOE
ADDRESS: 10827 NE 68th St
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: LKERNER@DOFNW.com
PHONE #: 208-316-7223 FAX #:
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8270LL☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐ T-Phos	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases CO_2☐ RSK 175☐ Methane☐ Ethane☐ Ethene☐	1,4-dioxane	Ferrous/Ferric Iron	REMARKS
CG-127-40-062217	06/22/17	11:15		water									X			X					X	X	
CG-9-127-42-062217	06/22/17	11:20		water									X			X					X	X	
CG-127-75-062217	06/22/17	1205		water									X			X					X	X	

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
X 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:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature: FEDEX UNDER	Signature:	Signature:
Date/Time: 06/22/17 1545	Date/Time: Custody Seal	Date/Time:	Date/Time: 6/23/17 0920
Printed Name: Lucas Kerner	Printed Name:	Printed Name:	Printed Name:
Firm: DOE	Firm:	Firm:	Firm:

PC KC

Cooler Receipt and Preservation Form

Client DOF Service Request *K17* 806565

Received: 6/23/17 Opened: 6/23/17 By: [illegible] Unloaded: 6/23/17 By: [illegible]

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 NA	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 Cl2/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
ALL	250mL				X	HNO_3	0.5mL	RE/1-45-E	SM	1100

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

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17
Sample Matrix:	Water	**Date Received:**	06/23/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Replicate Sample Summary

Nitrate+Nitrite as Nitrogen

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706370-006	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1706370-006MS			**Duplicate Matrix Spike** K1706370-006DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	2.28	7.45	5.00	103	7.58	5.00	106	90-110	3	20

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706500-008	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1706500-008MS			**Duplicate Matrix Spike** K1706500-008DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	1.91	7.18	5.00	105	7.15	5.00	105	90-110	<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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706571-002	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1706571-002MS			**Duplicate Matrix Spike** K1706571-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	ND U	0.981	1.00	98	0.999	1.00	100	90-110	2	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Analyzed:**	07/08/17
Sample Matrix:	Water	**Date Extracted:**	07/07/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	552784

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1706565-LCS1	9.93	10.9	91	90-110

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Analyzed:**	07/11/17
Sample Matrix:	Water	**Date Extracted:**	07/07/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	552748

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1706565-LCS2	10.1	10.9	92	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Continuing Calibration Verification (CCV) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1706565
Project: Georgetown ISB/STRCL-001

Continuing Calibration Blank (CCB) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17
Sample Matrix:	Water	**Date Received:**	06/23/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-062217	K1706565-001	**11.0**	1.0	0.3	5	06/23/17 12:15	*
CG-9-127-40-062217	K1706565-002	**12.6**	1.0	0.3	5	06/23/17 12:15	*
CG-127-75-0612217	K1706565-003	**0.78**	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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	06/22/17

Replicate Sample Summary

General Chemistry Parameters

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1706507-001	**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

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	06/22/17
		Date Extracted:	NA

Matrix Spike Summary
Iron, Divalent (Ferrous Iron)

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1706507-001	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1706507-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron, Divalent (Ferrous Iron)	ND U	2.47	2.00	124	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. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1706565
Project: Georgetown ISB/STRCL-001

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17 11:15
Sample Matrix:	Water	**Date Received:**	06/23/17 09:20
Sample Name:	CG-127-40-062217	**Basis:**	NA
Lab Code:	K1706565-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	**13700**	ug/L	21	3	1	07/10/17 14:31	07/05/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17 11:20
Sample Matrix:	Water	**Date Received:**	06/23/17 09:20
Sample Name:	CG-9-127-40-062217	**Basis:**	NA
Lab Code:	K1706565-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	**13600**	ug/L	21	3	1	07/10/17 15:58	07/05/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17 12:05
Sample Matrix:	Water	**Date Received:**	06/23/17 09:20
Sample Name:	CG-127-75-0612217	**Basis:**	NA
Lab Code:	K1706565-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	**9310**	ug/L	21	3	1	07/10/17 16:01	07/05/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1708649-02		

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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	07/10/17

Replicate Sample Summary

Dissolved Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706692-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1708649-07 Result	Average	RPD	RPD Limit
Iron	6010C	21	3	4460	4490	4470	<1	20

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ALS Group USA, Corp.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17
Sample Matrix:	Water	**Date Received:**	06/23/17
		Date Analyzed:	07/10/17

Replicate Sample Summary

Total Metals

Sample Name:	CG-127-40-062217	**Units:**	ug/L
Lab Code:	K1706565-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1708649-03 Result	Average	RPD	RPD Limit
Iron	6010C	21	3	13700	13700	13700	<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.

Printed 7/12/2017 3:45:35 PM Superset Reference:

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	07/10/17

Replicate Sample Summary
Total Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706692-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1708649-05 Result	Average	RPD	RPD Limit
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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	07/10/17
		Date Extracted:	07/5/17

Matrix Spike Summary
Dissolved Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706692-002	**Basis:**	NA
Analysis Method:	6010C		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1708649-08

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

Printed 7/12/2017 3:45:35 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/17
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1706565-001	**Basis:**	NA
Analysis Method:	6010C		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1708649-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

Printed 7/12/2017 3:45:35 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	07/10/17
		Date Extracted:	07/5/17

Matrix Spike Summary
Total Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706692-002	**Basis:**	NA
Analysis Method:	6010C		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1708649-06

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

Printed 7/12/2017 3:45:35 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Analyzed:**	07/10/17
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ1708649-01

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6010C	977	1000	98	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1706565
Project: Georgetown ISB/STRCL-001
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**291693
Analytical Method: 6010C

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	552902	2500	2540	102	10000	10300	103	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	552902				10000	10300	103	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	552902				10000	10300	103	10000	9990	100

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	552902				10000	10100	101	10000	10100	101

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	552902				10000	9960	100	10000	9920	99

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

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	3	J	6	J	3	U	4	J

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

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			11	J	3	U	3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

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. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

INITIAL AND CONTINUING CALIBRATION BLANK

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank Result	C	Continuing Calibration Blank Result	C	Continuing Calibration Blank Result	C	Continuing Calibration Blank Result	C
Iron	6010C	552902			3	U				

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSA **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	552902	186000	-	-	-	07/10/17 11:28

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	552902	185000	-	-	-	07/10/17 11:31

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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.

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565

Project: Georgetown ISB/STRCL-001

Detection Limits

Matrix: Water

Analyte	Wavelength (nm)	Units	MRL	MDL	Method
Iron	2599	ug/L	20	3	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

ICP Linear Range (Quarterly)

Instrument: K-ICP-AES-03

Analyte	Concentration (ug/L)	Method
Iron 2599	360000	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **552902**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **552902**

Sample	Dilution Factor	Date/Time	Fe
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	

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **552902**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **552902**

Sample	Dilution Factor	Date/Time	Fe
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}	☒	1	Fe	0.000833	0.000000	No
Al 394.401 { 85}	☒	None				
Sb 206.833 {463}	☒	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}	☒	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}	☒	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}	☒	None				
Be 234.861 {144}	☒	3	Fe	0.000008	0.000000	No
			Mn	-0.000058	0.000000	No
			Mo	-0.000392	0.000000	No
B 249.678 {135}	☒	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}	☒	2	Al	-0.000005	0.000000	No
			Fe	0.000028	0.000000	No
Cd 226.502 {449}	☒	2	Fe	0.000133	0.000000	No
			Ti	0.000128	0.000000	No
Ca 315.887 {107}	☒	None				
Ca 393.366 { 86}	☒	1	Fe	0.000130	0.000000	No
Cr 267.716 {126}	☒	3	Cd	-0.000118	0.000000	No
			Mn	0.000260	0.000000	No
			Fe	0.000026	0.000000	No
Co 228.616 {447}	☒	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}	☒	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}	☒	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}	☒	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}	☒	None				
Pb 220.353 {453}	☒	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/2017
Sample Matrix:	Water	**Date Received:**	06/23/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-062217	**Units:**	ug/L
Lab Code:	K1706565-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/2017
Sample Matrix:	Water	**Date Received:**	06/23/2017

1,4-Dioxane by GCMS

Sample Name:	CG-9-127-40-062217	**Units:**	ug/L
Lab Code:	K1706565-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	06/22/2017
Sample Matrix:	Water	**Date Received:**	06/23/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-0612217	**Units:**	ug/L
Lab Code:	K1706565-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1705306-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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 (%)

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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**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	**Lab Code:**	KWG1705854-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705854
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	52,760	5.21
	Upper Limit ==>	105,520	5.71
	Lower Limit ==>	26,380	4.71
	ICAL Result ==>	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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**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	**Lab Code:**	KWG1705951-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705951
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	40,099	5.22
	Upper Limit ==>	80,198	5.72
	Lower Limit ==>	20,050	4.72
	ICAL Result ==>	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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/29/2017
Sample Matrix:	Water	**Date Analyzed:**	07/11/2017

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

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706496-032	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705306

		Batch QCMS KWG1705306-1 Matrix Spike			Batch QCDMS KWG1705306-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/29/2017
Sample Matrix:	Water	**Date Analyzed:**	07/11/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1705306

	Lab Control Sample KWG1705306-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705306-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/29/2017
Sample Matrix:	Water	**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 Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706565
Project:	Georgetown ISB/STRCL-001	**Date Extracted:**	06/29/2017
Sample Matrix:	Water	**Date Analyzed:**	07/11/2017
		Time Analyzed:	18:14

Lab Control Sample Summary
1,4-Dioxane by GCMS

Sample Name:	Lab Control Sample	**Instrument ID:**	MS26
Lab Code:	KWG1705306-3	**File ID:**	J:\MS26\DATA\071117\0711F006.D
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705306

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1705306-5	J:\MS26\DATA\071117\0711F005.D	07/11/17	17:56
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706565
Project: Georgetown ISB/STRCL-001

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

for Kurt Clarkson
Client Services
Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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 4ºC 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 Noe D. Diaz

Chain of Custody

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CHAIN OF CUSTODY

ALS Environmental

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SR# K1706576

PAGE 1 OF 1 COC#

PROJECT NAME	Georgetown 1,4-Dioxane IDW
PROJECT NUMBER	STRC1-001 37508
PROJECT MANAGER	TASYA GRAY
COMPANY NAME	DOF
ADDRESS	10827 NE 68th St
CITY/STATE/ZIP	Kirkland, WA 98033
E-MAIL ADDRESS	LHERNER@DOFNW.com
PHONE #	206-316-7223 FAX #
SAMPLER'S SIGNATURE	

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS, Turb.	(circle) NH3-N, COD, TKN, TOC, DOC NO2+NO3 T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO3☐ HCO3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ CO2☐ Methane☐ Ethane☐ Ethene☐	1,4 Dioxane	Ferrous/Ferric Iron	REMARKS
CG-127-40-062917	06/29/17	11:55		Water	4								X			X					X	X	
CG-127-120-062917	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: STERICYCLE
Bill Beck

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 day
X 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:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature: Fedex under Custody Seal	Signature:	Signature:
Date/Time: 06/29/17 1240	Date/Time:	Date/Time:	Date/Time: 6/30/17 0930
Printed Name: Lucas Herner	Printed Name:	Printed Name:	Printed Name: CODY GRAVES
Firm: DOF	Firm:	Firm:	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 (NA)	Tracking Number NA	Filed
0.7	0.5	/	/	-0.2	374		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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17
Sample Matrix:	Water	**Date Received:**	06/30/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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.	**Service Request:**	K1706876
Project	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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:	K1706698-006	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike				Duplicate Matrix Spike					
		K1706698-006MS				K1706698-006DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	0.340	1.50	1.00	116 *	1.44	1.00	110	90-110	5	20

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Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike K1706910-001MS			Duplicate Matrix Spike K1706910-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	ND U	1.10	1.00	110	1.10	1.00	110	90-110	<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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707226-001	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1707226-001MS			Duplicate Matrix Spike K1707226-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	0.467	1.49	1.00	102	1.49	1.00	103	90-110	<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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707326-001	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike			Duplicate Matrix Spike					
		K1707326-001MS			K1707326-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	0.950	6.31	5.00	107	6.37	5.00	108	90-110	<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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Analyzed:**	07/15/17
Sample Matrix:	Water	**Date Extracted:**	07/15/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	553669

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1706876-LCS1	9.88	10.9	91	90-110

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Analyzed:**	07/20/17
Sample Matrix:	Water	**Date Extracted:**	07/20/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	554397

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1706876-LCS2	10.1	10.9	93	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Continuing Calibration Blank (CCB) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17
Sample Matrix:	Water	**Date Received:**	06/30/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-062917	K1706876-001	**7.95**	0.40	0.10	2	06/30/17 14:00	*
CG-9-127-40-062917	K1706876-002	**12.4**	1.0	0.3	5	06/30/17 14:00	*
CG-127-75-062917	K1706876-003	**0.59**	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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17
Sample Matrix:	Water	**Date Received:**	06/30/17
		Date Analyzed:	06/30/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	CG-127-75-062917	**Units:**	mg/L
Lab Code:	K1706876-003	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1706876-003DUP Result	Average	RPD	RPD Limit
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	0.59	0.58	0.585	2	20

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Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1706876-003	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1706876-003MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17 11:55
Sample Matrix:	Water	**Date Received:**	06/30/17 09:30
Sample Name:	CG-127-40-062917	**Basis:**	NA
Lab Code:	K1706876-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17 12:00
Sample Matrix:	Water	**Date Received:**	06/30/17 09:30
Sample Name:	CG-9-127-40-062917	**Basis:**	NA
Lab Code:	K1706876-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6010C	**13000**	ug/L	21	3	1	07/20/17 17:55	07/12/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/17 11:08
Sample Matrix:	Water	**Date Received:**	06/30/17 09:30
Sample Name:	CG-127-75-062917	**Basis:**	NA
Lab Code:	K1706876-003		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1709261-02		

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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	07/20/17

Replicate Sample Summary
Total Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706824-002	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1709261-03 Result	Average	RPD	RPD Limit
Iron	6010C	21	3	7570	7500	7530	<1	20

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ALS Group USA, Corp.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	07/20/17
		Date Extracted:	07/12/17

Matrix Spike Summary
Total Metals

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1706824-002	**Basis:**	NA
Analysis Method:	6010C		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1709261-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6010C	2490	2500	99	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**292473
Analytical Method: 6010C

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289	2500	2500	100	10000	10000	100	10000	10200	102

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10000	100	10000	10000	100

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10100	101	10000	10100	101

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10100	101	10000	10100	101

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10200	102	10000	10200	102

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10300	103	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10300	103	10000	10400	104

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10300	103	10000	10300	103

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6010C	554289				10000	10300	103			

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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		

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSA **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	554289	184000	-	-	-	07/20/17 09:56

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6010C	554289	185000	-	-	-	07/20/17 09:58

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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.

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Detection Limits

Matrix: Water

Analyte	Wavelength (nm)	Units	MRL	MDL	Method
Iron	2599	ug/L	20	3	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-AES-03

Analyte	Concentration (ug/L)	Method
Iron 2599	360000	6010C

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876

Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-AES-03** **Analytical BatchID:** **554289**

Sample	Dilution Factor	Date/Time	Fe
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}	☒	1	Fe	0.000833	0.000000	No
Al 394.401 { 85}	☒	None				
Sb 206.833 {463}	☒	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}	☒	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}	☒	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}	☒	None				
Be 234.861 {144}	☒	3	Fe	0.000008	0.000000	No
			Mn	-0.000058	0.000000	No
			Mo	-0.000392	0.000000	No
B 249.678 {135}	☒	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}	☒	2	Al	-0.000005	0.000000	No
			Fe	0.000028	0.000000	No
Cd 226.502 {449}	☒	2	Fe	0.000133	0.000000	No
			Ti	0.000128	0.000000	No
Ca 315.887 {107}	☒	None				
Ca 393.366 { 86}	☒	1	Fe	0.000130	0.000000	No
Cr 267.716 {126}	☒	3	Cd	-0.000118	0.000000	No
			Mn	0.000260	0.000000	No
			Fe	0.000026	0.000000	No
Co 228.616 {447}	☒	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}	☒	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}	☒	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}	☒	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}	☒	None				
Pb 220.353 {453}	☒	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

Sample Name	Lab Code	Date Collected	Date Received
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

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/2017
Sample Matrix:	Water	**Date Received:**	06/30/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-062917	**Units:**	ug/L
Lab Code:	K1706876-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/2017
Sample Matrix:	Water	**Date Received:**	06/30/2017

1,4-Dioxane by GCMS

Sample Name:	CG-9-127-40-062917	**Units:**	ug/L
Lab Code:	K1706876-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/2017
Sample Matrix:	Water	**Date Received:**	06/30/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-062917	**Units:**	ug/L
Lab Code:	K1706876-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	06/29/2017
Sample Matrix:	Water	**Date Received:**	06/30/2017

1,4-Dioxane by GCMS

Sample Name:	Field Blank	**Units:**	ug/L
Lab Code:	K1706876-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

ALS Group USA, Corp. dba ALS Environmental

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1705607-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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

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

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.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**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	**Lab Code:**	KWG1705944-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705944
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	48,789	5.21
	Upper Limit ==>	97,578	5.71
	Lower Limit ==>	24,395	4.71
	ICAL Result ==>	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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**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	**Lab Code:**	KWG1705951-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1705951
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	40,099	5.22
	Upper Limit ==>	80,198	5.72
	Lower Limit ==>	20,050	4.72
	ICAL Result ==>	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.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/05/2017
Sample Matrix:	Water	**Date Analyzed:**	07/12/2017

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

Sample Name:	CG-127-40-062917	**Units:**	ug/L
Lab Code:	K1706876-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705607

		CG-127-40-062917MS KWG1705607-1 Matrix Spike			CG-127-40-062917DMS KWG1705607-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/05/2017
Sample Matrix:	Water	**Date Analyzed:**	07/12/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1705607

	Lab Control Sample KWG1705607-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705607-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/05/2017
Sample Matrix:	Water	**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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/05/2017
Sample Matrix:	Water	**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

ALS Group USA, Corp. dba ALS Environmental

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

ALS Group USA, Corp. dba ALS Environmental

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08 **Calibration Date:** 07/10/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15465 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Calibration Date:**	07/10/2017
		Date Analyzed:	07/10/2017

Second Source Calibration Verification
1,4-Dioxane by GCMS

Calibration Type:	Internal Standard	**Calibration ID:**	CAL15465
Analysis Method:	8270D SIM	**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**

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1706876
Project:	Georgetown 1,4-Dioxane ISB/STRCL-001 375.08	**Date Analyzed:**	07/12/2017

Continuing Calibration Verification Summary
1,4-Dioxane by GCMS

Calibration Type:	Internal Standard	**Calibration Date:**	07/10/2017
Analysis Method:	8270D SIM	**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**

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1706876
Project: Georgetown 1,4-Dioxane ISB/STRCL-001 375.08

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

for Kurt Clarkson
Client Services
Manager

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Table of Contents

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

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

Case Narrative

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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 4ºC 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 Noe D. Diaz

Chain of Custody

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
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CHAIN OF CUSTODY
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SR# K1702384

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	1,4 Dioxane JOB
Project Number	STRCL-001 37508
Project Manager	Tasya Gray
Company	DOF
Address	10527 NE 68th B
Phone #	208-310 7223
email	lkerne@dofnw.com
Sampler Signature	
Sampler Printed Name	Lucas Kerne

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H ApplEnvMic7-87-1536-1540 /	7D 8270D / 1,4-Dioxane	28D 353.2 / NO2 NO3 T	180D 6020A / Metals T	1	2	3	4	5	Remarks
1. CG-127-40-1G-07132017		07/13/2017	12:55	Water	4	X	X	X	X						
2. CG-127-40-07132017			13:20		4	X	X	X	X						
3. CG-127-75-1G-07132017			13:40		4	X	X	X	X						
4. CG-127-75-07132017			14:00		4	X	X	X	X						
5. CG-127-75-9-07132017			14:05		4	X	X	X	X						
6. FieldBlank 07132017			14:15		1		X								
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: STERLYCLE

Bill Beck

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X 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 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

Special Instructions/Comments:

Sample event 3

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	FEDEX UNDER	Signature		Signature	Signature
Printed Name Lucas Kerne	Signature Custody Seal	Printed Name	Printed Name DOF	Printed Name	Printed Name
Firm DOF	Printed Name	Firm	Firm ARS	Firm	Firm
Date/Time 15:05 7/13/2017	Firm	Date/Time	Date/Time 7/14/17 0940	Date/Time	Date/Time
	Date/Time				

PC Kurt

Cooler Receipt and Preservation Form

Client DOF Service Request K17 07384

Received: 7/14/17 Opened: 7/14/17 By: [signature] Unloaded: 7/14/17 By: [signature]/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? 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
1.5	1.0	3.7	4.0	+0.1	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:
CG-127-40-07132017	CG-127-75-07132017	Sampling time / elimination
CG-127-40-9-07132017	CG-127-75-9-07132017	

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

7/25/16 ***Page*** _____ ***of*** _____

General Chemistry

ALS Environmental—Kelso Laboratory
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ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**Date Received:**	07/14/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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	

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**Date Received:**	07/14/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**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
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707384-001	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	Method		

		Matrix Spike K1707384-001MS			Duplicate Matrix Spike K1707384-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Analyzed:**	07/27/17
Sample Matrix:	Water	**Date Extracted:**	07/27/17

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	555331

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1707384-LCS	9.86	10.9	90	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

Continuing Calibration Blank (CCB) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**Date Received:**	07/14/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
CG-127-40-1G-07132017	K1707384-001	**10.5**	0.40	0.10	2	07/14/17 13:30	*
CG-127-40-07132017	K1707384-002	**3.90**	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	**0.23**	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	

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**Date Received:**	07/14/17
		Date Analyzed:	07/14/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	CG-127-75-9-07132017	**Units:**	mg/L
Lab Code:	K1707384-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1707384-005DUP Result	Average	RPD	RPD Limit
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707384-005	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1707384-005MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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
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www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17 12:55
Sample Matrix:	Water	**Date Received:**	07/14/17 09:40
Sample Name:	CG-127-40-1G-07132017	**Basis:**	NA
Lab Code:	K1707384-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**12.9**	mg/L	0.0020	0.0003	1	07/24/17 18:51	07/18/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17 13:20
Sample Matrix:	Water	**Date Received:**	07/14/17 09:40
Sample Name:	CG-127-40-07132017	**Basis:**	NA
Lab Code:	K1707384-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**12.7**	mg/L	0.0020	0.0003	1	07/24/17 19:21	07/18/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17 13:40
Sample Matrix:	Water	**Date Received:**	07/14/17 09:40
Sample Name:	CG-127-75-1G-07132017	**Basis:**	NA
Lab Code:	K1707384-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**4.15**	mg/L	0.0020	0.0003	1	07/24/17 19:25	07/18/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17 14:00
Sample Matrix:	Water	**Date Received:**	07/14/17 09:40
Sample Name:	CG-127-75-07132017	**Basis:**	NA
Lab Code:	K1707384-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**4.02**	mg/L	0.0020	0.0003	1	07/24/17 19:29	07/18/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17 14:05
Sample Matrix:	Water	**Date Received:**	07/14/17 09:40
Sample Name:	CG-127-75-9-07132017	**Basis:**	NA
Lab Code:	K1707384-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**4.04**	mg/L	0.0020	0.0003	1	07/24/17 19:33	07/18/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1709657-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	ND U	mg/L	0.0020	0.0003	1	07/24/17 18:36	07/18/17	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**Date Received:**	07/14/17
		Date Analyzed:	07/24/17

Replicate Sample Summary
Total Metals

Sample Name:	CG-127-40-1G-07132017	**Units:**	mg/L
Lab Code:	K1707384-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1709657-03 Result	Average	RPD	RPD Limit
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.

Printed 7/26/2017 3:44:31 PM Superset Reference:

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707384-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1709657-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron	12.9	12.9	0.0500	126 #	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.

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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0500	0.0500	100	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**292990
Analytical Method: 6020A

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	554768	50.0	49.2	98	250	248	99	250	250	100

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	554768				250	249	99	250	247	99

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

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. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

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				

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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	554768	46300	-	-	-	07/24/17 17:43

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	554768	47700	-	-	-	07/24/17 17:46

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384

Project: 1,4 Dioxane ISB/STRCL-001 375.08

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-06

Analyte	Concentration (ug/L)	Method
Iron 56	45000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **554768**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **554768**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-1G-07132017	**Units:**	ug/L
Lab Code:	K1707384-001	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-07132017	**Units:**	ug/L
Lab Code:	K1707384-002	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-1G-07132017	**Units:**	ug/L
Lab Code:	K1707384-003	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-07132017	**Units:**	ug/L
Lab Code:	K1707384-004	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-9-07132017	**Units:**	ug/L
Lab Code:	K1707384-005	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	07/13/2017
Sample Matrix:	Water	**Date Received:**	07/14/2017

1,4-Dioxane by GCMS

Sample Name:	Field Blank 07132017	**Units:**	ug/L
Lab Code:	K1707384-006	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1705961-5	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3510C **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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 (%)

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: 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	
		Area	**RT**
	Results ==>	39,423	5.26
	Upper Limit ==>	78,846	5.76
	Lower Limit ==>	19,712	4.76
	ICAL Result ==>	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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**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	**Lab Code:**	KWG1706506-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1706506
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	43,425	5.26
	Upper Limit ==>	86,850	5.76
	Lower Limit ==>	21,713	4.76
	ICAL Result ==>	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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/17/2017
Sample Matrix:	Water	**Date Analyzed:**	07/19/2017

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

Sample Name:	CG-127-40-1G-07132017	**Units:**	ug/L
Lab Code:	K1707384-001	**Basis:**	NA
Extraction Method:	EPA 3510C	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1705961

		CG-127-40-1G-07132017MS KWG1705961-1 Matrix Spike			CG-127-40-1G-07132017D MS KWG1705961-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/17/2017
Sample Matrix:	Water	**Date Analyzed:**	07/19/2017

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

Extraction Method:	EPA 3510C	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1705961

	Lab Control Sample KWG1705961-3 Lab Control Spike			Duplicate Lab Control Sample KWG1705961-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/17/2017
Sample Matrix:	Water	**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

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707384
Project:	1,4 Dioxane ISB/STRCL-001 375.08	**Date Extracted:**	07/17/2017
Sample Matrix:	Water	**Date Analyzed:**	07/19/2017
		Time Analyzed:	11:25

Lab Control Sample Summary
1,4-Dioxane by GCMS

Sample Name:	Lab Control Sample	**Instrument ID:**	MS26
Lab Code:	KWG1705961-3	**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	KWG1705961-5	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. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

ALS Group USA, Corp. dba ALS Environmental

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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. **Service Request:** K1707384
Project: 1,4 Dioxane ISB/STRCL-001 375.08

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kurt Clarkson
Client Services
Manager

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Table of Contents

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

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

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 4ºC 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 Kurt Clawson

Chain of Custody

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Environmental

CHAIN OF CUSTODY
81267

004

SR# K1707014

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: STERICYCLE PSC Georgetown ISCO	Project Number: STRCL001 375.08
Project Manager: TASYA GRAY	
Company: DOF	
Address: 10827 NE 68th St. Suite B, Kirkland WA	
Phone #: 206-375-0211	email: NGRAY@DOFNW.com
Sampler Signature: [signature]	Sampler Printed Name: L. Kerner

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H ApplEnvMic7-87-1536-1540 /	7D 8270D / 1,4-Dioxane	~~SM4500-S2 D / Sulfide T~~	28D 300.0 / SO4	180D 6020A / Metals T	1	2	3	4	5	Remarks
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_2SO_4
4. IP-6-07192017			1230		4	X	X		X	X						↓
5. IP-7-07192017			1300		4	X	X		X	X						*
6. CG-122-60-07192017			1500		4	X	X		X	X						
7. CG-122-75-07192017			1420													
8. CG-9-122-75-07192017			1425													
9. FB1-07192017		↓	1505	↓	4	X	X		X	X						
10.																

Report Requirements

___ I. Routine Report: Method Blank, Surrogate, as required

X II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

X V. EDD

Invoice Information

P.O.# 375.08

Bill To: Bill Beck Stericycle

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

X 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 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

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

* IP 5,6,7 have high Sodium Persulphate concentrations *

- use extra sample volume to perform MS/DS

* - 1,4 Dioxane preserved with ascorbic acid

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: [signature]	Signature: Fedex under	Signature:	Signature: [signature]	Signature:	Signature:
Printed Name: Lucas Kerner	Printed Name: Custody	Printed Name:	Printed Name: CODY GRAVES	Printed Name:	Printed Name:
Firm: DOF	Firm: Seal	Firm:	Firm: ALS	Firm:	Firm:
Date/Time: 07/19/17 1600	Date/Time:	Date/Time:	Date/Time: 7/20/17 0940	Date/Time:	Date/Time:

PC KC

Cooler Receipt and Preservation Form

Client DOF/Stericycle Service Request *K17* 07614

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 NA	Tracking Number NA	Filed
0.3	0.2	4.5	4.4	-0.1	328	81267	7972 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

Votes, Discrepancies, & Resolutions: SHORT HOLD TIME

ALS Environmental

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81267

004

SR# K1707614

COC Set ____ of ____

COC# ____________

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www.alsglobal.com

Project Name: STERICYCLE PSC Georgetown ISCO
Project Number: STRCL-001 375.08
Project Manager: TASYA GRAY
Company: DOF
Address: 10827 NE 68th St. Suite B, Kirkland WA
Phone #: 206-375-0211
email: NGRAY@DOFNW.COM
Sampler Signature: [signature]
Sampler Printed Name: L. Kerne

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H: AppIEnvMic7-87-1536-1540 /	7D: 8270D / 1,4-Dioxane *	7D: SM4500-S2 D / Sulfide T	28D: 300.0 / SO4	180D: 6020A / Metals T	1	2	3	4	5	Remarks
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_2SO_4
4. IP-6-07192017			1230		4	X	X		X	X						↓
5. IP-7-07192017			1300		4	X	X		X	X						↓
6. CG-122-60-07192017			1500		4	X	X		X	X						
7. CG-122-75-07192017			1420		4	X	X		X	X						
8. CG-9-122-75-07192017			1425		4	X	X		X	X						
9. FB1-07192017		↓	1505	↓	4	X	X		X	X						
10.																

Report Requirements

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

Invoice Information

P.O.# 375.08
Bill To: Bill Beck, Stericycle

Turnaround Requirements

___ 24 hr. ___ 48 hr
___ 5 Day
X 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 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:
- IP 5,6,7 have high Sodium Persulphate concentrations
- use extra sample volume to perform MS/DS
- *1,4 Dioxane preserved with ascorbic acid

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: [signature]	Signature: Fedex under	Signature	Signature: [signature]	Signature	Signature
Printed Name: Lucas Kerne	Printed Name: Custody	Printed Name	Printed Name: CODY GRAVES	Printed Name	Printed Name
Firm: DOF	Firm: Seal	Firm	Firm: ALS	Firm	Firm
Date/Time: 07/19/17 1600	Date/Time	Date/Time	Date/Time: 7/20/17 0940	Date/Time	Date/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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**Date Received:**	07/20/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-07192017	K1707614-001	**1050**	2.0	0.2	20	07/29/17 21:21	7/29/17	
IMV-2-07192017	K1707614-002	**496**	1.0	0.1	10	07/29/17 21:31	7/29/17	
IP-5-07192017	K1707614-003	**846**	20	2	200	07/29/17 21:41	7/29/17	
IP-6-07192017	K1707614-004	**148**	20	2	200	07/29/17 21:51	7/29/17	
IP-7-07192017	K1707614-005	**501**	20	2	200	07/29/17 22:01	7/29/17	
CG-122-60-07192017	K1707614-006	**210**	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	

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**Date Received:**	07/20/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**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		

		Matrix Spike			Duplicate Matrix Spike					
		K1707614-002MS			K1707614-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Analyzed:**	07/29/17
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	555986

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1707614-LCS1	5.35	5.00	107	90-110

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Analyzed:**	08/01/17
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	556108

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1707614-LCS2	5.22	5.00	104	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

Continuing Calibration Blank (CCB) Summary

Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**Date Received:**	07/20/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-07192017	K1707614-001	**0.84**	0.20	0.05	1	07/20/17 11:00	*
IMV-2-07192017	K1707614-002	**1.87**	0.20	0.05	1	07/20/17 11:00	*
CG-122-60-07192017	K1707614-006	**0.39**	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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**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

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1707614-007DUP 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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707614-007	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike K1707614-007MS			Duplicate Matrix Spike K1707614-007DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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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www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 10:00
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	IMW-1-07192017	**Basis:**	NA
Lab Code:	K1707614-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 10:50
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	IMV-2-07192017	**Basis:**	NA
Lab Code:	K1707614-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**11.9**	mg/L	0.0020	0.0003	1	08/01/17 12:24	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 11:45
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	IP-5-07192017	**Basis:**	NA
Lab Code:	K1707614-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.160**	mg/L	0.020	0.003	1	08/01/17 12:47	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 12:30
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	IP-6-07192017	**Basis:**	NA
Lab Code:	K1707614-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.287**	mg/L	0.020	0.003	1	08/01/17 12:50	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 13:00
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	IP-7-07192017	**Basis:**	NA
Lab Code:	K1707614-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.765**	mg/L	0.020	0.003	1	08/01/17 12:54	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 15:00
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	CG-122-60-07192017	**Basis:**	NA
Lab Code:	K1707614-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**2.50**	mg/L	0.0020	0.0003	1	08/01/17 12:58	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 14:20
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	CG-122-75-07192017	**Basis:**	NA
Lab Code:	K1707614-007		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**1.39**	mg/L	0.0020	0.0003	1	08/01/17 13:02	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 14:25
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	CG-9-122-75-07192017	**Basis:**	NA
Lab Code:	K1707614-008		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**1.39**	mg/L	0.0020	0.0003	1	08/01/17 13:06	07/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17 15:05
Sample Matrix:	Water	**Date Received:**	07/20/17 09:40
Sample Name:	FB1-07192017	**Basis:**	NA
Lab Code:	K1707614-009		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1710319-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0006 J**	mg/L	0.0020	0.0003	1	08/01/17 11:57	07/28/17	

ALS Group USA, Corp.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**Date Received:**	07/20/17
		Date Analyzed:	08/01/17

Replicate Sample Summary
Total Metals

Sample Name:	IMW-1-07192017	**Units:**	mg/L
Lab Code:	K1707614-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1710319-03 Result	Average	RPD	RPD Limit
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1707614-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1710319-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Analyzed:**	08/01/17
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1710319-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0525	0.0500	105	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**293892
Analytical Method: 6020A

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

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
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

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	555962				250	254	102			

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614

Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614

Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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	555962	46900	-	-	-	08/01/17 11:46

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

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	555962	46300	-	-	-	08/01/17 11:50

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614

Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614

Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

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

Analyte	Concentration (ug/L)	Method
Iron 56	45000	6020A

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **555962**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

Sample Name	Lab Code	Date Collected	Date Received
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

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	IMW-1-07192017	**Units:**	ug/L
Lab Code:	K1707614-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	IMV-2-07192017	**Units:**	ug/L
Lab Code:	K1707614-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	IP-5-07192017	**Units:**	ug/L
Lab Code:	K1707614-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	IP-6-07192017	**Units:**	ug/L
Lab Code:	K1707614-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	IP-7-07192017	**Units:**	ug/L
Lab Code:	K1707614-005	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	CG-122-60-07192017	**Units:**	ug/L
Lab Code:	K1707614-006	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	CG-122-75-07192017	**Units:**	ug/L
Lab Code:	K1707614-007	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	CG-9-122-75-07192017	**Units:**	ug/L
Lab Code:	K1707614-008	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

Analytical Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	07/19/2017
Sample Matrix:	Water	**Date Received:**	07/20/2017

1,4-Dioxane by GCMS

Sample Name:	FB1-07192017	**Units:**	ug/L
Lab Code:	K1707614-009	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1706246-3	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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 (%)

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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**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	**Lab Code:**	KWG1706550-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1706550
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	51,586	5.26
	Upper Limit ==>	103,172	5.76
	Lower Limit ==>	25,793	4.76
	ICAL Result ==>	41,760	5.27
Associated Analyses			
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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**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	**Lab Code:**	KWG1706609-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1706609
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	55,086	5.26
	Upper Limit ==>	110,172	5.76
	Lower Limit ==>	27,543	4.76
	ICAL Result ==>	41,760	5.27
Associated Analyses			
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Extracted:**	07/25/2017
Sample Matrix:	Water	**Date Analyzed:**	07/31/2017

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

Sample Name:	IMW-1-07192017	**Units:**	ug/L
Lab Code:	K1707614-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1706246

		IMW-1-07192017MS KWG1706246-4 Matrix Spike			IMW-1-07192017DMS KWG1706246-5 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Extracted:**	07/25/2017
Sample Matrix:	Water	**Date Analyzed:**	07/31/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1706246

	Lab Control Sample KWG1706246-1 Lab Control Spike			Duplicate Lab Control Sample KWG1706246-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Extracted:**	07/25/2017
Sample Matrix:	Water	**Date Analyzed:**	07/31/2017
		Time Analyzed:	19:25

Method Blank Summary
1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Instrument ID:**	MS26
Lab Code:	KWG1706246-3	**File ID:**	J:\MS26\DATA\073117\0731F018.D
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**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.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Extracted:**	07/25/2017
Sample Matrix:	Water	**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

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

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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 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**

QA/QC Results

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1707614
Project:	PSC Georgetown Dalton Olmsted/STRCL-001 375.08	**Date Analyzed:**	07/31/2017

Continuing Calibration Verification Summary
1,4-Dioxane by GCMS

Calibration Type:	Internal Standard	**Calibration Date:**	07/18/2017
Analysis Method:	8270D SIM	**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**

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. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1707614
Project: PSC Georgetown Dalton Olmsted/STRCL-001 375.08

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

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

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

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 4ºC 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 Noe D. Diaz

Chain of Custody

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ALS Environmental

CHAIN OF CUSTODY

81267

004

SR# K1709181

COC Set____of____

COC#____________

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www.alsglobal.com

Project Name: Stericycle Georgetown ISCO
Project Number: STRCL-001 375.08
Project Manager: TASYA GRAY
Company: Dalton, Olmsted & Fuglevand (DOF)
Address:
Phone #: 206-325-0211
email: ngray@DOFNW.COM
Sampler Signature: L Kerner
Sampler Printed Name: L Kerner

Analyses: NUMBER OF CONTAINERS; 24H ApplEnvMic7-87-1536-1540 /; 7D 8270D / 1,4-Dioxane; (crossed out); 28D 300.0 / SO4; 180D 6020A / Metals T (Fe); 1; 2; 3; 4; 5; Remarks

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H ApplEnvMic	7D 8270D / 1,4-Dioxane	(crossed out)	28D 300.0 / SO4	180D 6020A / Metals T	1	2	3	4	5	Remarks
1. IMW-1-08302017		8/30/17	1130	Water	4	X	X		X	X						
2. IMW-2-08302017			1215		4											
3. IP-5-08302017			1420		4											*
4. IP-6-08302017			1345		4											*
5. IP-7-08302017			1315		4											*
6. CG-122-60-08302017			1015		4											
7. CG-122-75-08302017			0935		4											
8. CG-9-122-75-08302017			0940		4											
9. FB01-08302017		↓	1020	↓	4	↓	↓		↓	↓						
10.																

Report Requirements

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

Invoice Information

P.O.# 375.08
Bill To: Bill Beck Stericycle

Turnaround Requirements

___ 24 hr. ___ 48 hr.
___ 5 Day
X 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 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

Special Instructions/Comments:
* IP 5,6,7 have high $Na_2S_2O_8$ concentration
- 1,4Dioxane preserved with Ascorbic Acid

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other_____(Circle One)

	Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	[signature]	Under Custody		[signature]		
Printed Name	L. Kerner	Seal		[illegible]		
Firm	DOF	FEDEX		8/31/17 0940		
Date/Time	8/30/17 1515	8/30/17 1515				

PC KC

Cooler Receipt and Preservation Form

Client Stericycle Service Request *K17* 09181

Received: 8/31/17 Opened: 8/31/17 By: [signature] Unloaded: 8/31/17 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? 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
2.3	2.2	6.7	6.6	-0.1	375		7875 6864 2666	

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

tes, Discrepancies, & Resolutions: _____

SHORT HOLD TIME

General Chemistry

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1317 South 13th Avenue, Kelso, WA 98626
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www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**Date Received:**	08/31/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
IMW-1-08302017	K1709181-001	**811**	20	2	200	09/07/17 21:46	9/7/17	
IMW-2-08302017	K1709181-002	**386**	20	2	200	09/07/17 21:55	9/7/17	
IP-5-08302017	K1709181-003	**599**	20	2	200	09/07/17 22:15	9/7/17	
IP-6-08302017	K1709181-004	**75**	20	2	200	09/07/17 22:24	9/7/17	
IP-7-08302017	K1709181-005	**398**	20	2	200	09/07/17 22:34	9/7/17	
CG-122-60-08302017	K1709181-006	**234**	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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**Date Received:**	08/31/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1709181-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	Method		

		Matrix Spike			**Duplicate Matrix Spike**					
		K1709181-001MS			K1709181-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike			Duplicate Matrix Spike					
		K1709277-001MS			K1709277-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Analyzed:**	09/07/17
Sample Matrix:	Water	**Date Extracted:**	09/07/17

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	561138

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1709181-LCS	4.95	5.00	99	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1709181
Project: PSC Georgetown ISCO/STRCL-001

Continuing Calibration Blank (CCB) Summary
Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**Date Received:**	08/31/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-08302017	K1709181-001	**1.96**	0.20	0.05	1	08/31/17 12:00	*
IMW-2-08302017	K1709181-002	**0.54**	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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**Date Received:**	08/31/17
		Date Analyzed:	08/31/17

Replicate Sample Summary

General Chemistry Parameters

Sample Name:	CG-122-60-08302017	**Units:**	mg/L
Lab Code:	K1709181-006	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1709181-006DUP Result	Average	RPD	RPD Limit
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	ND U	ND U	NC	NC	20

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1709181-006	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1709181-006MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1709181
Project: PSC Georgetown ISCO/STRCL-001

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 11:30
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	IMW-1-08302017	**Basis:**	NA
Lab Code:	K1709181-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 12:15
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	IMW-2-08302017	**Basis:**	NA
Lab Code:	K1709181-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**10.9**	mg/L	0.0040	0.0006	2	09/21/17 17:12	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 14:20
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	IP-5-08302017	**Basis:**	NA
Lab Code:	K1709181-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.224**	mg/L	0.0040	0.0006	2	09/21/17 17:14	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 13:45
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	IP-6-08302017	**Basis:**	NA
Lab Code:	K1709181-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.440**	mg/L	0.0040	0.0006	2	09/21/17 17:16	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 13:15
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	IP-7-08302017	**Basis:**	NA
Lab Code:	K1709181-005		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 10:15
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	CG-122-60-08302017	**Basis:**	NA
Lab Code:	K1709181-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**2.68**	mg/L	0.0040	0.0006	2	09/21/17 17:20	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 09:35
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	CG-122-75-08302017	**Basis:**	NA
Lab Code:	K1709181-007		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**1.52**	mg/L	0.0040	0.0006	2	09/21/17 17:23	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 09:40
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	CG-9-122-75-08302017	**Basis:**	NA
Lab Code:	K1709181-008		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17 10:20
Sample Matrix:	Water	**Date Received:**	08/31/17 09:40
Sample Name:	FB01-08302017	**Basis:**	NA
Lab Code:	K1709181-009		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0489**	mg/L	0.0040	0.0006	2	09/21/17 17:27	09/08/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1712886-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	ND U	mg/L	0.0020	0.0003	1	09/21/17 16:52	09/08/17	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**Date Received:**	08/31/17
		Date Analyzed:	09/21/17

Replicate Sample Summary

Total Metals

Sample Name:	IMW-1-08302017	**Units:**	mg/L
Lab Code:	K1709181-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1712886-03 Result	Average	RPD	RPD Limit
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.

Printed 9/25/2017 2:57:09 PM Superset Reference:

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1709181-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1712886-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

Printed 9/25/2017 2:57:09 PM Superset Reference:

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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0529	0.0500	106	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1709181
Project: PSC Georgetown ISCO/STRCL-001
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**297557
Analytical Method: 6020A

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. **Service Request:** K1709181

Project: PSC Georgetown ISCO/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	562688	50.0	49.5	99	250	240	96	250	242	97

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181

Project: PSC Georgetown ISCO/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	562688				250	243	97			

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181

Project: PSC Georgetown ISCO/STRCL-001

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	562688	0.3	U	0.3	U	0.3	U	0.3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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	562688	43800	-	-	-	09/21/17 16:46

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	562688	43900	-	-	-	09/21/17 16:48

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181

Project: PSC Georgetown ISCO/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181

Project: PSC Georgetown ISCO/STRCL-001

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-06

Analyte	Concentration (ug/L)	Method
Iron 56	45000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **562688**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	IMW-1-08302017	**Units:**	ug/L
Lab Code:	K1709181-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	IMW-2-08302017	**Units:**	ug/L
Lab Code:	K1709181-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	IP-5-08302017	**Units:**	ug/L
Lab Code:	K1709181-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	IP-6-08302017	**Units:**	ug/L
Lab Code:	K1709181-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	IP-7-08302017	**Units:**	ug/L
Lab Code:	K1709181-005	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	CG-122-60-08302017	**Units:**	ug/L
Lab Code:	K1709181-006	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	CG-122-75-08302017	**Units:**	ug/L
Lab Code:	K1709181-007	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	CG-9-122-75-08302017	**Units:**	ug/L
Lab Code:	K1709181-008	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	08/30/2017
Sample Matrix:	Water	**Date Received:**	08/31/2017

1,4-Dioxane by GCMS

Sample Name:	FB01-08302017	**Units:**	ug/L
Lab Code:	K1709181-009	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1707873-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**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	**Lab Code:**	KWG1708451-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1708451
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	31,371	5.25
	Upper Limit ==>	62,742	5.75
	Lower Limit ==>	15,686	4.75
	ICAL Result ==>	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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**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	**Lab Code:**	KWG1708452-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1708452
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	34,184	5.25
	Upper Limit ==>	68,368	5.75
	Lower Limit ==>	17,092	4.75
	ICAL Result ==>	41,760	5.27
Associated Analyses			
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Extracted:**	09/06/2017
Sample Matrix:	Water	**Date Analyzed:**	09/19/2017

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

Sample Name:	IMW-1-08302017	**Units:**	ug/L
Lab Code:	K1709181-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1707873

		IMW-1-08302017MS KWG1707873-1 Matrix Spike			IMW-1-08302017DMS KWG1707873-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Extracted:**	09/06/2017
Sample Matrix:	Water	**Date Analyzed:**	09/19/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1707873

	Lab Control Sample KWG1707873-3 Lab Control Spike			Duplicate Lab Control Sample KWG1707873-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Extracted:**	09/06/2017
Sample Matrix:	Water	**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

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709181
Project:	PSC Georgetown ISCO/STRCL-001	**Date Extracted:**	09/06/2017
Sample Matrix:	Water	**Date Analyzed:**	09/19/2017
		Time Analyzed:	22:53

Lab Control Sample Summary
1,4-Dioxane by GCMS

Sample Name:	Lab Control Sample	**Instrument ID:**	MS26
Lab Code:	KWG1707873-3	**File ID:**	J:\MS26\DATA\091917\0919F035.D
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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**

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709181
Project: PSC Georgetown ISCO/STRCL-001

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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.:**	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 4ºC 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 Noe D. Dan

Chain of Custody

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ALS Environmental

CHAIN OF CUSTODY
81268

005

SR# K1709916

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: Georgetown ISB	Project Number: STRCL-001
Project Manager: TASYA GRAY	
Company: DOF	
Address: 1001 SW Klickitat Way, Suite 200B Seattle WA	
Phone #: 206-375-0211	email: 98134
Sampler Signature:	Sampler Printed Name: L. Kerner

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H AppIEnvMic7-87-1536-1540 /	48H 300.0 / NO2	7D 8270D / 1,4-Dioxane	180D 6020A / Metals T	1	2	3	4	5	Remarks
1. CG-127-40-IG-091717		9/17/17	1002	W	4	X	X	X	X						
2. CG-127-40-091717			1030	W	4	X	X	X	X						
3. CG-DUP-127-40-091717			1035	W	4	X	X	X	X						
4. CG-127-75-IG-091717			1150	W	4	X	X	X	X						
5. CG-127-75-091717			1215	W	5	X	X	X	X						X Perform MS/MSD w/ extra volume
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: STERICYCLE

Turnaround Requirements

___ 24 hr. ___ 48 hr.

___ 5 Day

_X_ 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 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

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	Signature FEDEX under	Signature	Signature	Signature	Signature
Printed Name: Lucas Kerner	Printed Name: Custody Seal	Printed Name	Printed Name	Printed Name	Printed Name
Firm: DOF	Firm	Firm	Firm 9/19/17 0920	Firm	Firm
Date/Time: 9/17/17 1500	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

PC KC

Cooler Receipt and Preservation Form

Client Stericycle Service Request K17 09916

Received: 9/19/17 Opened: 9/19/17 By: [illegible] Unloaded: 9/19/17 By: [illegible]

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
3.5	3.7	—	—	+0.2	379		787767739308	

4. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves* wet ice
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

7/25/16 *Page____of____*

General Chemistry

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**Date Received:**	09/19/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**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.	**Service Request:**	K1709916
Project	PSC Georgetown I5B/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	09/19/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	KQ1713673-06	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1713673-06DUP Result	Average	RPD	RPD Limit
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	N/A
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	KQ1713673-06	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	Method		

		Matrix Spike KQ1713673-06MS			Duplicate Matrix Spike KQ1713673-06DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Analyzed:**	09/19/17
Sample Matrix:	Water	**Date Extracted:**	09/19/17

Lab Control Sample Summary
Nitrite as Nitrogen

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	Method	**Basis:**	NA
		Analysis Lot:	562523

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1709916-LCS	2.34	2.50	94	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

Continuing Calibration Verification (CCV) Summary

Nitrite as Nitrogen

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1709916
Project: PSC Georgetown I5B/STRCL-001

Continuing Calibration Blank (CCB) Summary

Nitrite as Nitrogen

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**Date Received:**	09/19/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**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.	**Service Request:**	K1709916
Project	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**Date Received:**	09/19/17
		Date Analyzed:	09/19/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	CG-127-75-091717	**Units:**	mg/L
Lab Code:	K1709916-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1709916-005DUP 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.

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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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1709916-005	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

Matrix Spike
K1709916-005MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1709916
Project: PSC Georgetown I5B/STRCL-001

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17 10:02
Sample Matrix:	Water	**Date Received:**	09/19/17 09:20
Sample Name:	CG-127-40-1G-091717	**Basis:**	NA
Lab Code:	K1709916-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17 10:30
Sample Matrix:	Water	**Date Received:**	09/19/17 09:20
Sample Name:	CG-127-40-091717	**Basis:**	NA
Lab Code:	K1709916-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**13.1**	mg/L	0.0020	0.0003	1	09/27/17 10:59	09/26/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17 10:35
Sample Matrix:	Water	**Date Received:**	09/19/17 09:20
Sample Name:	CG-09-127-40-091717	**Basis:**	NA
Lab Code:	K1709916-003		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17 11:50
Sample Matrix:	Water	**Date Received:**	09/19/17 09:20
Sample Name:	CG-127-75-1G-091717	**Basis:**	NA
Lab Code:	K1709916-004		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17 12:15
Sample Matrix:	Water	**Date Received:**	09/19/17 09:20
Sample Name:	CG-127-75-091717	**Basis:**	NA
Lab Code:	K1709916-005		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1714002-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0003 J**	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.	**Service Request:**	K1709916
Project	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**Date Received:**	09/19/17
		Date Analyzed:	09/27/17

Replicate Sample Summary
Total Metals

Sample Name:	CG-127-75-091717	**Units:**	mg/L
Lab Code:	K1709916-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1714002-03 Result	Average	RPD	RPD Limit
Iron	6020A	0.0020	0.0003	3.94	3.91	3.93	<1	20

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Printed 10/10/2017 3:57:43 PM Superset Reference:

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1709916-005	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1714002-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron	3.94	4.01	0.0500	142 #	75-125

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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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0530	0.0500	106	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1709916
Project: PSC Georgetown I5B/STRCL-001
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**299061
Analytical Method: 6020A

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
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. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	563374	50.0	49.4	99	250	250	100	250	247	99

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	563374				250	247	99	250	245	98

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	563374				250	245	98	250	243	97

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

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	563374	0.3	U	0.3	U	0.5	J	0.3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

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	563374			0.3	U	0.3	U	0.3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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	563374	47200	-	-	-	09/27/17 10:39

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	563374	46800	-	-	-	09/27/17 10:41

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916

Project: PSC Georgetown I5B/STRCL-001

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-05

Analyte	Concentration (ug/L)	Method
Iron 56	50000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **563374**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **563374**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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

Sample Name	Lab Code	Date Collected	Date Received
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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/2017
Sample Matrix:	Water	**Date Received:**	09/19/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-1G-091717	**Units:**	ug/L
Lab Code:	K1709916-001	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/2017
Sample Matrix:	Water	**Date Received:**	09/19/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-40-091717	**Units:**	ug/L
Lab Code:	K1709916-002	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/2017
Sample Matrix:	Water	**Date Received:**	09/19/2017

1,4-Dioxane by GCMS

Sample Name:	CG-09-127-40-091717	**Units:**	ug/L
Lab Code:	K1709916-003	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/2017
Sample Matrix:	Water	**Date Received:**	09/19/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-1G-091717	**Units:**	ug/L
Lab Code:	K1709916-004	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	09/17/2017
Sample Matrix:	Water	**Date Received:**	09/19/2017

1,4-Dioxane by GCMS

Sample Name:	CG-127-75-091717	**Units:**	ug/L
Lab Code:	K1709916-005	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

1,4-Dioxane by GCMS

Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KWG1708497-5	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM		

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:

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001
Sample Matrix: Water

Surrogate Recovery Summary
1,4-Dioxane by GCMS

Extraction Method: EPA 3535A **Units:** Percent
Analysis Method: 8270D SIM **Level:** Low

Sample Name	Lab Code	Sur1
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

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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**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	**Lab Code:**	KWG1708709-2
Instrument ID:	MS26	**Analysis Lot:**	KWG1708709
Analysis Method:	8270D SIM		

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Results ==>	24,913	5.24
	Upper Limit ==>	49,826	5.74
	Lower Limit ==>	12,457	4.74
	ICAL Result ==>	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	
		Area	**RT**
	Results ==>	24,535	5.24
	Upper Limit ==>	49,070	5.74
	Lower Limit ==>	12,268	4.74
	ICAL Result ==>	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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Extracted:**	09/24/2017
Sample Matrix:	Water	**Date Analyzed:**	09/28/2017

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

Sample Name:	Batch QC	**Units:**	ug/L
Lab Code:	K1710186-005	**Basis:**	NA
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1708497

		Batch QCMS KWG1708497-1 Matrix Spike			Batch QCDMS KWG1708497-2 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Extracted:**	09/24/2017
Sample Matrix:	Water	**Date Analyzed:**	09/28/2017

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

Extraction Method:	EPA 3535A	**Units:**	ug/L
Analysis Method:	8270D SIM	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1708497

	Lab Control Sample KWG1708497-3 Lab Control Spike			Duplicate Lab Control Sample KWG1708497-4 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**	**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Extracted:**	09/24/2017
Sample Matrix:	Water	**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 Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Extracted:**	09/24/2017
Sample Matrix:	Water	**Date Analyzed:**	09/28/2017
		Time Analyzed:	01:05

Lab Control Sample Summary
1,4-Dioxane by GCMS

Sample Name:	Lab Control Sample	**Instrument ID:**	MS26
Lab Code:	KWG1708497-3	**File ID:**	J:\MS26\DATA\092717\0927F053.D
Extraction Method:	EPA 3535A	**Level:**	Low
Analysis Method:	8270D SIM	**Extraction Lot:**	KWG1708497

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1708497-5	J:\MS26\DATA\092717\0927F052.D	09/28/17	00:47
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

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	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level 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**

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001 **Calibration Date:** 07/18/2017

Initial Calibration Summary
1,4-Dioxane by GCMS

Calibration ID: CAL15481 **Column:** MS
Instrument ID: MS26

		Calibration Evaluation					RRF Evaluation		
Analyte Name	Compound Type	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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Analyzed:**	09/28/2017

Continuing Calibration Verification Summary
1,4-Dioxane by GCMS

Calibration Type:	Internal Standard	**Calibration Date:**	07/18/2017
Analysis Method:	8270D SIM	**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.	**Service Request:**	K1709916
Project:	PSC Georgetown I5B/STRCL-001	**Date Analyzed:**	09/29/2017

Continuing Calibration Verification Summary
1,4-Dioxane by GCMS

Calibration Type:	Internal Standard	**Calibration Date:**	07/18/2017
Analysis Method:	8270D SIM	**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**

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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

QA/QC Results

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1709916
Project: PSC Georgetown I5B/STRCL-001

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

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

Client: Stericycle Environmental Solutions, Inc.
Project: Stericycle Georgtown
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 4ºC 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

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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CHAIN OF CUSTODY
81268

005

SR# K1712610

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: Stericycle Georgetown | Project Number: 375.08 ~~STRCL-001~~ AK
Project Manager: Tasya Gray
Company: Dalton, Olmsted & Fuglevand (DOF)
Address: 1001 SW Klickitat Way Suite 200B, Seattle, WA 98134
Phone #: 206-375-0211 | email: NGRAY@DOFNW.com
Sampler Signature: [signature] | Sampler Printed Name: L. Herner

Analyses: NUMBER OF CONTAINERS; 24H – ApplEnvMic7-87-1536-1540 / Reductive; 48H – 300/SO4; 7D – 8270D / 1,4-Dioxane; 180D – 6020A / Metals T; 1; 2; 3; 4; 5

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H	48H	7D	180D	1	2	3	4	5	Remarks
1. IMW-1-112017		11/20/17	10:40	Water	12	X	X	X	X						MS/MSD
2. IMW-2-112017		↓	11:30	↓	4	X	X	X	X						
3. ~~IP~~ CG-122-60-112017			12:25		4	X	X	X	X						
4. CG-9-122-60-112017			12:30		4	X	X	X	X						
5. IP-5-112017			1450		4	X	X	X	X						*
6. IP-6-112017			1525		4	X	X	X	X						*
7. IP-7-112017			1600		4	X	X	X	X						*
8. CG-122-75-112017			1305		4	X	X	X	X						
9. EB1-112017		↓	1300	↓	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.
___ 5 Day
X 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 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:
* IP 5, 6, & 7 have high concentrations of sodium phosphate
- 1,4 Dioxane preserved w/ Ascorbic Acid

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature [signature]	Signature FedEx under	Signature	Signature Daniel S. Pearson	Signature	Signature
Printed Name Luke Herner	Printed Name Custody Seal	Printed Name	Printed Name ALS	Printed Name	Printed Name
Firm DOF	Firm	Firm	Firm 11-21-17 ~~0830~~ 0910 (DSP 11-21-17)	Firm	Firm
Date/Time 11/20/17	Date/Time 11/20/17	Date/Time	Date/Time	Date/Time	Date/Time

PC Mark

Cooler Receipt and Preservation Form

Client DALTON, OLMSTED & FUGLEVAND (DOF) Service Request K17 12610

Received: 11-21-17 Opened: 11-21-17 By: ASP Unloaded: 11-21-17 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 NA	Tracking Number NA	Filed
5.3	5.3			0.0	360		7885 4065 0094	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* (11-21-17) (*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: _____

General Chemistry

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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**Date Received:**	11/21/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-112017	K1712610-001	**660**	20	2	200	12/16/17 13:03	
IMW-2-112017	K1712610-002	**374**	10	1	100	12/16/17 13:45	
CG-122-60-112017	K1712610-003	**457**	5.0	0.5	50	12/16/17 14:17	
CG-9-122-60-112017	K1712610-004	**453**	5.0	0.5	50	12/16/17 14:28	
IP-5-112017	K1712610-005	**810**	20	2	200	12/16/17 14:38	
IP-6-112017	K1712610-006	**136**	5.0	0.5	50	12/16/17 14:49	
IP-7-112017	K1712610-007	**278**	10	1	100	12/16/17 15:00	
CG-122-75-112017	K1712610-008	**0.26**	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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**Date Received:**	11/21/17
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**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		

		Matrix Spike			**Duplicate Matrix Spike**					
		K1712610-001MS			K1712610-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	12/16/17
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1713442-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike			Duplicate Matrix Spike					
		K1713442-001MS			K1713442-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	12/16/17
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	574015

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1712610-LCS	4.98	5.00	100	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08

Continuing Calibration Blank (CCB) Summary
Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**Date Received:**	11/21/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**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

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1712610-001DUP Result	Average	RPD	RPD Limit
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1712610-001	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike K1712610-001MS			**Duplicate Matrix Spike** K1712610-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

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www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 10:40
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IMW-1-112017	**Basis:**	NA
Lab Code:	K1712610-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 11:30
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IMW-2-112017	**Basis:**	NA
Lab Code:	K1712610-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**10.1**	mg/L	0.010	0.0003	1	12/06/17 11:42	11/29/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 12:25
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-122-60-112017	**Basis:**	NA
Lab Code:	K1712610-003		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 12:30
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-9-122-60-112017	**Basis:**	NA
Lab Code:	K1712610-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**5.09**	mg/L	0.010	0.0003	1	12/06/17 11:48	11/29/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 14:50
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-5-112017	**Basis:**	NA
Lab Code:	K1712610-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**1.14**	mg/L	0.20	0.006	20	12/06/17 11:50	11/29/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 15:25
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-6-112017	**Basis:**	NA
Lab Code:	K1712610-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**4.65**	mg/L	0.20	0.006	20	12/06/17 11:53	11/29/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 16:00
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-7-112017	**Basis:**	NA
Lab Code:	K1712610-007		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 13:05
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-122-75-112017	**Basis:**	NA
Lab Code:	K1712610-008		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**1.60**	mg/L	0.010	0.0003	1	12/06/17 11:58	11/29/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 13:00
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	FB1-112017	**Basis:**	NA
Lab Code:	K1712610-009		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1717626-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.001 J**	mg/L	0.010	0.0003	1	12/06/17 11:08	11/29/17	

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dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project	Stericycle Georgtown/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Analyzed:	12/06/17

Replicate Sample Summary

Total Metals

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1712377-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1717626-03 Result	Average	RPD	RPD Limit
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project	Stericycle Georgtown/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 KQ1717626-06 Result	Average	RPD	RPD Limit
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.

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1712610-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1717626-07

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	12/6/17
		Date Extracted:	11/29/17

Duplicate Matrix Spike Summary
Total Metals

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1712377-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

		Matrix Spike KQ1717626-04			**Duplicate Matrix Spike** KQ1717626-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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Client: Stericycle Environmental Solutions, Inc.
Project: Stericycle Georgtown/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

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.052	0.050	104	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**303928
Analytical Method: 6020A

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. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	572539	50	50	99	250	247	99	250	243	97

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	572539				250	260	104	250	247	99

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	572539				250	251	100	250	252	101

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	572539				250	249	99			

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

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. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

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			0.8	J	0.4	J	0.7	J

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

INITIAL AND CONTINUING CALIBRATION BLANK

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration Blank Result	C	Continuing Calibration Blank Result	C	Continuing Calibration Blank Result	C	Continuing Calibration Blank Result	C
Iron	6020A	572539			0.3	J				

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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	572539	51700	-	-	-	12/06/17 09:34

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	572539	51900	-	-	-	12/06/17 09:37

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	10	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-05

Analyte	Concentration (ug/L)	Method
Iron 56	50000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **572539**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **572539**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **572539**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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					

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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. **Service Request:** K1712610
Project: Stericycle Georgtown/375.08

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
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 10:40
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IMW-1-112017	**Units:**	ug/L
Lab Code:	K1712610-001	**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	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 11:30
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IMW-2-112017	**Units:**	ug/L
Lab Code:	K1712610-002	**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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 12:25
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-122-60-112017	**Units:**	ug/L
Lab Code:	K1712610-003	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 12:30
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-9-122-60-112017	**Units:**	ug/L
Lab Code:	K1712610-004	**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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 14:50
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-5-112017	**Units:**	ug/L
Lab Code:	K1712610-005	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 15:25
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-6-112017	**Units:**	ug/L
Lab Code:	K1712610-006	**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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 16:00
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	IP-7-112017	**Units:**	ug/L
Lab Code:	K1712610-007	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 13:05
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	CG-122-75-112017	**Units:**	ug/L
Lab Code:	K1712610-008	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17 13:00
Sample Matrix:	Water	**Date Received:**	11/21/17 09:10
Sample Name:	FB1-112017	**Units:**	ug/L
Lab Code:	K1712610-009	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ1717587-04	**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. **Service Request:** K1712610

Project: Stericycle Georgtown/375.08

Sample Matrix: Water

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08 **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\ **Lab Code:**KQ1717643-02
Instrument ID: K-MS-26 **Analysis Lot:**571750
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	53,647	5.23
	Upper Limit ==>	107,294	5.73
	Lower Limit ==>	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08 **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\ **Lab Code:**KQ1717721-02
Instrument ID: K-MS-26 **Analysis Lot:**571985
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	48,624	5.22
	Upper Limit ==>	97,248	5.72
	Lower Limit ==>	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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Collected:**	11/20/17
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1712610-001	**Basis:**	NA
Analysis Method:	8270D		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1717587-01			Duplicate Matrix Spike KQ1717587-02					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	11/28/17
Sample Matrix:	Water	**Date Extracted:**	11/27/17

Lab Control Sample Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Units:**	ug/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	571750

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	KQ1717587-03	7.17	10.0	72	59-111

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	11/28/17 17:12
Sample Matrix:	Water	**Date Extracted:**	11/27/17

Method Blank Summary
1,4-Dioxane by GC/MS

Sample Name:	Method Blank	**Instrument ID:**	K-MS-26
Lab Code:	KQ1717587-04	**File ID:**	J:\MS26\DATA\112817\1128F005.D\
Analysis Method:	8270D	**Analysis Lot:**	571750
Prep Method:	EPA 3535A	**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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	11/28/17 17:31
Sample Matrix:	Water	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08 **Date Analyzed:**11/28/17 16:33

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\112817\1128F003.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08 **Date Analyzed:**11/29/17 13:22

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\112917\1129F003.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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. **Service Request:** K1712610
Project: Stericycle Georgtown **Calibration Date:** 10/12/2017

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1700243 **Signal ID:** 1
Instrument ID: K-MS-26

#	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. **Service Request:** K1712610
Project: Stericycle Georgtown **Calibration Date:** 10/12/2017

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1700243 **Signal ID:** 1
Instrument ID: K-MS-26

		Calibration Evaluation				Calibration Evaluation	
Analyte Name	Compound Type	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. **Service Request:** K1712610
Project: Stericycle Georgtown **Calibration Date:** 10/12/2017

Initial Calibration Verification Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1700243 **Signal ID:** 1
Instrument ID: K-MS-26

#	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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	11/28/17 16:52

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	10/12/2017
File ID:	J:\MS26\DATA\112817\1128F004.D\	**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.	**Service Request:**	K1712610
Project:	Stericycle Georgtown/375.08	**Date Analyzed:**	11/29/17 13:41

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	10/12/2017
File ID:	J:\MS26\DATA\112917\1129F004.D\	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08

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	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08

Analysis Run Log
1,4-Dioxane by GC/MS

Analysis Method: 8270D **Analysis Lot:**571985
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
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	

ALS Group USA, Corp.
dba ALS Environmental

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1712610
Project: Stericycle Georgtown/375.08
Sample Matrix: Water

1,4-Dioxane by GC/MS

Prep Method: EPA 3535A **Extraction Lot:**303741
Analytical Method: 8270D

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

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

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 4ºC 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
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
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Chain of Custody Record & Laboratory Analysis Request

KP173453

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: STANDARD	Page:	of
ARI Client Company: Dalton, Olmsted, & Fuglevand (DOF)	Phone: 206-375-0211	Date:	Ice Present?
Client Contact: Tasya Gray NGRAY@DOFENV.com		No. of Coolers:	Cooler Temps:
Client Project Name: GEORGETOWN STERICYCLE			
Client Project #: 375.08	Samplers: L. Kerner 208-316-7223		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Nitrate/Nitrite	Ferrous/Ferric	Total Fe	1,4-Dioxane					Notes/Comments
CG-127-40-IG-121317	12/13/17	1140	WATER	4	X	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-IG-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					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Bill to: Bill Beck, Stericycle	Printed Name: Luke Kerner	Printed Name: CUSTODY SEAL	Printed Name:	Printed Name: KP Morrow
	Company: DOF	Company: FEDEX UNDER	Company:	Company: ARI 1010 12/14/17 ARI
	Date & Time: 12-13-17 1450	Date & Time: 12-13-17 1450	Date & Time:	Date & Time:

PC MH

Cooler Receipt and Preservation Form

Client ARI Service Request *K17* 13455

Received: 12/14/17 Opened: 12/14/17 By: [illegible] Unloaded: 12/14/17 By: [illegible]

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 NA	Tracking Number NA	Filed
-0.1	-0.2			-0.1	349		7889 2236 0581	

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.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**Date Received:**	12/14/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	None	**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	**0.031 J**	0.050	0.020	1	12/20/17 17:04	
CG-9-127-40-121317	K1713453-003	**0.033 J**	0.050	0.020	1	12/20/17 17:04	
CG-127-75-1G-121317	K1713453-004	**0.020 J**	0.050	0.020	1	12/20/17 17:04	
CG-127-75-121317	K1713453-005	**0.026 J**	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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**Date Received:**	12/14/17
Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	None	**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

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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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike K1713435-004MS			Duplicate Matrix Spike K1713435-004DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	1.22	6.22	5.00	100	6.19	5.00	99	90-110	1	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike K1713435-011MS			Duplicate Matrix Spike K1713435-011DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	0.525	1.52	1.00	99	1.56	1.00	104	90-110	5	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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:	K1713436-001	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	None		

		Matrix Spike K1713436-001MS			Duplicate Matrix Spike K1713436-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	ND U	1.01	1.00	101	1.05	1.00	105	90-110	4	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1713453-005	**Basis:**	NA
Analysis Method:	353.2		
Prep Method:	None		

		Matrix Spike			Duplicate Matrix Spike					
		K1713453-005MS			K1713453-005DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	0.026 J	0.908	1.00	88 *	0.891	1.00	87 *	90-110	1	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	N/A
Sample Matrix:	Water	**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		

		Matrix Spike K1713624-001MS			Duplicate Matrix Spike K1713624-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Nitrate+Nitrite as Nitrogen	ND U	1.06	1.00	106	1.04	1.00	104	90-110	2	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	12/20/17
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Nitrate+Nitrite as Nitrogen

Analysis Method:	353.2	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	574608

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Verification (CCV) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Blank (CCB) Summary

Nitrate+Nitrite as Nitrogen

Analysis Method: 353.2 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**Date Received:**	12/14/17
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**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	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**Date Received:**	12/14/17
		Date Analyzed:	12/14/17

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	CG-127-75-121317	**Units:**	mg/L
Lab Code:	K1713453-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1713453-005DUP Result	Average	RPD	RPD Limit
Iron, Divalent (Ferrous Iron)	ApplEnvMic7-87-1536-1540	0.20	0.05	0.13 J	0.13 J	0.132	2	20

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1713453-005	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike			Duplicate Matrix Spike					
		K1713453-005MS			K1713453-005DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Iron, Divalent (Ferrous Iron)	0.13 J	2.29	2.00	108	2.29	2.00	108	75-125	<1	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.

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 11:40
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-40-1G-121317	**Basis:**	NA
Lab Code:	K1713453-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:05
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-40-121317	**Basis:**	NA
Lab Code:	K1713453-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**13.7**	mg/L	0.0020	0.0003	1	01/02/18 11:38	12/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:10
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-9-127-40-121317	**Basis:**	NA
Lab Code:	K1713453-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**13.4**	mg/L	0.0020	0.0003	1	01/02/18 11:40	12/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:35
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-75-1G-121317	**Basis:**	NA
Lab Code:	K1713453-004		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 13:05
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-75-121317	**Basis:**	NA
Lab Code:	K1713453-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**4.12**	mg/L	0.0020	0.0003	1	01/02/18 11:42	12/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:50
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	FB-01	**Basis:**	NA
Lab Code:	K1713453-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0056**	mg/L	0.0020	0.0003	1	01/02/18 11:52	12/28/17	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1718978-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0012 J**	mg/L	0.0020	0.0003	1	01/02/18 11:35	12/28/17	

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**Date Received:**	12/14/17
		Date Analyzed:	01/02/18

Replicate Sample Summary
Total Metals

Sample Name:	CG-127-75-121317	**Units:**	mg/L
Lab Code:	K1713453-005	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1718978-03 Result	Average	RPD	RPD Limit
Iron	6020A	0.0020	0.0003	4.12	3.97	4.05	4	20

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1713453-005	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1718978-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron	4.12	4.16	0.0500	90 #	75-125

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/02/18
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1718978-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0539	0.0500	108	80-120

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Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:**305822
Analytical Method: 6020A

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	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. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	575631	50.0	51.7	103	250	250	100	250	246	99

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	575631				250	252	101	250	250	100

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Concentration Units: ug/L

Analyte	Method	Analysis Batch	Initial Calibration			Continuing Calibration			Continuing Calibration		
			True	Found	%R (1)	True	Found	%R (1)	True	Found	%R (1)
Iron	6020A	575631				250	255	102	250	250	100

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

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. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

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	0.5	J	0.3	U

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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	575631	48400	-	-	-	01/02/18 11:00

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	575631	50600	-	-	-	01/02/18 11:01

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-06

Analyte	Concentration (ug/L)	Method
Iron 56	45000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **575631**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **575631**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 11:40
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-40-1G-121317	**Units:**	ug/L
Lab Code:	K1713453-001	**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	

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:05
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-40-121317	**Units:**	ug/L
Lab Code:	K1713453-002	**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	

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:10
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-9-127-40-121317	**Units:**	ug/L
Lab Code:	K1713453-003	**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	

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:35
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-75-1G-121317	**Units:**	ug/L
Lab Code:	K1713453-004	**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	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 13:05
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	CG-127-75-121317	**Units:**	ug/L
Lab Code:	K1713453-005	**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	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17 12:50
Sample Matrix:	Water	**Date Received:**	12/14/17 10:10
Sample Name:	FB-01	**Units:**	ug/L
Lab Code:	K1713453-006	**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	

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ1718625-04	**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. **Service Request:** K1713453

Project: PSC Georgetown Dalton Olmsted/375.08

Sample Matrix: Water

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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08 **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\ **Lab Code:**KQ1800087-02
Instrument ID: K-MS-26 **Analysis Lot:**575849
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	65,258	5.25
	Upper Limit ==>	130,516	5.75
	Lower Limit ==>	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08 **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\ **Lab Code:**KQ1800309-03
Instrument ID: K-MS-26 **Analysis Lot:**576488
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	75,830	5.25
	Upper Limit ==>	151,660	5.75
	Lower Limit ==>	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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	12/13/17
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1713453-005	**Basis:**	NA
Analysis Method:	8270D		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1718625-01			**Duplicate Matrix Spike** KQ1718625-02					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/03/18
Sample Matrix:	Water	**Date Extracted:**	12/20/17

Lab Control Sample Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Units:**	ug/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	575849

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	KQ1718625-03	9.19	10.0	92	52-111

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/03/18 21:12
Sample Matrix:	Water	**Date Extracted:**	12/20/17

Method Blank Summary
1,4-Dioxane by GC/MS

Sample Name:	Method Blank	**Instrument ID:**	K-MS-26
Lab Code:	KQ1718625-04	**File ID:**	J:\MS26\DATA\010318\0103F040.D\
Analysis Method:	8270D	**Analysis Lot:**	575849
Prep Method:	EPA 3535A	**Extraction Lot:**	305374

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/03/18 21:30
Sample Matrix:	Water	**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.

Sample Name	Lab Code	File ID	Date Analyzed
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

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QC/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08 **Date Analyzed:**01/03/18 20:35

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\010318\0103F038.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08 **Date Analyzed:**01/04/18 09:13

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\010418\0104F003.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted **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

#	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. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted **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

		Calibration Evaluation				Calibration Evaluation	
Analyte Name	Compound Type	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

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1713453
Project: PSC Georgetown Dalton Olmsted **Calibration Date:** 1/2/2018

Initial Calibration Verification Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800002 **Signal ID:** 1
Instrument ID: K-MS-26

#	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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/03/18 20:53

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	1/2/2018
File ID:	J:\MS26\DATA\010318\0103F039.D\	**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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1713453
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	01/04/18 09:31

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	1/2/2018
File ID:	J:\MS26\DATA\010418\0104F004.D\	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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	
J:\MS26\DATA\010318\0103F056.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	02:04:00	
J:\MS26\DATA\010318\0103F057.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	02:23:00	
J:\MS26\DATA\010318\0103F058.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	02:41:00	
J:\MS26\DATA\010318\0103F059.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	02:59:00	
J:\MS26\DATA\010318\0103F060.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	03:17:00	
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	
J:\MS26\DATA\010318\0103F063.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	04:12:00	
J:\MS26\DATA\010418\0104F003.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	09:13:00	
J:\MS26\DATA\010418\0104F005.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	10:28:00	
J:\MS26\DATA\010418\0104F006.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	10:47:00	
J:\MS26\DATA\010418\0104F007.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	11:05:00	
J:\MS26\DATA\010418\0104F008.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	11:23:00	
J:\MS26\DATA\010418\0104F009.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	11:42:00	
J:\MS26\DATA\010418\0104F010.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	12:00:00	
J:\MS26\DATA\010418\0104F011.D\	ZZZZZZZ	ZZZZZZZ	1/4/2018	12:18:00	
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

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\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	

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QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log
1,4-Dioxane by GC/MS

Analysis Method: 8270D **Analysis Lot:**576488
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
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. **Service Request:**K1713453
Project: PSC Georgetown Dalton Olmsted/375.08
Sample Matrix: Water

1,4-Dioxane by GC/MS

Prep Method: EPA 3535A **Extraction Lot:**305374
Analytical Method: 8270D

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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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 4ºC 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
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Phone (360)577-7222 Fax (360)636-1068
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ALS Environmental

86975

CHAIN OF CUSTODY

86975

004

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: Stericycle Georgetown
Project Number: 375.08
Project Manager: Tasya Gray
Company: Paltch, Olmsted, & Fuglevand (DOF)
Address: 1001 SW Klickitat Way Suite 200B Seattle, WA
Phone #: 206-375-0211
email: NGRAY@DOFNW.com
Sampler Signature:
Sampler Printed Name: L Kerner

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H: ~~ApplEnvMicro 7-87-1530-1540~~	7D: 8270D / 1,4-Dioxane	28D: 300.0 / SO4	180D: 6020A / Metals T	1 Ferrous/Ferric Fe	2	3	4	5	Remarks
1. IMU-1-022618		02/26/18	1320	WATER	12		X	X	X	X					MS/MSD
2. IMU-2-022618		↓	1405	↓	4		X	X	X	X					
3. IP-5-022618		↓	1545	↓	4		X	X	X	X					*
4. IP-6-022618		↓	1440	↓	4		X	X	X	X					*
5. IP-7-022618		↓	1510	↓	4		X	X	X	X					*
6. CG-122-60-022618		↓	1135	↓	4		X	X	X	X					
7. CG-122-75-022618		↓	1050	↓	4		X	X	X	X					
8. CG-9-122-60-022618		↓	1140	↓	4		X	X	X	X					
9. FB-1-022618		↓	1040	↓	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.
___ 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 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:
* High concentrations of Sodium Persulphate
- 1,4-Dioxane perserved w/ Ascorbic Acid
Data to T. Gray, B. Beck, J. McAteer

	Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	[signature]	Fedex Unk		[signature]		
Printed Name	Luke Kerner	Custody Seal		ALSK		
Firm	DOF					
Date/Time	02-26-18			2-27-18 0945		

ALS

PC MH

Cooler Receipt and Preservation Form

Client ~~Anton~~ 2-27-18 - STERICYCLE - Service Request K18 01813

Received: 2-27-18 Opened: 2-27-18 By: DSP Unloaded: 2-27-18 By: DSP

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 NA	Tracking Number NA	Filed
1.0	1.2	5.8	6.0	+0.2	386		7715 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 Cl2/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

7/25/16

Page ____ *of* ____

General Chemistry

ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**Date Received:**	02/27/18
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-022618	K1801813-001	**662**	20	2	200	03/11/18 03:23	
IMW-2-022618	K1801813-002	**396**	10	1	100	03/11/18 04:07	
IP-5-022618	K1801813-003	**253**	10	1	100	03/11/18 04:17	
IP-6-022618	K1801813-004	**137**	10	1	100	03/11/18 04:28	
IP-7-022618	K1801813-005	**181**	5.0	0.5	50	03/11/18 09:39	
CG-122-60-022618	K1801813-006	**363**	5.0	0.5	50	03/11/18 05:11	
CG-122-75-022618	K1801813-007	**0.07 J**	0.20	0.02	2	03/11/18 09:50	
CG-9-122-60-022618	K1801813-008	**383**	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.	**Service Request:**	K1801813
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1801813-001DUP Result	Average	RPD	RPD Limit
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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**Date Received:**	02/27/18
		Date Analyzed:	03/11/18
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	IMW-1-022618	**Units:**	mg/L
Lab Code:	K1801813-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike K1801813-001MS			**Duplicate Matrix Spike** K1801813-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Sulfate	662	1460	800	99	1470	800	101	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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/10/18
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	583176

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Blank (CCB) Summary

Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**Date Received:**	02/27/18
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-022618	K1801813-001	**0.77**	0.20	0.05	1	02/27/18 10:44	
IMW-2-022618	K1801813-002	**2.31**	0.20	0.05	1	02/27/18 10:44	
IP-5-022618	K1801813-003	**5.00**	0.20	0.05	1	02/27/18 10:44	
IP-6-022618	K1801813-004	**2.45**	0.20	0.05	1	02/27/18 10:44	
IP-7-022618	K1801813-005	**2.10**	0.20	0.05	1	02/27/18 10:44	
CG-122-60-022618	K1801813-006	**1.85**	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	**1.54**	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.	**Service Request:**	K1801813
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**Date Received:**	02/27/18
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary

Iron, Divalent (Ferrous Iron)

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
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

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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1801813-001	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike			Duplicate Matrix Spike					
		K1801813-001MS			K1801813-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1801813-003	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike			**Duplicate Matrix Spike**					
		K1801813-003MS			K1801813-003DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 13:20
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IMW-1-022618	**Basis:**	NA
Lab Code:	K1801813-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**6.91**	mg/L	0.0020	0.0003	1	03/09/18 15:55	03/08/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 14:05
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IMW-2-022618	**Basis:**	NA
Lab Code:	K1801813-002		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 15:45
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-5-022618	**Basis:**	NA
Lab Code:	K1801813-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**10.0**	mg/L	0.0080	0.0012	1	03/09/18 16:19	03/08/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 14:40
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-6-022618	**Basis:**	NA
Lab Code:	K1801813-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.729**	mg/L	0.0080	0.0012	1	03/09/18 16:23	03/08/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 15:15
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-7-022618	**Basis:**	NA
Lab Code:	K1801813-005		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 11:35
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-122-60-022618	**Basis:**	NA
Lab Code:	K1801813-006		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 10:50
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-122-75-022618	**Basis:**	NA
Lab Code:	K1801813-007		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**2.26**	mg/L	0.0020	0.0003	1	03/09/18 16:32	03/08/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 11:40
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-9-122-60-022618	**Basis:**	NA
Lab Code:	K1801813-008		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 10:45
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	FB-1-022618	**Basis:**	NA
Lab Code:	K1801813-009		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0026**	mg/L	0.0020	0.0003	1	03/09/18 16:38	03/08/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1802994-01		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
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.	**Service Request:**	K1801813
Project	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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 Sample KQ1802994-03 Result	Average	RPD	RPD Limit
Iron	6020A	0.0020	0.0003	6.91	6.93	6.92	<1	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.

Printed 3/14/2018 1:15:36 PM Superset Reference:

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1801813-001	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP-METALS ILM04.0		

Matrix Spike
KQ1802994-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Iron	6.91	6.84	0.0500	-138 #	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.

ALS Group USA, Corp.
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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/09/18
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1802994-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0535	0.0500	107	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP-METALS ILM04.0 **Extraction Lot:** 309581
Analytical Method: 6020A **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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

INITIAL AND CONTINUING CALIBRATION BLANKS

Concentration Units: ug/L

Sample ID / Analyte	Method	Analysis Batch:	Result	C
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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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	583135	56100	-	-	-	03/09/18 15:40

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	583135	56300	-	-	-	03/09/18 15:43

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813

Project: PSC Georgetown Dalton Olmsted/375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813

Project: PSC Georgetown Dalton Olmsted/375.08

Detection Limits

Matrix: Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	2.0	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-04

Analyte	Concentration (ug/L)	Method
Iron 56	50000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-04** **Analytical BatchID:** **583135**

Sample	Dilution Factor	Date/Time	Fe
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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-04** **Analytical BatchID:** **583135**

Sample	Dilution Factor	Date/Time	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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						

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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
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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 13:20
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IMW-1-022618	**Units:**	ug/L
Lab Code:	K1801813-001	**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	

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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 14:05
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IMW-2-022618	**Units:**	ug/L
Lab Code:	K1801813-002	**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	

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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 15:45
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-5-022618	**Units:**	ug/L
Lab Code:	K1801813-003	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 14:40
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-6-022618	**Units:**	ug/L
Lab Code:	K1801813-004	**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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 15:15
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	IP-7-022618	**Units:**	ug/L
Lab Code:	K1801813-005	**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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 11:35
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-122-60-022618	**Units:**	ug/L
Lab Code:	K1801813-006	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 10:50
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-122-75-022618	**Units:**	ug/L
Lab Code:	K1801813-007	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 11:40
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	CG-9-122-60-022618	**Units:**	ug/L
Lab Code:	K1801813-008	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18 10:45
Sample Matrix:	Water	**Date Received:**	02/27/18 09:45
Sample Name:	FB-1-022618	**Units:**	ug/L
Lab Code:	K1801813-009	**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.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ1802820-06	**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. **Service Request:** K1801813

Project: PSC Georgetown Dalton Olmsted/375.08

Sample Matrix: Water

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. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08 **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\ **Lab Code:**KQ1803199-02
Instrument ID: K-MS-26 **Analysis Lot:**583441
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	55,063	5.25
	Upper Limit ==>	110,126	5.75
	Lower Limit ==>	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08 **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\ **Lab Code:**KQ1803319-02
Instrument ID: K-MS-26 **Analysis Lot:**583787
Analysis Method: 8270D **Signal ID:**

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	60,190	5.24
	Upper Limit ==>	120,380	5.74
	Lower Limit ==>	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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Collected:**	02/26/18
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1801813-001	**Basis:**	NA
Analysis Method:	8270D		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1802820-01			Duplicate Matrix Spike KQ1802820-02					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,4-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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/08/18
Sample Matrix:	Water	**Date Extracted:**	03/05/18

Lab Control Sample Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Units:**	ug/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	583441

Lab Control Sample
KQ1802820-05

Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
1,4-Dioxane	9.99	10.0	100	52-111

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/08/18 13:59
Sample Matrix:	Water	**Date Extracted:**	03/05/18

Method Blank Summary
1,4-Dioxane by GC/MS

Sample Name:	Method Blank	**Instrument ID:**	K-MS-26
Lab Code:	KQ1802820-06	**File ID:**	J:\MS26\DATA\030818\0308F005.D\
Analysis Method:	8270D	**Analysis Lot:**	583441
Prep Method:	EPA 3535A	**Extraction Lot:**	309366

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
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

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/08/18 14:18
Sample Matrix:	Water	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08 **Date Analyzed:**03/08/18 12:40

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\030818\0308F003.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08 **Date Analyzed:**03/14/18 11:23

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\031418\0314F003.D\ **Analytical Method:** 8270D
Instrument ID: K-MS-26 **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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted **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

#	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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted **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

		Calibration Evaluation				Calibration Evaluation	
Analyte Name	Compound Type	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. **Service Request:** K1801813
Project: PSC Georgetown Dalton Olmsted **Calibration Date:** 1/2/2018

Initial Calibration Verification Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800002 **Signal ID:** 1
Instrument ID: K-MS-26

#	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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/08/18 12:58

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	1/2/2018
File ID:	J:\MS26\DATA\030818\0308F004.D\	**Calibration ID:**	KC1800002
Signal ID:	1	**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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1801813
Project:	PSC Georgetown Dalton Olmsted/375.08	**Date Analyzed:**	03/14/18 11:42

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D	**Calibration Date:**	1/2/2018
File ID:	J:\MS26\DATA\031418\0314F004.D\	**Calibration ID:**	KC1800002
Signal ID:	1	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

Analysis Run Log
1,4-Dioxane by GC/MS

Analysis Method: **Analysis Lot:**583441
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08

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. **Service Request:**K1801813
Project: PSC Georgetown Dalton Olmsted/375.08
Sample Matrix: Water

1,4-Dioxane by GC/MS

Prep Method: EPA 3535A **Extraction Lot:** 309366
Analytical Method: 8270D **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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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

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 4ºC 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 Noe D. Dan Date 06/26/2018

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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K1804907

Chain of Custody Record & Laboratory Analysis Request

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: Standard	Page: 1 of 2	
ARI Client Company: STERICYCLE ATTN: Bill Beck	Phone: 208-316-7223	Date: 5/23/18	Ice Present?
Client Contact: Tanya Gray / NGRAY@DOFNW.com	DOF	No. of Coolers: 2	Cooler Temps:
Client Project Name: 1,4-Dioxane Pilot Study / Stericycle Georgetown			
Client Project #: BPO: 37508	Samplers: L Kerner / lkerner@DOFNW.com		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SO4/300.0	Total Metals (Fe)/6020A	Dissolved Metals (Cr/As)/6020A	Ferrous/Ferric Iron	1,4-Dioxane 8270D				Notes/Comments
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									

1-4 Dioxane Present w/ Ascorbic Acid

Comments/Special Instructions: - Dissolved Metals Field Filtered 0.45µm. (As/Cr)	Relinquished by: (Signature) L Kerner	Received by: (Signature) FEDEX	Relinquished by: (Signature)	Received by: (Signature) Cody Graves
	Printed Name: L. Kerner	Printed Name: UNDER CUSTODY	Printed Name:	Printed Name: CODY GRAVES
	Company: DOF	Company: SEAL	Company:	Company: ALS
	Date & Time: 5/23/18 1715	Date & Time: 5/23/18 1715	Date & Time:	Date & Time: 5/24/18 0945

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.

K1804907

Chain of Custody Record & Laboratory Analysis Request

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: Standard	Page: 2 of 2	
ARI Client Company: STERICYCLE ATTN: Bill Beck	Phone: 208-316-7223	Date: 5/23/18	Ice Present?
Client Contact: Tasya Gray / NGRAY@DOFNW.com	DOF	No. of Coolers:	Cooler Temps:
Client Project Name: 1,4-Dioxane Pilot Study / Stericycle Georgetown			
Client Project #: B.W.P.O.: 375.08	Samplers: L Kerner	LKerner@DOFNW.com	

Sample ID	Date	Time	Matrix	No. Containers	SO_4/3000	Total (Fe)/6020A	Dissolved Metals (Cr/As)/6020A	Ferrous/Ferric Iron	1,4-Dioxane 8270D				Notes/Comments
					Analysis Requested								
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	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* High concentrations of Sodium Persulphate - Dissolved Metals Field Filtered 0.45µm. (As/Cr)	Printed Name: L Kerner	Printed Name: UNDER CUSTODY	Printed Name:	Printed Name: CODY GRAVES
	Company: DOF	Company: SEAL	Company:	Company: ALS
	Date & Time: 5/23/18 1715	Date & Time: 5/23/18 1715	Date & Time:	Date & Time: 5/24/18 0945

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 Stericycle GT Service Request K1804907

Received: 5/24/18 Opened: 5/24/18 By: CG Unloaded: 5/24/18 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 NA	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	

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? CG 5/24 (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
IMW-1-052318	6-250ml P				X	HNO_3	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
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Sulfate

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-052318	K1804907-001	**625**	20	2	200	06/18/18 18:24	
IMW-2-052318	K1804907-002	**340**	10	1	100	06/18/18 20:48	
CG-122-60-052318	K1804907-003	**200**	5.0	0.5	50	06/18/18 19:44	
CG-122-75-052318	K1804907-004	**0.08 J**	0.20	0.02	2	06/18/18 19:55	
IP-5-052318	K1804907-005	**137**	10	1	100	06/18/18 20:06	
IP-6-052318	K1804907-006	**172**	10	1	100	06/18/18 20:16	
IP-7-052318	K1804907-007	**129**	5.0	0.5	50	06/18/18 20:27	
CG-9-122-60-052318	K1804907-008	**199**	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.	**Service Request:**	K1804907
Project	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**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

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1804907-001DUP Result	Average	RPD	RPD Limit
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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
		Date Analyzed:	06/18/18
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Sulfate

Sample Name:	IMW-1-052318	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA
Analysis Method:	300.0		
Prep Method:	None		

		Matrix Spike K1804907-001MS			**Duplicate Matrix Spike** K1804907-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Analyzed:**	06/18/18
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Sulfate

Analysis Method:	300.0	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	595211

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1804907-LCS	4.85	5.00	97	90-110

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Continuing Calibration Verification (CCV) Summary

Sulfate

Analysis Method: 300.0 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Continuing Calibration Blank (CCB) Summary
Sulfate

Analysis Method: 300.0 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
IMW-1-052318	K1804907-001	**2.68**	0.40	0.10	2	05/24/18 13:45	*
IMW-2-052318	K1804907-002	**1.09**	0.20	0.05	1	05/24/18 13:45	*
CG-122-60-052318	K1804907-003	**1.10**	0.20	0.05	1	05/24/18 13:45	*
CG-122-75-052318	K1804907-004	**0.08 J**	0.20	0.05	1	05/24/18 13:45	
CG-9-122-60-052318	K1804907-008	**0.68**	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	

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	**Date Collected:**	05/23/18
Sample Matrix:	Water	**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

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1804907-001DUP Result	Average	RPD	RPD Limit
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.

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	**Date Collected:**	05/23/18
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike K1804907-001MS			Duplicate Matrix Spike K1804907-001DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Continuing Calibration Blank (CCB) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 10:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-1-052318	**Basis:**	NA
Lab Code:	K1804907-001		

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	**0.00045**	mg/L	0.00020	0.00003	1	06/12/18 08:04	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 10:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-1-052318	**Basis:**	NA
Lab Code:	K1804907-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-2-052318	**Basis:**	NA
Lab Code:	K1804907-002		

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 08:13	06/05/18	
Chromium	6020A	**0.00035**	mg/L	0.00020	0.00003	1	06/12/18 08:13	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-2-052318	**Basis:**	NA
Lab Code:	K1804907-002		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:55
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-60-052318	**Basis:**	NA
Lab Code:	K1804907-003		

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	**0.00037**	mg/L	0.00020	0.00003	1	06/12/18 08:15	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:55
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-60-052318	**Basis:**	NA
Lab Code:	K1804907-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**2.84**	mg/L	0.0020	0.0003	1	06/12/18 07:48	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:35
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-75-052318	**Basis:**	NA
Lab Code:	K1804907-004		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	6020A	**0.00010 J**	mg/L	0.00050	0.00009	1	06/12/18 08:16	06/05/18	
Chromium	6020A	**0.00059**	mg/L	0.00020	0.00003	1	06/12/18 08:16	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:35
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-75-052318	**Basis:**	NA
Lab Code:	K1804907-004		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-5-052318	**Basis:**	NA
Lab Code:	K1804907-005		

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	**0.0597**	mg/L	0.0040	0.0006	5	06/12/18 08:17	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-5-052318	**Basis:**	NA
Lab Code:	K1804907-005		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:50
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-6-052318	**Basis:**	NA
Lab Code:	K1804907-006		

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	**0.0505**	mg/L	0.0040	0.0006	5	06/12/18 08:19	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:50
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-6-052318	**Basis:**	NA
Lab Code:	K1804907-006		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 16:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-7-052318	**Basis:**	NA
Lab Code:	K1804907-007		

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 08:20	06/05/18	
Chromium	6020A	**0.0025 J**	mg/L	0.0040	0.0006	5	06/12/18 08:20	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 16:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-7-052318	**Basis:**	NA
Lab Code:	K1804907-007		

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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 12:00
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-9-122-60-052318	**Basis:**	NA
Lab Code:	K1804907-008		

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	**0.00041**	mg/L	0.00020	0.00003	1	06/12/18 08:21	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 12:00
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-9-122-60-052318	**Basis:**	NA
Lab Code:	K1804907-008		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:40
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	FB-01-052318	**Basis:**	NA
Lab Code:	K1804907-009		

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	**0.00004 J**	mg/L	0.00020	0.00003	1	06/12/18 08:23	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:40
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	FB-01-052318	**Basis:**	NA
Lab Code:	K1804907-009		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0016 J**	mg/L	0.0020	0.0003	1	06/12/18 08:03	06/05/18	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1807222-01		

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	**0.0007 J**	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.	**Service Request:**	K1804907
Project	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
		Date Analyzed:	06/12/18

Replicate Sample Summary
Dissolved Metals

Sample Name:	IMW-1-052318	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1807222-05 Result	Average	RPD	RPD Limit
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.

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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	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
		Date Analyzed:	06/12/18

Replicate Sample Summary
Total Metals

Sample Name:	IMW-1-052318	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1807222-03 Result	Average	RPD	RPD Limit
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.

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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	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
		Date Analyzed:	6/12/18

Matrix Spike Summary
Dissolved Metals

Sample Name:	IMW-1-052318	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA

Matrix Spike
KQ1807222-06

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

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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	**Date Collected:**	05/23/18
Sample Matrix:	Water	**Date Received:**	05/24/18
		Date Analyzed:	6/12/18

Matrix Spike Summary
Total Metals

Sample Name:	IMW-1-052318	**Units:**	mg/L
Lab Code:	K1804907-001	**Basis:**	NA

Matrix Spike
KQ1807222-04

Analyte Name	Method	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

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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	**Date Analyzed:**	06/12/18
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1807222-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0549	0.0500	110	80-120

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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	**Date Analyzed:**	06/12/18
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1807222-02

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	6020A	0.0541	0.0500	108	80-120
Chromium	6020A	0.0106	0.0100	106	80-120

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Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08
Sample Matrix: Water

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	

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

Sample ID / Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits
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

Sample ID / Analyte	Method	Analysis Batch:	Result	C
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. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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

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

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
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

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

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
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. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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

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

Analyte	Mass	Units	MRL	MDL	Method
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

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

Analyte	Concentration (ug/L)	Method
Arsenic 75	3000	6020A
Chromium 52	3000	6020A
Iron 56	50000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **594325**

Sample	Dilution Factor	Date/Time	As	Cr	Fe
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-05** **Analytical BatchID:** **594325**

Sample	Dilution Factor	Date/Time	As	Cr	Fe
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. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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
ZZZZZZ	06/12/18 08:07		
CCV	06/12/18 08:08	99	107
CCB	06/12/18 08:10	98	102
ZZZZZZ	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

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 10:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-1-052318	**Units:**	ug/L
Lab Code:	K1804907-001	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:10
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IMW-2-052318	**Units:**	ug/L
Lab Code:	K1804907-002	**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	

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 11:55
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-60-052318	**Units:**	ug/L
Lab Code:	K1804907-003	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:35
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-122-75-052318	**Units:**	ug/L
Lab Code:	K1804907-004	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-5-052318	**Units:**	ug/L
Lab Code:	K1804907-005	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 15:50
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-6-052318	**Units:**	ug/L
Lab Code:	K1804907-006	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 16:20
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	IP-7-052318	**Units:**	ug/L
Lab Code:	K1804907-007	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 12:00
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	CG-9-122-60-052318	**Units:**	ug/L
Lab Code:	K1804907-008	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18 14:40
Sample Matrix:	Water	**Date Received:**	05/24/18 09:45
Sample Name:	FB-01-052318	**Units:**	ug/L
Lab Code:	K1804907-009	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ1807154-06	**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. **Service Request:** K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

Sample Matrix: Water

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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dba ALS Environmental

QA/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08 **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\ **Lab Code:**KQ1807571-02
Instrument ID: K-MS-26 **Analysis Lot:**593769
Analysis Method: 8270D SIM **Signal ID:**1

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	44,528	5.21
	Upper Limit ==>	89,056	5.71
	Lower Limit ==>	22,264	4.71
Associated Analyses			
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08 **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\ **Lab Code:**KQ1807906-02
Instrument ID: K-MS-26 **Analysis Lot:**594048
Analysis Method: 8270D SIM **Signal ID:**1

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	ICAL Result ==>	47,002	5.21
	Upper Limit ==>	94,004	5.71
	Lower Limit ==>	23,501	4.71
Associated Analyses			
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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Collected:**	05/23/18
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1804907-001	**Basis:**	NA
Analysis Method:	8270D SIM		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1807154-01			**Duplicate Matrix Spike** KQ1807154-02					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Analyzed:**	06/07/18
Sample Matrix:	Water	**Date Extracted:**	05/30/18

Lab Control Sample Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Units:**	ug/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	593769

Lab Control Sample
KQ1807154-05

Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
1,4-Dioxane	8.15	10.0	82	52-111

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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	**Date Analyzed:**	06/07/18 04:13
Sample Matrix:	Water	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Analyzed:**	06/07/18 04:31
Sample Matrix:	Water	**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

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QC/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08 **Date Analyzed:**06/07/18 03:36

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\060618\0606F057.D\ **Analytical Method:** 8270D SIM
Instrument ID: K-MS-26 **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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907

Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08 **Date Analyzed:**06/08/18 13:36

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\060818\0608F003.D\ **Analytical Method:** 8270D SIM

Instrument ID: K-MS-26 **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. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown **Calibration Date:** 5/22/2018

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800201 **Signal ID:** 1
Instrument ID: K-MS-26

#	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. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown **Calibration Date:** 5/22/2018

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800201 **Signal ID:** 1
Instrument ID: K-MS-26

		Calibration Evaluation				Calibration Evaluation	
Analyte Name	Compound Type	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. **Service Request:** K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown **Calibration Date:** 5/22/2018

Initial Calibration Verification Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800201 **Signal ID:** 1
Instrument ID: K-MS-26

#	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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Analyzed:**	06/07/18 03:55

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Calibration Date:**	5/22/2018
File ID:	J:\MS26\DATA\060618\0606F058.D\	**Calibration ID:**	KC1800201
Signal ID:	1	**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.	**Service Request:**	K1804907
Project:	1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08	**Date Analyzed:**	06/08/18 13:55

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Calibration Date:**	5/22/2018
File ID:	J:\MS26\DATA\060818\0608F004.D\	**Calibration ID:**	KC1800201
Signal ID:	1	**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. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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	
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Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08

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	
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Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1804907
Project: 1,4-Dioxane Pilot Study/Stericycle Georgetown/375.08
Sample Matrix: Water

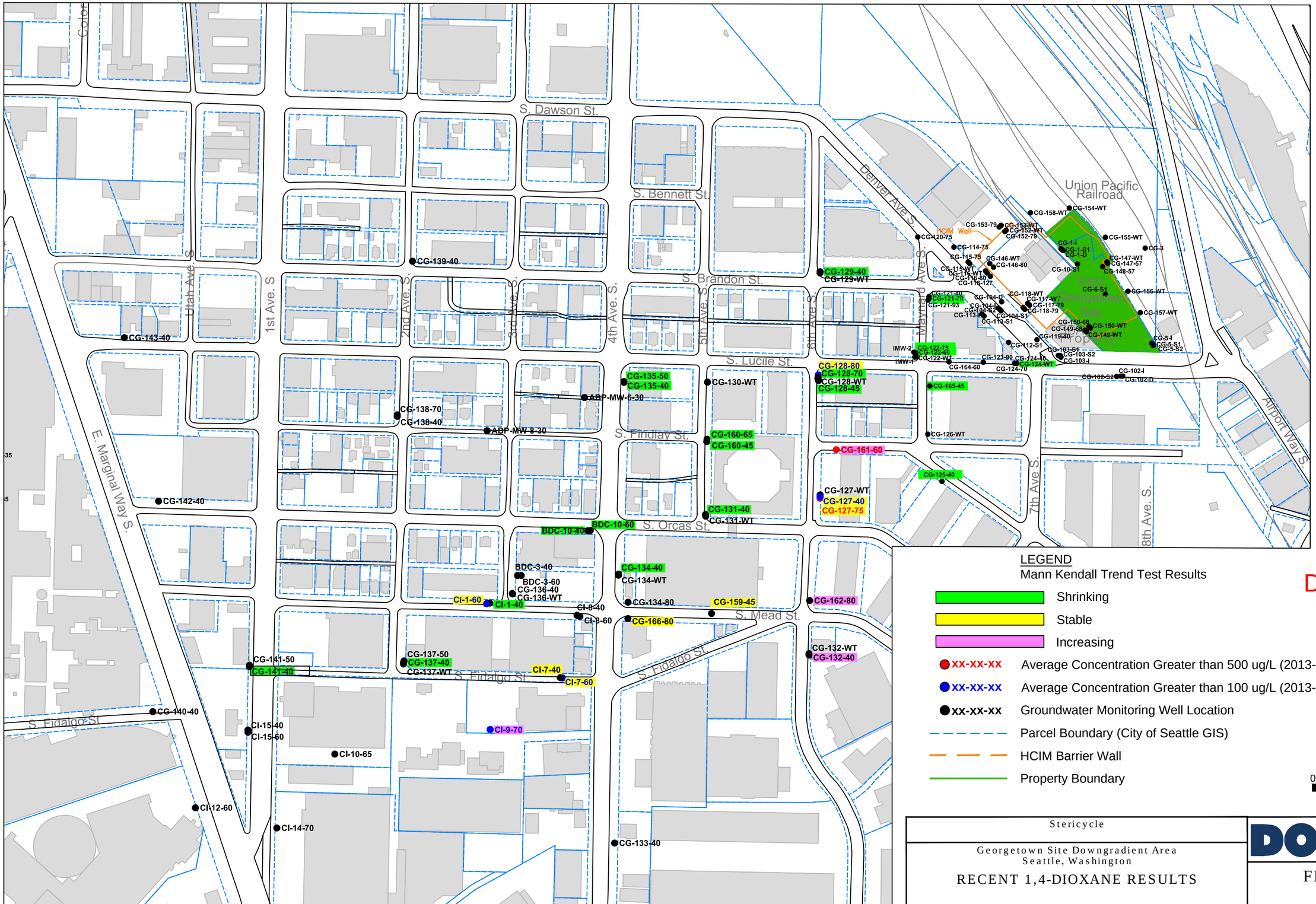
1,4-Dioxane by GC/MS

Prep Method: EPA 3535A **Extraction Lot:** 314874
Analytical Method: 8270D SIM **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

August 1, 2018 Meeting Data



LEGEND

Mann Kendall Trend Test Results

DRAFT

- Shrinking
- Stable
- Increasing
- XX-XX-XX Average Concentration Greater than 500 ug/L (2013-2018)
- XX-XX-XX Average Concentration Greater than 100 ug/L (2013-2018)
- XX-XX-XX Groundwater Monitoring Well Location
- Parcel Boundary (City of Seattle GIS)
- HCIM Barrier Wall
- Property Boundary

0 300

Scale in Feet

Stericycle

Georgetown Site Downgradient Area
Seattle, Washington

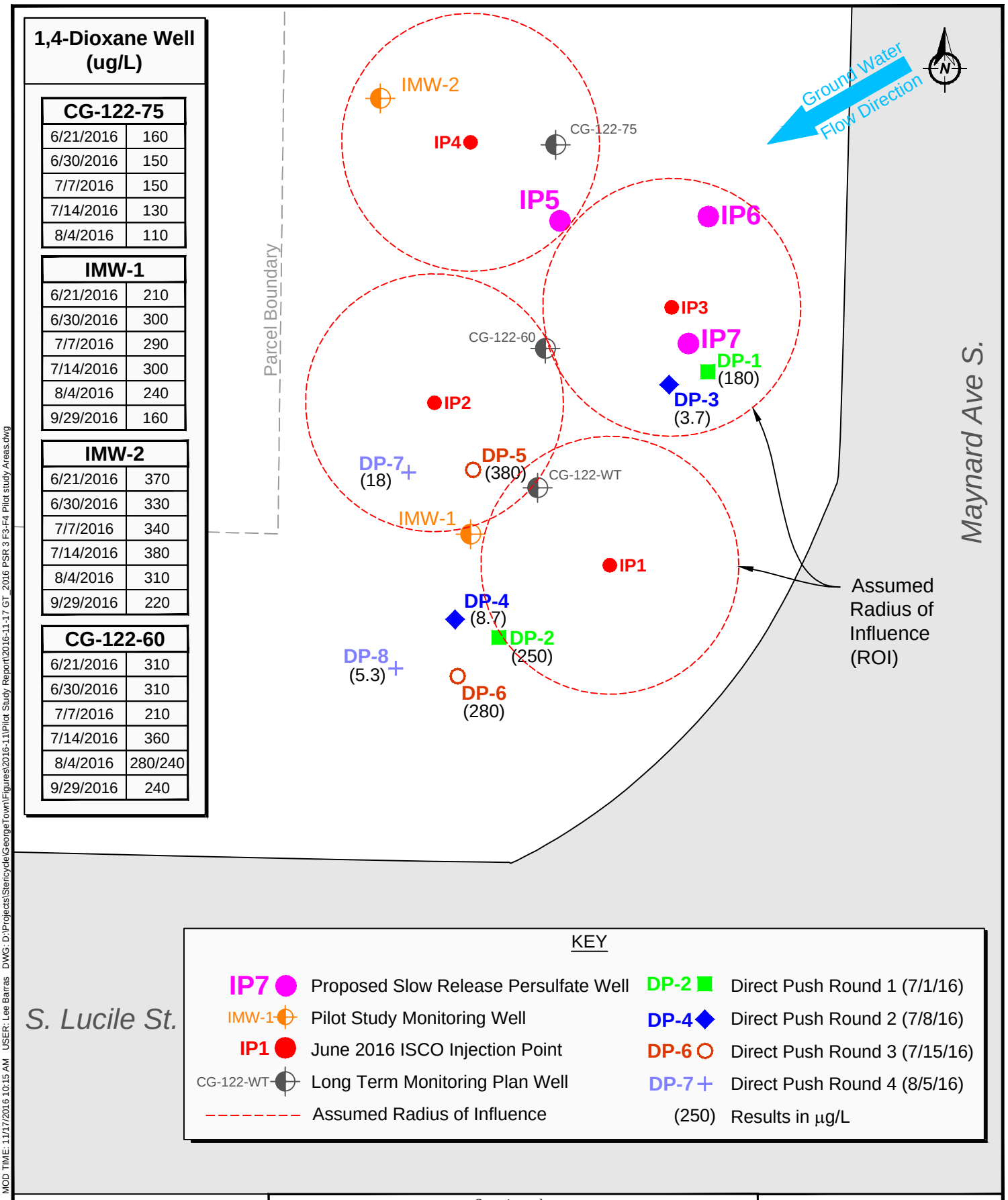
RECENT 1,4-DIOXANE RESULTS

DALTON OLMSTED FUGLEVAND

FIGURE
1

July 27, 2018

PLOT TIME: 7/27/2018 2:23 PM MOD TIME: 7/27/2018 2:23 PM USER: Lee Barras DWG: D:\Projects\Stericycle\GeorgeTown\Figures\2018-07\PilotStudyReport\2018-07-27 GT Recent 1-4-Dioxance Results.dwg



Stericycle

Georgetown Site Downgradient Area
Seattle, Washington

Proposed Slow Release Persulfate Wells

DALTON OLMSTED FUGLEVAND

Figure 1

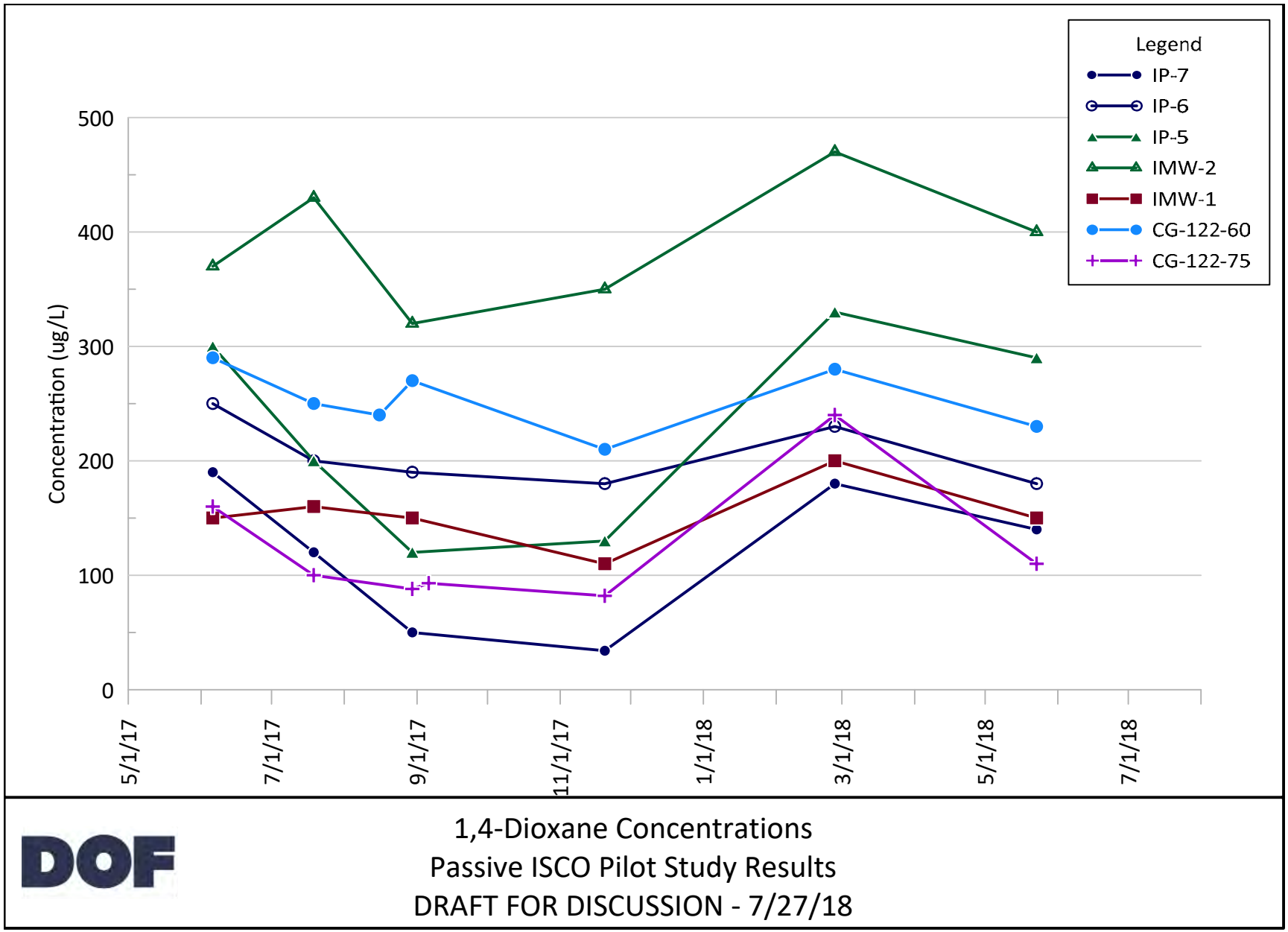
November 17, 2016

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\Pilot Study Report\2016-11-17 GT_2016 PSR 3 F3-F4 Pilot study Areas.dwg

ATTACHMENT C
PASSIVE IN-SITU CHEMICAL OXIDATION PILOT STUDY MONITORING RESULTS
DRAFT FOR DISCUSSION - 7/27/18

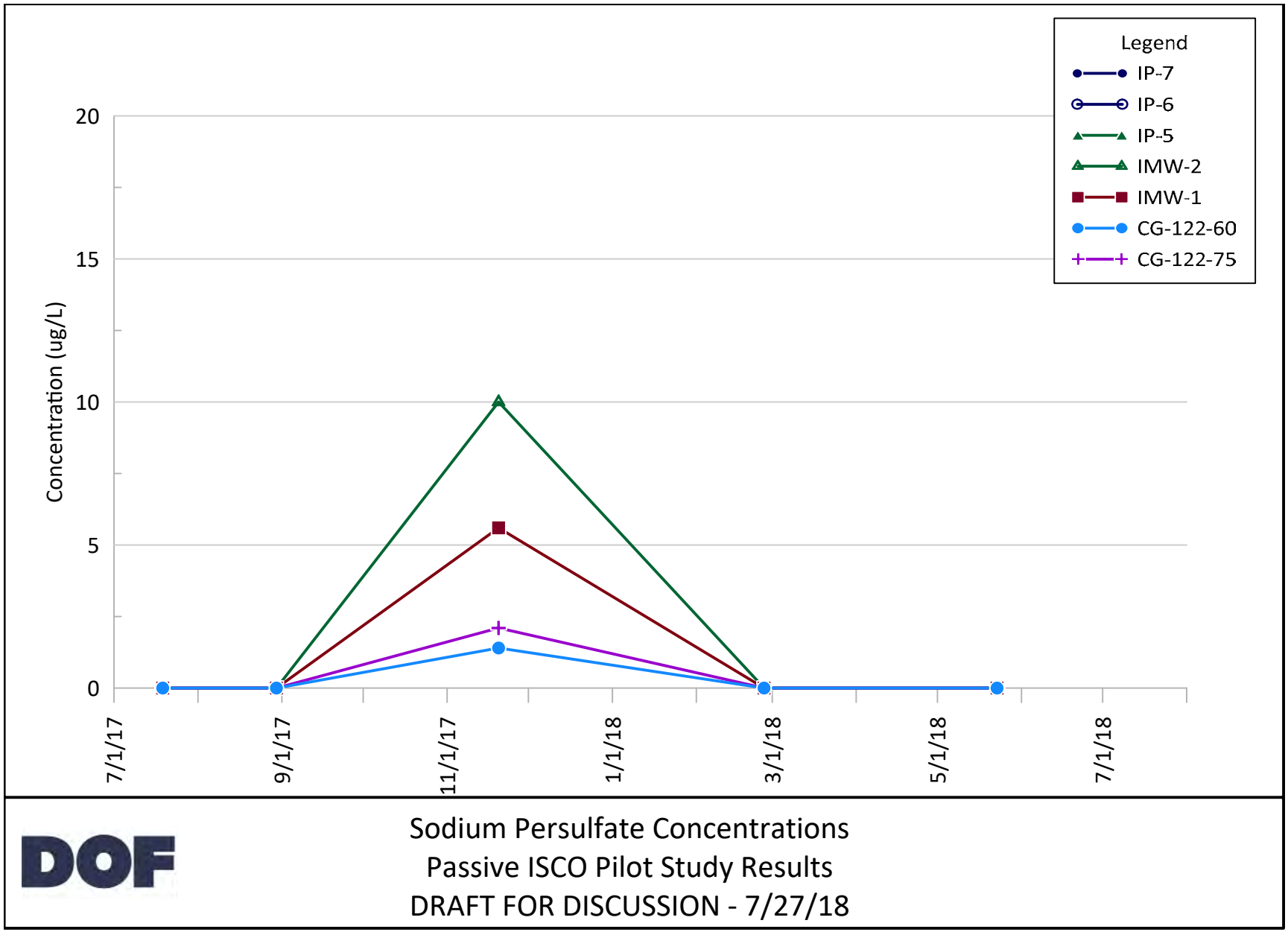
Well ID	Sampling Event	Date	Groundwater Elevation (feet)	Pumping rate	Volume Purged	pH	Conductivity	Temperature	Turbidity	Dissolved Oxygen	Redox Potential	Ferric Fe3+	Ferrous Fe2+	Total Fe	Sulfate	Arsenic Dissolved	Chromium Dissolved	Sodium Persulfate	1,4-Dioxane
				mL/min	Liters	standard	mS/cm	°C	NTU	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	<.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	<.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	<.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



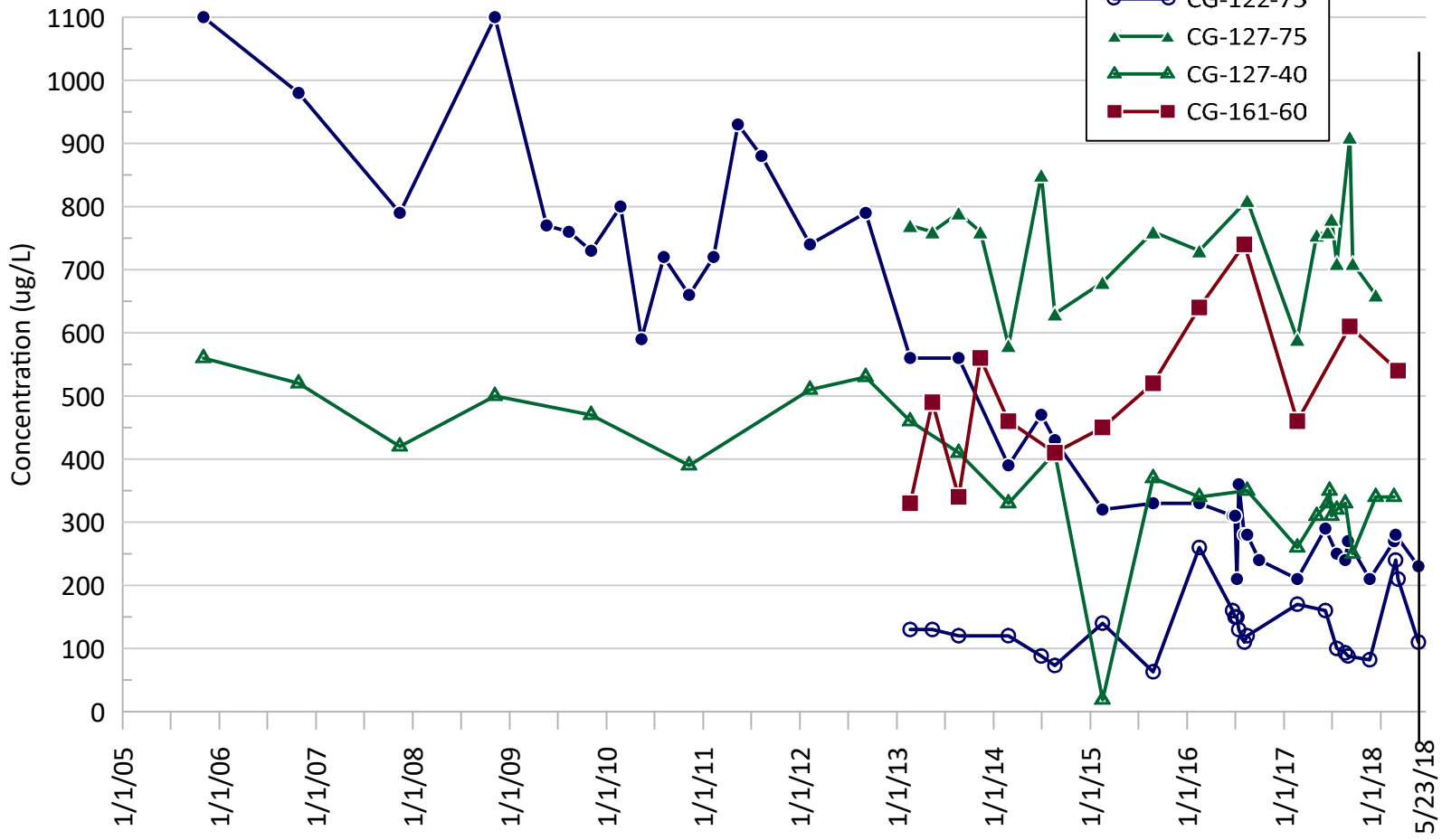
DOF

1,4-Dioxane Concentrations
Passive ISCO Pilot Study Results
DRAFT FOR DISCUSSION - 7/27/18



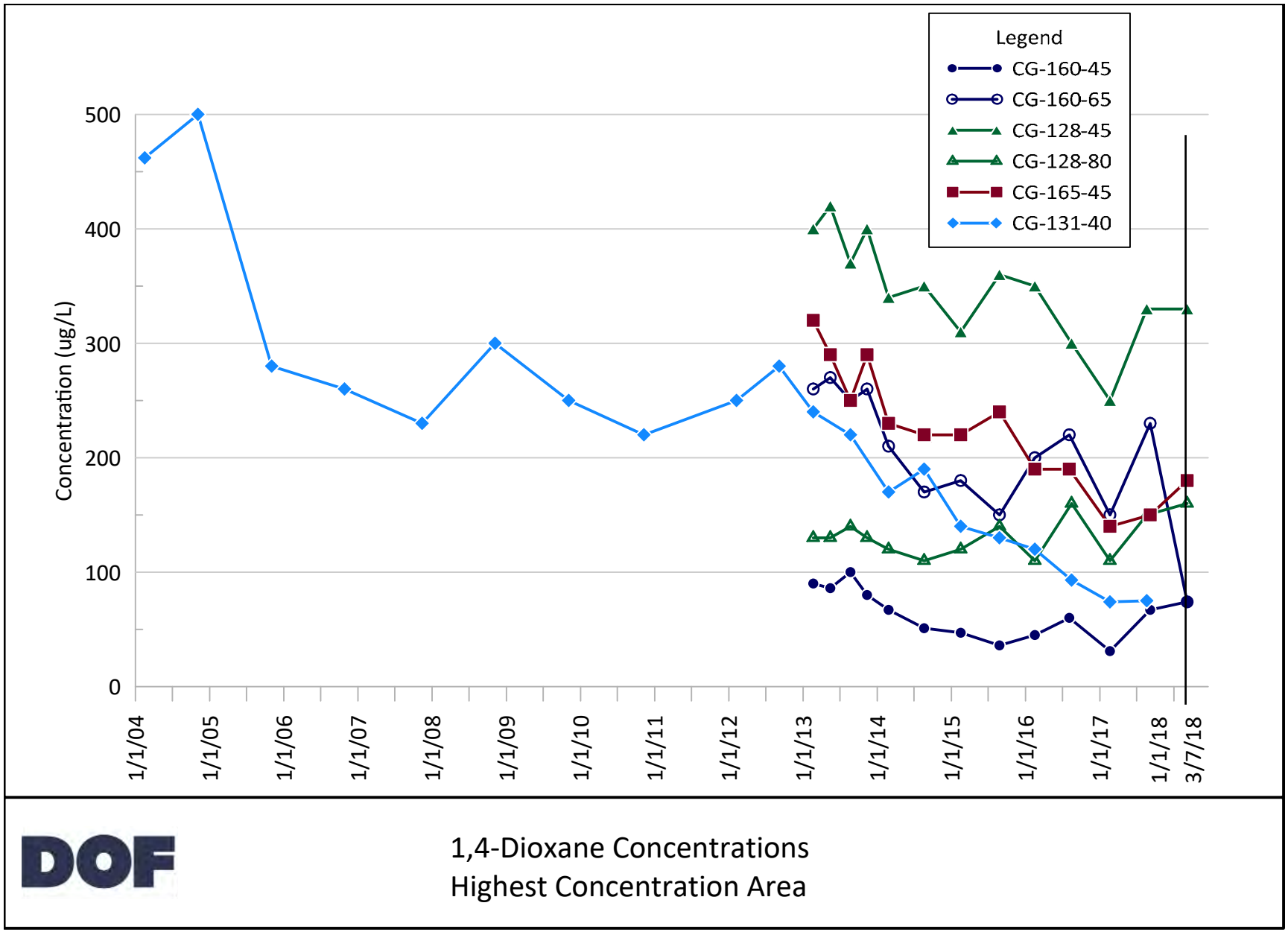
DOF

Sodium Persulfate Concentrations
Passive ISCO Pilot Study Results
DRAFT FOR DISCUSSION - 7/27/18



DOF

1,4-Dioxane Concentrations
Highest Concentration Area



DOF

1,4-Dioxane Concentrations
Highest Concentration Area

Appendix C

DP-167 Boring Log, Lab Data and DV

DALTON OLMSTED FUGLEVAND

LOG OF DP-167

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: Sample Recovery	SAMPLES: Lab Sample	VISUAL SOIL DESCRIPTION	TEMPORARY WELL CONSTRUCTION DETAILS: Temporaray Well Screen interval	TEMPORARY WELL CONSTRUCTION DETAILS: Groundwater Sample Number
			Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors **Drilling tools Advanced directly to 40 ft bgs**	Note: Temporary well consisted of 3/4" Diameter SCH 40 PVC - 0.010" slot screen	
41		DP-167-40-43.3-0119 0900	80% fine sand 20% silt interbed		
42					
43					
44			POORLY GRADED SAND WITH TRACE SILT (SP): Gray (7.5YR 3/1), saturated, 95% fine sand with 5% silt		
45					DP-167-43-48-0119 1000
46		DP-167-45-49-0119 920			
47					
48					
49					
50			95% silt with 5% fine sand interbed		
51			POORLY GRADED SAND (SP): Gray 7.5YR 3/1, saturated, 100% fine sand with scattered organics		
52		DP-167-50-54.5-0119 940			
53					
54			SILTY SAND stringers (mm scale)		DP-167-52-57-0119 1045
55					
56			POORLY GRADED SAND WITH TRACE SILT(SP): Gray 7.5YR 3/1, saturated, 95% fine to medium sand with 5% silt		
57		DP-167-55-59.3-0119 1000			
58			SILT with FINE SAND clasts (1/4" to 1" in size)		
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.

LOG OF DP-167

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: Sample Recovery	SAMPLES: Lab Sample	VISUAL SOIL DESCRIPTION
61			90% fine to medium sand 10% silt inclusion (~1")
62		DP-60-65-0119 1100	occassional woody debris
63			
64			90% fine to medium sand 10% silt interbed (1" thick)
65			
66		DP-65-67.3-0119 1200	fine organics
67			interbedded dark, woody debris 90% fine to medium sand 10% silt stringers (mm scale)
68			
69			POORLY GRADED SAND WITH TRACE SILT (SP): Dark Gray7.5YR 4/1, saturated, very loose, 95% fine sand with 5% silt
70			
71			dense organics
72		DP-167-70-75-0119 1300	
73			
74			85% sand 15% silt stringers oriented vertically (mm scale)
75			
76			
77			organic flecks
78		DP-167-75-80-0119 1400	
79			
80			silt increases to 10%

TEMPORARY WELL CONSTRUCTION DETAILS

Note: Temporary well consisted of 3/4" Diameter SCH 40 PVC - 0.010" slot screen

Temporaray Well Screen interval	Groundwater Sample Number
	DP-167-61-66-0119 1140
	DP-167-70-75-0119 1350

Abandoment 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.

ALS Environmental
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www.alsglobal.com

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. 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.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Mark Harris
Project Manager

ALS Environmental
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Table of Contents

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	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 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/anlayte 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

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 4ºC 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
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Environmental

96127

CHAIN OF CUSTODY
96127

004

SR# 4900739

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	STERICYCLE GEORGETOWN
Project Number	STRCL-001 375.08
Project Manager	TASYA GRAY
Company	DALTON OLMSTED & FUGLEVAND
Address	1601 SW KLICKITAT WAY SUITE 200B SEATTLE, WA.
Phone #	(206) 502-1120
email	ngray@dofnw.com
Sampler Signature	
Sampler Printed Name	ANTHONY CERRUTI

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	24H: ApplEnvMic7-87-1536-1540/	7D: 8270D SIM / 1,4-Dioxane	28D: 415.1 / TOC T	180D: 6020A / Metals T	180D: 6020B / Metals D	1	2	3	4	5	Remarks
1. DP-167-43-48-0119		1/23/19	1000	W	5	X	X	X	X	X						FIELD FILTERED (6020B) TO 0.45 µm)
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. EB01-0119		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 & DUANE 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 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

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other____ (Circle One)

*ApplEnv MIC 7-87-1536-1540 FOR FERROUS IRON: BOTTLES CAME PRESERVED W/ ASCORBIC. CONSULTED W/ MARK HARRIS AND DETERMINED 3x-DI RINSE + 2x-SAMPLE GW RINSE WOULD SUFFICE FOR UNPRESERVED SAMPLE. REQ.

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature FEDEX	Signature FEDEX	Signature	Signature	Signature
Printed Name ANTHONY CERRUTI	Printed Name	Printed Name	Printed Name 1-25-19 0940	Printed Name	Printed Name
Firm DOF	Firm	Firm	Firm ARS-K	Firm	Firm
Date/Time 1/24/19 1330	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

PC MH

Cooler Receipt and Preservation Form

Client DALTON OLMSTED & FUGLEVAND 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	9607	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 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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
Analysis Method:	415.1	**Units:**	mg/L
Prep Method:	None	**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.	**Service Request:**	K1900739
Project	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
Analysis Method:	415.1	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary

Carbon, Total Organic

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA
Analysis Method:	415.1		
Prep Method:	None		

Matrix Spike
K1900739-006MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	02/03/19
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	415.1	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	624113

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1900739-LCS	24.6	25.0	99	83-117

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Carbon, Total Organic

Analysis Method: 415.1 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance Limits
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. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: 415.1 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
Analysis Method:	ApplEnvMic7-87-1536-1540	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Iron, Divalent (Ferrous Iron)

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
DP-167-43-48-0119	K1900739-001	**7.50**	0.40	0.10	2	01/25/19 13:45	*
DP-167-52-57-0119	K1900739-002	**0.40**	0.20	0.05	1	01/25/19 13:45	*
DP-9-167-52-57-0119	K1900739-003	**1.69**	0.20	0.05	1	01/25/19 13:45	*
DP-167-61-66-0119	K1900739-004	**0.30**	0.20	0.05	1	01/25/19 13:45	*
EB01-0119	K1900739-005	**0.15 J**	0.20	0.05	1	01/25/19 13:45	*
DP-167-70-75-0119	K1900739-006	**11.5**	1.0	0.3	5	01/25/19 13:45	*
Method Blank	K1900739-MB	**0.15 J**	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.	**Service Request:**	K1900739
Project	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
		Date Analyzed:	01/25/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	DP-167-70-75-0119	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1900739-006DUP Result	Average	RPD	RPD Limit
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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA
Analysis Method:	ApplEnvMic7-87-1536-1540		
Prep Method:	None		

		Matrix Spike K1900739-006MS			Duplicate Matrix Spike K1900739-006DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
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. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Continuing Calibration Verification (CCV) Summary

Iron, Divalent (Ferrous Iron)

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:** mg/L

	Analysis Lot	Lab Code	Date Analyzed	True Value	Measured Value	Percent Recovery	Acceptance 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. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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

Analysis Method: ApplEnvMic7-87-1536-1540 **Units:**mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
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

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

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-43-48-0119	**Basis:**	NA
Lab Code:	K1900739-001		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-43-48-0119	**Basis:**	NA
Lab Code:	K1900739-001		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**11.7**	mg/L	0.0080	0.0003	1	01/29/19 11:10	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:45
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-52-57-0119	**Basis:**	NA
Lab Code:	K1900739-002		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:45
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-52-57-0119	**Basis:**	NA
Lab Code:	K1900739-002		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**17.9**	mg/L	0.0080	0.0003	1	01/29/19 11:11	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-9-167-52-57-0119	**Basis:**	NA
Lab Code:	K1900739-003		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**2.38**	mg/L	0.0080	0.0003	1	01/29/19 11:50	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-9-167-52-57-0119	**Basis:**	NA
Lab Code:	K1900739-003		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**21.9**	mg/L	0.0080	0.0003	1	01/29/19 11:13	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 11:40
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-61-66-0119	**Basis:**	NA
Lab Code:	K1900739-004		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 11:40
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-61-66-0119	**Basis:**	NA
Lab Code:	K1900739-004		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**8.31**	mg/L	0.0080	0.0003	1	01/29/19 11:31	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 12:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	EB01-0119	**Basis:**	NA
Lab Code:	K1900739-005		

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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 12:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	EB01-0119	**Basis:**	NA
Lab Code:	K1900739-005		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**0.0043 J**	mg/L	0.0080	0.0003	1	01/29/19 11:30	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 13:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-70-75-0119	**Basis:**	NA
Lab Code:	K1900739-006		

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**7.76**	mg/L	0.0080	0.0003	1	01/29/19 11:33	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 13:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-70-75-0119	**Basis:**	NA
Lab Code:	K1900739-006		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Iron	6020A	**36.8**	mg/L	0.0080	0.0003	1	01/29/19 11:03	01/28/19	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	KQ1901096-02		

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
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.	**Service Request:**	K1900739
Project	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
		Date Analyzed:	01/29/19

Replicate Sample Summary
Dissolved Metals

Sample Name:	DP-167-70-75-0119	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1901096-07 Result	Average	RPD	RPD Limit
Iron	6020A	0.0080	0.0003	7.76	7.80	7.78	<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.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**Date Received:**	01/25/19
		Date Analyzed:	01/29/19

Replicate Sample Summary
Total Metals

Sample Name:	DP-167-70-75-0119	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample KQ1901096-03 Result	Average	RPD	RPD Limit
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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ1901096-08

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**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	**Units:**	mg/L
Lab Code:	K1900739-006	**Basis:**	NA
Analysis Method:	6020A		
Prep Method:	EPA CLP ILM04.0		

Matrix Spike
KQ1901096-04

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
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.

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/29/19
Sample Matrix:	Water		

Lab Control Sample Summary
Total Metals

Units:mg/L
Basis:NA

Lab Control Sample
KQ1901096-01

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Iron	6020A	0.0473	0.0500	95	80-120

Prep Summary Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08
Sample Matrix: Water

Metals

Prep Method: EPA CLP ILM04.0 **Extraction Lot:** 330432
Analytical Method: 6020A **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. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

INITIAL AND CONTINUING CALIBRATION BLANKS

Concentration Units: ug/L

Sample ID / Analyte	Method	Analysis Batch:	Result	C
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. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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	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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

ICP INTERFERENCE CHECK SAMPLE

Sample ID ICSAB **Concentration Units:** ug/L

Analyte	Method	Analysis Batch:	Result	True Value	% Rec	% Rec. Limits	Analysis Date
Iron	6020A	623467	47700	-	-	-	01/29/19 10:07

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739

Project: Stericycle Georgetown/STRCL-001 375.08

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.

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739

Project: Stericycle Georgetown/STRCL-001 375.08

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Detection Limits

Instrument: K-ICP-MS-06 **Matrix:** Water

Analyte	Mass	Units	MRL	MDL	Method
Iron	56	ug/L	8	0.3	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

ICP Linear Range (Quarterly)

Instrument: K-ICP-MS-06

Analyte	Concentration (ug/L)	Method
Iron 56	45000	6020A

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **623467**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Analysis Run Log

Instrument ID: **K-ICP-MS-06** **Analytical BatchID:** **623467**

Sample	Dilution Factor	Date/Time	Fe
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

Client: Stericycle Environmental Solutions, Inc. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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. **Service Request:** K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

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

ALS Group USA, Corp.
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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-43-48-0119	**Units:**	ug/L
Lab Code:	K1900739-001	**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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Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:45
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-52-57-0119	**Units:**	ug/L
Lab Code:	K1900739-002	**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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 10:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-9-167-52-57-0119	**Units:**	ug/L
Lab Code:	K1900739-003	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 11:40
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-61-66-0119	**Units:**	ug/L
Lab Code:	K1900739-004	**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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 12:00
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	EB01-0119	**Units:**	ug/L
Lab Code:	K1900739-005	**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	

Analytical Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19 13:50
Sample Matrix:	Water	**Date Received:**	01/25/19 09:40
Sample Name:	DP-167-70-75-0119	**Units:**	ug/L
Lab Code:	K1900739-006	**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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ1901167-02	**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. **Service Request:** K1900739

Project: Stericycle Georgetown/STRCL-001 375.08

Sample Matrix: Water

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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08 **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\ **Lab Code:**KQ1901257-02
Instrument ID: K-MS-26 **Analysis Lot:**623635
Analysis Method: 8270D SIM **Signal ID:**1

		1,4-Dichlorobenzene-d4	
		Area	**RT**
	Result ==>	37,793	5.20
	Upper Limit ==>	75,586	5.70
	Lower Limit ==>	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. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08 **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\ **Lab Code:**KQ1901339-02
Instrument ID: K-MS-26 **Analysis Lot:**623808
Analysis Method: 8270D SIM **Signal ID:**1

	1,4-Dichlorobenzene-d4	
	Area	**RT**
Result ==>	37,763	5.21
Upper Limit ==>	75,526	5.71
Lower Limit ==>	18,882	4.71

Associated Analyses

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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Collected:**	01/23/19
Sample Matrix:	Water	**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	**Units:**	ug/L
Lab Code:	K1900739-006	**Basis:**	NA
Analysis Method:	8270D SIM		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1901167-03			Duplicate Matrix Spike KQ1901167-04					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,4-Dioxane	140	158 E	10.0	133 #	179 E	10.0	339 #	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.

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/30/19
Sample Matrix:	Water	**Date Extracted:**	01/29/19

Lab Control Sample Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Units:**	ug/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	623635

Lab Control Sample
KQ1901167-01

Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
1,4-Dioxane	6.68	10.0	67	52-111

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/30/19 11:00
Sample Matrix:	Water	**Date Extracted:**	01/29/19

Method Blank Summary
1,4-Dioxane by GC/MS

Sample Name:	Method Blank	**Instrument ID:**	K-MS-26
Lab Code:	KQ1901167-02	**File ID:**	J:\MS26\DATA\013019\0130F003.D\
Analysis Method:	8270D SIM	**Analysis Lot:**	623635,623808
Prep Method:	EPA 3535A	**Extraction Lot:**	330499

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
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

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QA/QC Report

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/30/19 11:19
Sample Matrix:	Water	**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.

Sample Name	Lab Code	File ID	Date Analyzed
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

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QC/QC Report

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08 **Date Analyzed:**01/30/19 09:07

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\013019\0130F001.D\ **Analytical Method:** 8270D SIM
Instrument ID: K-MS-26 **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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08 **Date Analyzed:**01/31/19 08:39

Tune Summary
1,4-Dioxane by GC/MS

File ID: J:\MS26\DATA\013119\0131F001.D\ **Analytical Method:** 8270D SIM
Instrument ID: K-MS-26 **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. **Service Request:** K1900739
Project: Stericycle Georgetown **Calibration Date:** 10/29/2018

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800492 **Signal ID:** 1
Instrument ID: K-MS-26

#	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. **Service Request:** K1900739
Project: Stericycle Georgetown **Calibration Date:** 10/29/2018

Initial Calibration Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800492 **Signal ID:** 1
Instrument ID: K-MS-26

		Calibration Evaluation				Calibration Evaluation	
Analyte Name	Compound Type	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. **Service Request:** K1900739
Project: Stericycle Georgetown **Calibration Date:** 10/29/2018

Initial Calibration Verification Summary
1,4-Dioxane by GC/MS

Calibration ID: KC1800492 **Signal ID:** 1
Instrument ID: K-MS-26

#	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.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/30/19 09:26

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Calibration Date:**	10/29/2018
File ID:	J:\MS26\DATA\013019\0130F002.D\	**Calibration ID:**	KC1800492
Signal ID:	1	**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

Client:	Stericycle Environmental Solutions, Inc.	**Service Request:**	K1900739
Project:	Stericycle Georgetown/STRCL-001 375.08	**Date Analyzed:**	01/31/19 08:58

Continuing Calibration Verification (CCV) Summary
1,4-Dioxane by GC/MS

Analysis Method:	8270D SIM	**Calibration Date:**	10/29/2018
File ID:	J:\MS26\DATA\013119\0131F002.D\	**Calibration ID:**	KC1800492
Signal ID:	1	**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

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Analysis Run Log
1,4-Dioxane by GC/MS

Analysis Method: **Analysis Lot:**623635
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
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	

Client: Stericycle Environmental Solutions, Inc. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08

Analysis Run Log
1,4-Dioxane by GC/MS

Analysis Method: **Analysis Lot:**623808
Instrument ID:K-MS-26

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
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. **Service Request:**K1900739
Project: Stericycle Georgetown/STRCL-001 375.08
Sample Matrix: Water

1,4-Dioxane by GC/MS

Prep Method: EPA 3535A **Extraction Lot:** 330499
Analytical Method: 8270D SIM **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 2019sampling 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 competed.

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.

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.

U.S. EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

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.

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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 for1,4-Dioxane January 2019 Sampling Event

Sample Number	Laboratory Sample Number	Sample Date	Sample Time	Sample Depth	Total Organic Carbon	Ferrous Iron	Total Iron	1,4-Dioxane
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[a]

Sample Number	Laboratory Sample Number	Chemical	Concentration	Units	MRL	MDL	Laboratory Data Flag	Data Validation Qualifier	Quality Control Reason	Quality Control Result	Possible Bias[b,c,d]
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

Total results qualified "J" =	6
Total results qualified "U" =	0
Total results qualified "UJ" =	2
Total results qualified "R" =	0

Notes:

J - estimated
MDL - method detection limit
MRL - method reporting limit
U - undetected at value shown

[a] Summary of qualified data is for natural and field quality control samples only
[b] Low bias - concentration reported is likely low and the actual reporting limit or concentration may be greater than reported
[c] High bias - result reported is likely high and the actual reporting limit or concentration may be lower than reported
[d] False positive - compound is likely not present

Appendix D

Bench Scale Treatability Study Report

BENCH SCALE TREATABILITY STUDY REPORT

STERICYCLE-GEORGETOWN FACILITY SITE
SEATTLE, WASHINGTON

MARCH 26, 2019

PREPARED FOR

DALTON, OLMSTED & FUGLEVAND
1001 SW KLICKITAT WAY, SUITE 200B
SEATTLE, WA

ISOTEC PROJECT NO. 802476

In-Situ Oxidative Technologies, Inc.
11 Princess Road, Suite A
Lawrenceville, New Jersey 08648
Phone: (609) 275-8500, Fax: (609) 275-9608
www.ISOTEC-INC.com

SBA Certified Small Business

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

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^{SM}) 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 ($Na_2S_2O_8$) 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 Medium Dose High Dose	Low Dose Medium Dose High Dose	Low Dose Medium Dose High Dose	Medium Dose	Aqueous Phase Solid Phase
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 $Na_2S_2O_8$ 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^{o}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 ($Na_2S_2O_8$). 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 (H_2O_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 >>	**$Na_2S_2O_8$ + H_2O_2**	**$Na_2S_2O_8$**	**$Na_2S_2O_8$**	**$Na_2S_2O_8$ + H_2O_2**
1,4-D test				
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
Metal test				
Control	0 g/kg			
High dose	(2.5+2.5) g/kg	5 g/kg		(2.5+2.5) g/kg
Experiment Duration	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 $Na_2S_2O_8$ and H_2O_2, and each contributed one half of the respective doses.

H_2O_2 = Hydrogen Peroxide; $Na_2S_2O_8$ = 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 ($Na_2S_2O_8$ + H_2O_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 ($Na_2S_2O_8$ 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 volumfes 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 $Na_2S_2O_8$ 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.

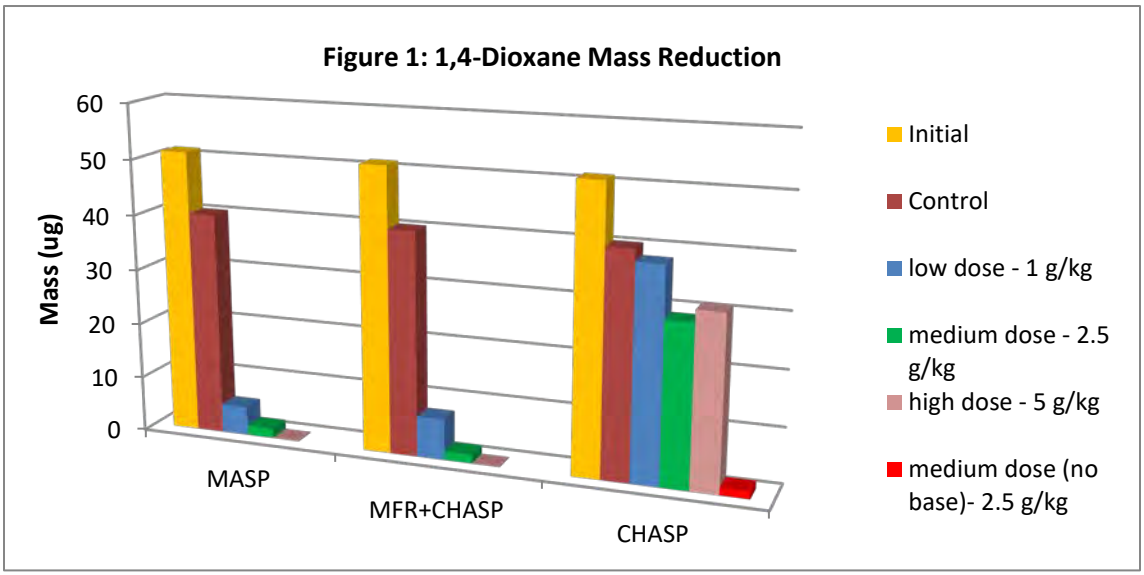
- Using MASP, 1,4-D was treated from 223 µg/l to a range of 0.4-24.6 µg/l in the aqueous phase, and from 88.6 µg/kg to a range of ND (<2.6 µg/kg) to 16.3 µg/kg in the solid phase, an equivalent reduction of 89%-99.8% (aqueous phase) and 81.6%-100% (solid phase), respectively. When aqueous and solid phases 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 ($Na_2S_2O_8$) 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 ($Na_2S_2O_8$) 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

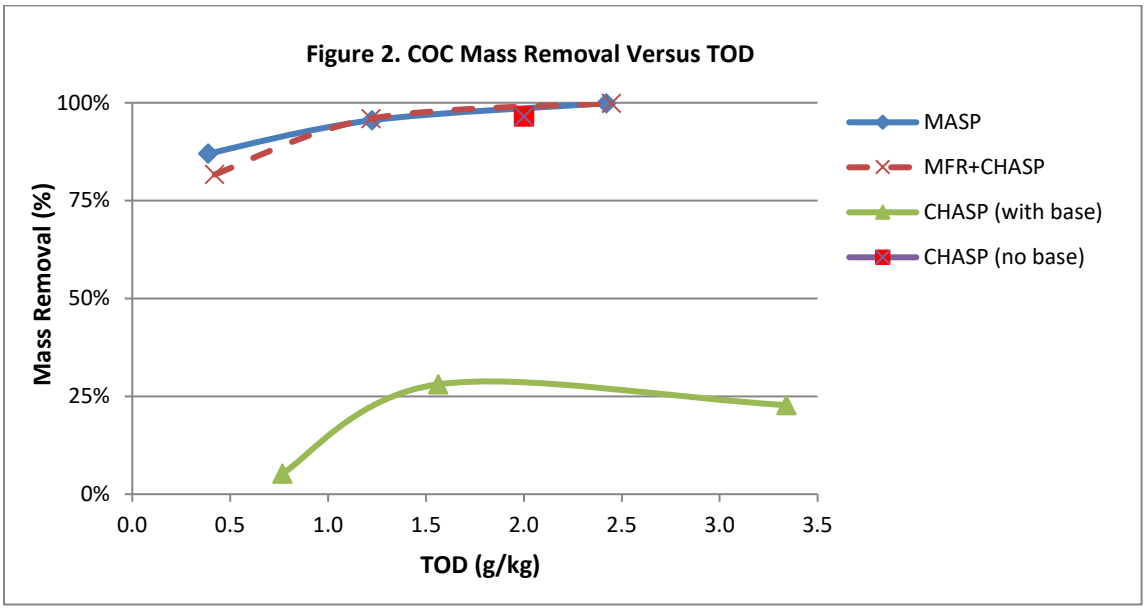
to 234 µg/l in the high dose reactor. In the solid phase, 1,4-D was treated from 88.6 µg/kg to a range of 37.6-72 µg/kg, an equivalent reduction of 18.7%-57.6%. When aqueous and solid phases are combined, 1,4-D mass reduction achieved (Figure 1) was 5.3%-28.1% when compared to "Control". The optimum dose appeared to be in the vicinity of the medium dose at $Na_2S_2O_8$, 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 $Na_2S_2O_8$, 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 $Na_2S_2O_8$ 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 $Na_2S_2O_8$ 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.

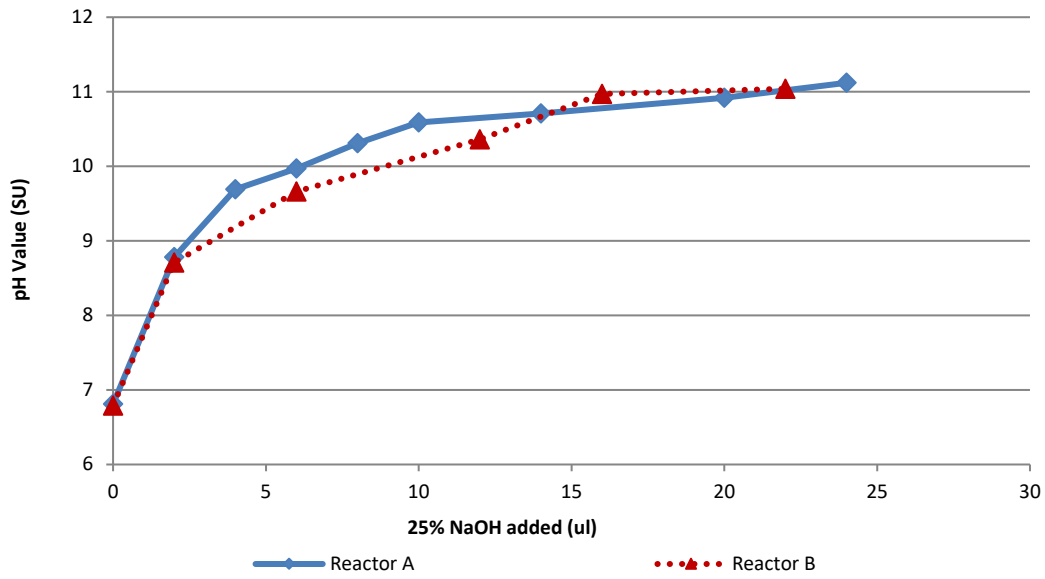
Sulfate levels increased from 14 mg/l in "Control" to 3,920 mg/l, 3,800 mg/l, and 8,880 mg/l, respectively for MASP, MFR+CHASP, and CHASP , which is expected as sulfate is a byproduct of sodium persulfate decomposition.

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.

Figure 4: Soil Buffering Capacity Estimate



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 the make up 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).

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, Seaattle, WA
ISOTEC Project #802476

Sample ID Matrix	CG-127-65-75 GW (ug/l)	Soil Comp (50'-60' bgs) Soil (mg/kg)
1,4-Dioxane	356	0.0323
Total Organic Carbon (TOC)	na	1,230
Iron	3,820	11,100
Manganese	930	103
% Solids	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, Seaattle, WA
ISOTEC Project #802476

			MASP			MFR+CHASP			CHASP (with base)			CHASP (no base)
Sample Description	**Initial**	**Control**	**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 J	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 J
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 graound surface.

Table 3. Metals Results
DOF/Stericycle-Georgetown Facility, Seaattle, 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			
Metals_dissolved (ug/l)				
Arsenic (As)	<3.0	<75 [a]	<75 [a]	<75 [a]
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 [a]	<75 [a]	<75 [a]
Sulfate (mg/l)	**14**	**3,920**	**3,800**	**8,880**
Final pH value (SU)	**7.15**	**3.31**	**3.24**	**5.8**
Final ORP value (mV)	**44**	**205**	**264**	**299**

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.

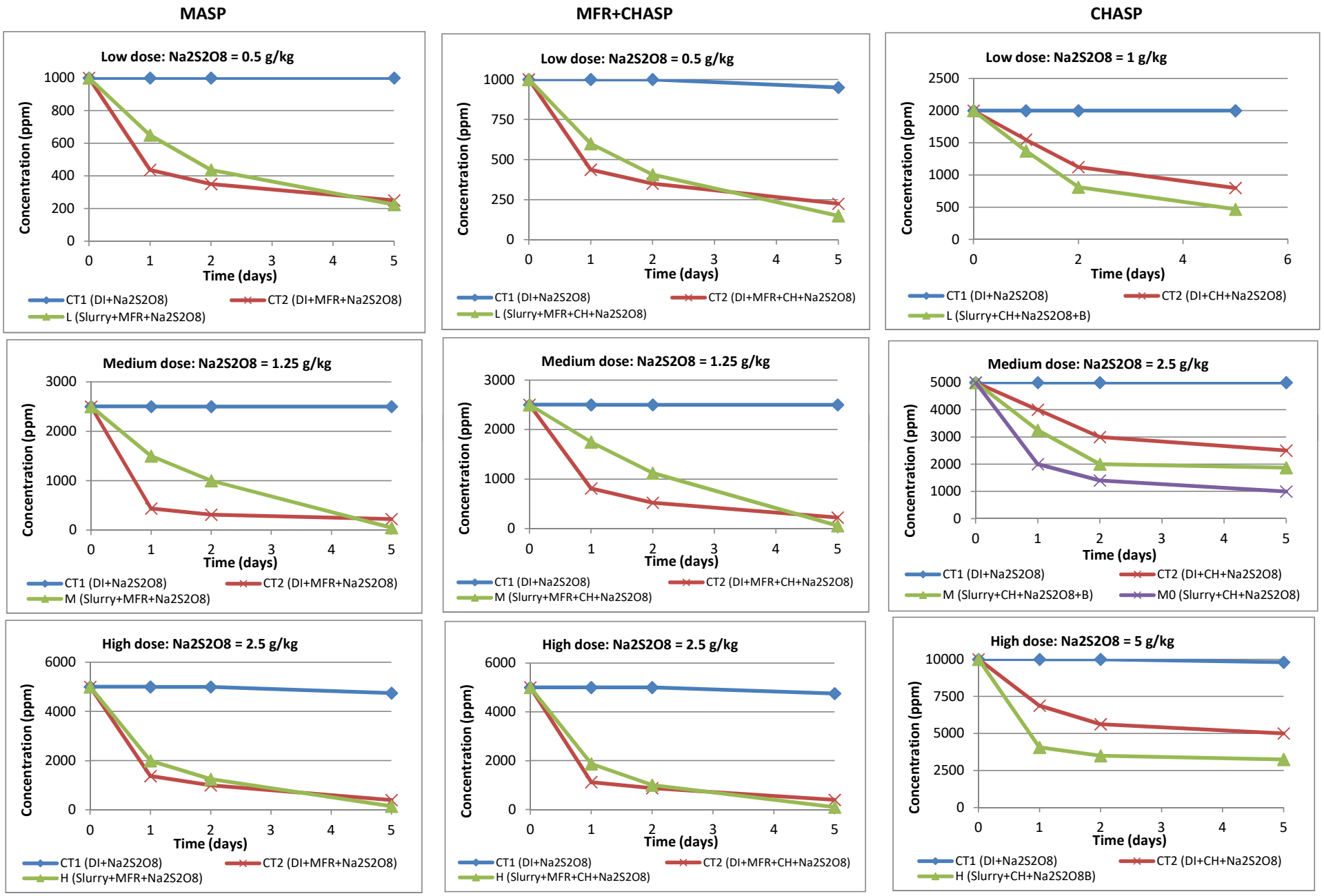
Table 4. Soil Buffering Capacity Estimate
Steericycle-Georgetown Fcility, Seattle, WA
ISOTEC Project #802476

	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		
Total added (ul)	**24**		**22**	
Capacity (ml/kg)	**4.8**		**4.4**	
Average Capacity (ml/kg)	**4.60**			

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 ($Na_2S_2O_8$) 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

In-Situ Oxidative Technologies, Inc.

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)

Table of Contents

SGS North America Inc.

Sample Summary

Isotec

Job No: JC81964

Stericycle Site, WA
Project No: 802476 PO# 5707

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
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

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC81964-1	**SOIL COMP**					
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
JC81964-2	**CG-127-65-75**					
1,4-Dioxane		356	8.0	1.9	ug/l	SW846 8260C BY SIM
JC81964-2F	**CG-127-65-75**					
Iron		3820	100		ug/l	SW846 6010D
Manganese		930	15		ug/l	SW846 6010D

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	SOIL COMP		
Lab Sample ID:	JC81964-1	**Date Sampled:**	01/29/19
Matrix:	SO - Soil	**Date Received:**	01/29/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	80.3
Project:	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

Client Sample ID:	SOIL COMP		
Lab Sample ID:	JC81964-1	**Date Sampled:**	01/29/19
Matrix:	SO - Soil	**Date Received:**	01/29/19
		Percent Solids:	80.3
Project:	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 [1]	SW846 3050B [2]
Manganese	103	1.8	mg/kg	1	01/30/19	01/30/19	PP	SW846 6010D [1]	SW846 3050B [2]

(1) Instrument QC Batch: MA46062
(2) Prep QC Batch: MP12317

RL = Reporting Limit

Report of Analysis

Client Sample ID:	SOIL COMP		
Lab Sample ID:	JC81964-1	**Date Sampled:**	01/29/19
Matrix:	SO - Soil	**Date Received:**	01/29/19
		Percent Solids:	80.3
Project:	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

Client Sample ID:	CG-127-65-75		
Lab Sample ID:	JC81964-2	**Date Sampled:**	01/29/19
Matrix:	AQ - Water	**Date Received:**	01/29/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	Stericycle Site, WA		

	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

	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 [a]	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
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

Client Sample ID:	CG-127-65-75		
Lab Sample ID:	JC81964-2F	**Date Sampled:**	01/29/19
Matrix:	AQ - Water Filtered	**Date Received:**	01/29/19
		Percent Solids:	n/a
Project:	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 [1]	SW846 3010A [2]
Manganese	930	15	ug/l	1	01/30/19	01/30/19	PP	SW846 6010D [1]	SW846 3010A [2]

(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

ACCUTEST LABORATORIES

SLL
WW

CHAIN OF CUSTODY

2235 Route 130, Dayton, NJ 08810
TEL: 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest Job #: JC81964

Client / Reporting Information

Company Name: ISOTEC
Street Address: 11 Princell Road, Suite A
City: Lawrenceville State: NJ Zip: 08648
Project Contact: Yan Chin E-mail: ychin@insituoxidation.com
Phone #: 609-843-0485 Fax #: 609-275-9608
Sampler(s) Name(s): Yan Chin Phone #: 609-843-0485

Project Information

Project Name: Stericycle Site
Street:
City: State: WA
Project #: 802476
Client Purchase Order #: 5707
Project Manager:

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	1,4-dioxane (8260C by SIM)	TOC (9060M)	Fe	Mn	LAB USE ONLY
1	Soil Cmp	0	1/29/19	10am	YC	SO	1					1			2	X	X	X	X	P55
2	CG-127-65-75		1/29/19	10am	YC	water	4	3		1						X		X	X	1451
																				4962
																				A24
																				V279

INITIAL ASSESSMENT 3B JK
LABEL VERIFICATION

Turnaround Time (Business days)

Approved By (Accutest PM): / Date:

- [ ] Std. 10 Business Days
- [ ] 5 Day RUSH
- [x] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] other

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [x] Other Results only

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Please use the lowest MDL possible.
Water sample for metal analyses was filtered
D 2x5g encore

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Yan Chin	1/29/2019 10am	1	2	1-29-19 1312	2
3			3	4		4
5			5			

Custody Seal #: [ ] Intact [ ] Not intact
Preserved where applicable: [x] JK
On Ice: [x] 1
Cooler Temp: 0.3 SP

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	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

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

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.

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)

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!

Our goal is to continuously improve our service to you. Please share your ideas about how we can serve you better at EHS.US.CustomerCare@sgs.com. Your feedback is appreciated!

Table of Contents

SGS North America Inc.

Sample Summary

Isotec

Job No: JC82688

Stericycle Site, WA
Project No: 802476 PO#5707

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
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

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 Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
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

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

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC82688-1	**CT AQ**					
1,4-Dioxane		223	4.0	0.95	ug/l	SW846 8260C BY SIM
JC82688-2	**R1 AQ**					
1,4-Dioxane		24.6	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-3	**R2 AQ**					
1,4-Dioxane		1.6	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-4	**R3 AQ**					
1,4-Dioxane		0.40	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-5	**R4 AQ**					
1,4-Dioxane [a]		222	4.0	0.95	ug/l	SW846 8260C BY SIM
JC82688-6	**R5 AQ**					
1,4-Dioxane [a]		184	4.0	0.95	ug/l	SW846 8260C BY SIM
JC82688-7	**R6 AQ**					
1,4-Dioxane [b]		234	4.0	0.95	ug/l	SW846 8260C BY SIM
JC82688-8	**R7 AQ**					
1,4-Dioxane		35.4	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-9	**R8 AQ**					
1,4-Dioxane		2.1	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-10	**R9 AQ**					
1,4-Dioxane		0.31 J	0.40	0.095	ug/l	SW846 8260C BY SIM
JC82688-11	**R10 AQ**					
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 / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC82688-12F	**CT AQ FIL**					
Sulfate		14.0	2.0		mg/l	EPA 300/SW846 9056A
JC82688-13F	**R3 AQ FIL**					
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
JC82688-14F	**R6 AQ FIL**					
Chromium		27.5	10		ug/l	SW846 6010D
Iron		44100	100		ug/l	SW846 6010D
Sulfate		8880	100		mg/l	EPA 300/SW846 9056A
JC82688-15F	**R9 AQ FIL**					
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
JC82688-16	**CT SO**					
1,4-Dioxane		88.6	7.8	2.5	ug/kg	SW846 8260C BY SIM
JC82688-17	**R1 SO**					
1,4-Dioxane		16.3	7.7	2.5	ug/kg	SW846 8260C BY SIM
JC82688-18	**R2 SO**					
1,4-Dioxane		13.2	7.2	2.3	ug/kg	SW846 8260C BY SIM
JC82688-19	**R3 SO**					
No hits reported in this sample.						
JC82688-20	**R4 SO**					
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 / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC82688-21	**R5 SO**					
1,4-Dioxane		37.6	7.4	2.3	ug/kg	SW846 8260C BY SIM
JC82688-22	**R6 SO**					
1,4-Dioxane		61.6	8.8	2.8	ug/kg	SW846 8260C BY SIM
JC82688-23	**R7 SO**					
1,4-Dioxane		22.3	9.6	3.1	ug/kg	SW846 8260C BY SIM
JC82688-24	**R8 SO**					
1,4-Dioxane		11.3	8.4	2.7	ug/kg	SW846 8260C BY SIM
JC82688-25	**R9 SO**					
No hits reported in this sample.						
JC82688-26	**R10 SO**					
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

Report of Analysis

Report of Analysis

Client Sample ID:	CT AQ		
Lab Sample ID:	JC82688-1	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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 [a]	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 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

Client Sample ID:	R1 AQ		
Lab Sample ID:	JC82688-2	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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%

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

Client Sample ID:	R2 AQ		
Lab Sample ID:	JC82688-3	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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

Client Sample ID:	R3 AQ		
Lab Sample ID:	JC82688-4	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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

Client Sample ID:	R4 AQ		
Lab Sample ID:	JC82688-5	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	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

Client Sample ID:	R5 AQ		
Lab Sample ID:	JC82688-6	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	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.

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

Client Sample ID:	R6 AQ		
Lab Sample ID:	JC82688-7	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	Stericycle Site, WA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	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
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

Client Sample ID:	R7 AQ		
Lab Sample ID:	JC82688-8	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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
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

Client Sample ID:	R8 AQ		
Lab Sample ID:	JC82688-9	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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
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

Client Sample ID:	R9 AQ		
Lab Sample ID:	JC82688-10	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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
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

Client Sample ID:	R10 AQ		
Lab Sample ID:	JC82688-11	**Date Sampled:**	02/11/19
Matrix:	AQ - Water	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM	**Percent Solids:**	n/a
Project:	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

Client Sample ID:	CT AQ FIL		
Lab Sample ID:	JC82688-12F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	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 [1]	SW846 3010A [3]
Cadmium	< 3.0	3.0	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Iron	< 100	100	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Lead	< 3.0	3.0	ug/l	1	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46139
(2) Instrument QC Batch: MA46150
(3) Prep QC Batch: MP12530

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CT AQ FIL		
Lab Sample ID:	JC82688-12F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	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

Client Sample ID:	R3 AQ FIL		
Lab Sample ID:	JC82688-13F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	Stericycle Site, WA		

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]
Cadmium	5.9	3.0	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Chromium	111	10	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Iron	284000	2500	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]
Lead [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]

(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

Client Sample ID:	R3 AQ FIL		
Lab Sample ID:	JC82688-13F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	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

Client Sample ID:	R6 AQ FIL		
Lab Sample ID:	JC82688-14F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	Stericycle Site, WA		

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]
Cadmium	< 3.0	3.0	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Chromium	27.5	10	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Iron	44100	100	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Lead [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]

(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

Client Sample ID:	R6 AQ FIL		
Lab Sample ID:	JC82688-14F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	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

Client Sample ID:	R9 AQ FIL		
Lab Sample ID:	JC82688-15F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	Stericycle Site, WA		

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]
Cadmium	3.3	3.0	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Chromium	68.5	10	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Iron	172000	100	ug/l	1	02/13/19	02/13/19	ND	SW846 6010D [1]	SW846 3010A [3]
Lead [a]	< 75	75	ug/l	25	02/13/19	02/14/19	ND	SW846 6010D [2]	SW846 3010A [3]

(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

Client Sample ID:	R9 AQ FIL		
Lab Sample ID:	JC82688-15F	**Date Sampled:**	02/11/19
Matrix:	AQ - Water Filtered	**Date Received:**	02/11/19
		Percent Solids:	n/a
Project:	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

Client Sample ID:	CT SO		
Lab Sample ID:	JC82688-16	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.4
Project:	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

Client Sample ID:	R1 SO		
Lab Sample ID:	JC82688-17	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	71.9
Project:	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
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

Client Sample ID:	R2 SO		
Lab Sample ID:	JC82688-18	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.7
Project:	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%

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

Client Sample ID:	R3 SO		
Lab Sample ID:	JC82688-19	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.3
Project:	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

Client Sample ID:	R4 SO		
Lab Sample ID:	JC82688-20	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.9
Project:	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

Client Sample ID:	R5 SO		
Lab Sample ID:	JC82688-21	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	73.6
Project:	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

Client Sample ID:	R6 SO		
Lab Sample ID:	JC82688-22	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.9
Project:	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%

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

Client Sample ID:	R7 SO		
Lab Sample ID:	JC82688-23	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.2
Project:	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%

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

Client Sample ID:	R8 SO		
Lab Sample ID:	JC82688-24	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.7
Project:	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

Client Sample ID:	R9 SO		
Lab Sample ID:	JC82688-25	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.1
Project:	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%

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

Client Sample ID:	R10 SO		
Lab Sample ID:	JC82688-26	**Date Sampled:**	02/11/19
Matrix:	SO - Soil	**Date Received:**	02/11/19
Method:	SW846 8260C BY SIM SW846 5035	**Percent Solids:**	72.6
Project:	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
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

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

ACCUTEST LABORATORIES

ww SLL (SLL)

CHAIN OF CUSTODY

2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

PAGE 1 OF 3

FED-EX Tracking # | Bottle Order Control #
Accutest Quote # | Accutest Job # JC82688

Client / Reporting Information
Company Name: ISOTEC
Street Address: 11 Princell Road, Suite A
City: Lawrenceville State: NJ Zip: 08648
Project Contact: Yan Chin E-mail: ychin@insituoxidation.com
Phone #: 609-843-0485 Fax #: 609-275-8608
Sampler(s) Name(s): Yan Chin Phone #: 609-843-0485

Project Information
Project Name: Stericycle Site
Street:
City: State: WA
Project #: 802476
Client Purchase Order #: 5707
Project Manager:

Billing Information (If different from Report to)
Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis (see TEST CODE sheet): 1,4-dioxane (8260C by SIM)

Matrix Codes: DW - Drinking Water, GW - Ground Water, WW - Water, SW - Surface Water, SO - Soil, SL- Sludge, SED-Sediment, OI - Oil, LIQ - Other Liquid, AIR - Air, SOL - Other Solid, WP - Wipe, FB-Field Blank, EB-Equipment Blank, RB- Rinse Blank, TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	1,4-dioxane (8260C by SIM)	LAB USE ONLY
1	CT AQ		1/29/19	1pm	YC	AQ	2	2								X	D4
2	R1 AQ		1/29/19	1pm	YC	AQ	2	2								X	1404
3	R2 AQ		1/29/19	1pm	YC	AQ	2	2								X	4990
4	R3 AQ		1/29/19	1pm	YC	AQ	2	2								X	V356
5	R4 AQ		1/29/19	1pm	YC	AQ	2	2								X	A24
6	R5 AQ		1/29/19	1pm	YC	AQ	2	2								X	G53
7	R6 AQ		1/29/19	1pm	YC	AQ	2	2								X	
8	R7 AQ		1/29/19	1pm	YC	AQ	2	2								X	
9	R8 AQ		1/29/19	1pm	YC	AQ	2	2								X	
10	R9 AQ		1/29/19	1pm	YC	AQ	2	2								X	
11	R10 SO		1/29/19	1pm	YC	AQ	2	2								X	

Turnaround Time (Business days)
- [x] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] other

Emergency & Rush T/A data available VIA Lablink

Approved By (Accutest PM): / Date:

Data Deliverable Information
- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [x] Other Results only

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions
Please use the lowest MDL possible.
Water sample for metal analyses was filtered
Anticiated 1,4-Dioxane concentrations <400 ug/l
INITIAL ASESSMENT
LABEL VERIFICATION

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 Yan Chin	1/29/2019 1pm	1	2	2/11/19 17:50	2
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by: 5	Date Time:	Received By: 5	Custody Seal #	Intact / Not intact	Preserved where applicable; On Ice; Cooler Temp. 2.4°C

JC82688: Chain of Custody
Page 1 of 5

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PAGE 2 OF 3

FED-EX Tracking # | Bottle Order Control #
Accutest Quote # | Accutest Job # JC82688

Client / Reporting Information

Company Name: ISOTEC
Street Address: 11 Princell Road, Suite A
City: Lawrenceville State: NJ Zip: 08648
Project Contact: Yan Chin E-mail: ychin@insituoxidation.com
Phone #: 609-843-0485 Fax #: 609-275-9608
Sampler(s) Name(s): Yan Chin Phone #: 609-843-0485

Project Information

Project Name: Stericycle Site
Street:
City: State: WA
Project #: 802476
Client Purchase Order #: 5707
Project Manager:

Billing Information (If different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	As, Cr, Cd, Fe, Pb	Sulfate	LAB USE ONLY
12F	CT AQ FIL		1/29/19	10am	YC	AQ	2			1		1				X	X	
13F	R3 AQ FIL		1/29/19	10am	YC	AQ	2			1		1				X	X	
14F	R6 AQ FIL		1/29/19	10am	YC	AQ	2			1		1				X	X	
15F	R9 AQ FIL		1/29/19	10am	YC	AQ	2			1		1				X	X	

Turnaround Time (Business days)

Approved By (Accutest PM): / Date:

- [x] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] other

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [x] Other Results only

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Please use the lowest MDL possible.
All four AQ samples for metals and sulfate analyses were field filtered

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Yan Chin	1/29/2019 10am	1	2	2/11/19 17:50	2
3			3	4		4
5	Relinquished by:	Date Time:	Received By: 5	Custody Seal #	[ ] Intact [ ] Not intact	Preserved where applicable [ ]

On Ice: X Cooler Temp: 2.4°C

ACCUTEST LABORATORIES

CHAIN OF CUSTODY

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TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: JC82688

Client / Reporting Information

Company Name: ISOTEC
Street Address: 11 Princell Road, Suite A
City: Lawrenceville State: NJ Zip: 08648
Project Contact: Yan Chin E-mail: ychin@insituoxidation.com
Phone #: 609-843-0485 Fax #: 609-275-9608
Sampler(s) Name(s): Yan Chin Phone #: 609-843-0485

Project Information

Project Name: Stericycle Site
Street:
City: State: WA
Project #: 802476
Client Purchase Order #: 5707
Project Manager:

Billing Information (If different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	1,4-dioxane (8260C by SIM)	LAB USE ONLY
16	CT SO		1/29/19	10am	YC	SO	1					1			2	X	
17	R1 SO		1/29/19	10am	YC	SO	1					1			2	X	
18	R2 SO		1/29/19	10am	YC	SO	1					1			2	X	
19	R3 SO		1/29/19	10am	YC	SO	1					1			2	X	
20	R4 SO		1/29/19	10am	YC	SO	1					1			2	X	
21	R5 SO		1/29/19	10am	YC	SO	1					1			2	X	
22	R6 SO		1/29/19	10am	YC	SO	1					1			2	X	
23	R7 SO		1/29/19	10am	YC	SO	1					1			2	X	
24	R8 SO		1/29/19	10am	YC	SO	1					1			2	X	
25	R9 SO		1/29/19	10am	YC	SO	1					1			2	X	
26	R10 SO		1/29/19	10am	YC	SO	1					1			2	X	

Turnaround Time (Business days)

Approved By (Accutest PM): / Date:

- [x] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] other

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [ ] NJ Reduced
- [ ] Commercial "C"
- [ ] NYASP Category A
- [ ] NYASP Category B
- [x] State Forms
- [ ] EDD Format
- [x] Other Results only

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Please use the lowest MDL possible.
Anticiated 1,4-Dioxane concentrations <400 ug/kg
• 2x Sgencral

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Yan Chin	1/29/2019 10am	1	2	2/1/19 17:30	2
3			3	4		4
5			5			

Custody Seal # | [ ] Intact [ ] Not intact | Preserved where applicable | On Ice [X] | Cooler Temp. 2.4/00

SGS Sample Receipt Summary

Job Number: JC82688 **Client:** ISOTEC **Project:** STERICYCLE SITE

Date / Time Received: 2/11/2019 5:50:00 PM **Delivery Method:** Accutest Courier **Airbill #'s:**

Cooler Temps (Raw Measured) °C: Cooler 1: (2.4);

Cooler Temps (Corrected) °C: Cooler 1: (2.1);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☑		☐	☐

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Test Strip Lot #s: pH 1-12: 206717 pH 12+: 208717 Other: (Specify)

Comments

1) Collection date on all sample labels is 2/11/19 not 1/29/19. ID and dates are ok.
2) -16 thru 26 Rec'd 2 Encores for 8260, not 3. VOA lab to prep 1 additional DI vial from intact volume.

SM089-02 Rev. Date 12/1/16

Responded to by: Cynthia Romero

Response Date: 2/12/2019

1) Per client, collection date is 2/11/2019.
2) Please proceed as noted.

JC82688: Chain of Custody
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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				
shrinking		**stable**		**shrinking**		**stable**		**shrinking**		**shrinking**		**shrinking**		**stable**		**shrinking**	

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														
shrinking		**stable**		**shrinking**		**shrinking**		**expanding**		**expanding**		**shrinking**		**shrinking**		**stable**	

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						
shrinking		**shrinking**		**shrinking**		**shrinking**		**expanding**		**stable**		**stable**	

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 E

Recent 1,4-Dioxane Data

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				
shrinking		**stable**		**shrinking**		**stable**		**shrinking**		**shrinking**		**shrinking**		**stable**		**shrinking**	

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														
shrinking		**stable**		**shrinking**		**shrinking**		**expanding**		**expanding**		**shrinking**		**shrinking**		**stable**	

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						
shrinking		**shrinking**		**shrinking**		**shrinking**		**expanding**		**stable**		**stable**	

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

ISOTEC

IN-SITU CHEMICAL OXIDATION FOR 1,4-DIOXANE TREATMENT

STERICYCLE GEORGETOWN SITE
SEATTLE, WA

MARCH 29, 2019
REVISED JULY 10, 2019

PREPARED FOR

DALTON, OLMSTED & FUGLEVAND
1001 SW KLICKITAT WAY, SUITE 200B
SEATTLE, WA

ISOTEC PROPOSAL NO. 802476

In-Situ Oxidative Technologies, Inc.
11 Princess Road, Suite A
Lawrenceville, New Jersey 08648
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www.ISOTEC-INC.com

SBA Certified Small Business

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FIGURES

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 parrafin 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. Per the EDR the site groundwater concentration goal for 1,4-dioxane is 78.5 µg/L with an ultimate clean up goal of 23 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 6th Ave. S) and east side of 6th Ave. S. (North of Findlay St)	CG-161	2,200	50 – 60
3 Right of Way on east side of 6th Ave. S. (South of Lucile St.)	CG-128	1,000	35 – 45
4 Right of Way on East Side of 6th 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^2. 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^2 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)f 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 utilize 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. Based on our previous site experience and field conditions during implementation, adjustments to screen length may be necessary dependent on flow and pressures observed during injections.

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. Calculations for design injection volumes for each of the ISCO Treatment Areas are presented in Attachment A.

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), simultaneously, is recommended, especially for injection with smaller vertical lifts. ISOTEC would advance more temporary injection points than being used for active injection so injection points can be adjusted rapidly 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. Calculations for design chemical oxidant quantities for each of the ISCO Treatment Areas are presented in Attachment A.

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 for dual diaphragm pumps, 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.

Table 3: Conceptual Treatment Program Design Summary

Treatment Area	Surface Area (sq. ft.)	Injection Intervals [1] (ft bgs)	Injection Point Spacing (ft)	Injection Points	Total Injection Volume[2] (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[3,4]	2,900	[35-43, 50-60, 65-75] or [38-52, 58-72]	13 – 18	15 – 20 DPT points	28,400
Total	6,300			35 - 45	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 between locations due to subsurface conditions in order to reach target injection volumes for a given treatment area. Total injection volume is based on 17 to 19 percent of the total estimated pore volume assuming an effective porosity of 0.26 and a bulk density of 112 lbs/cubic foot for calculating oxidant dosage based on a mass oxidant per mass soil basis.
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 screens (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.

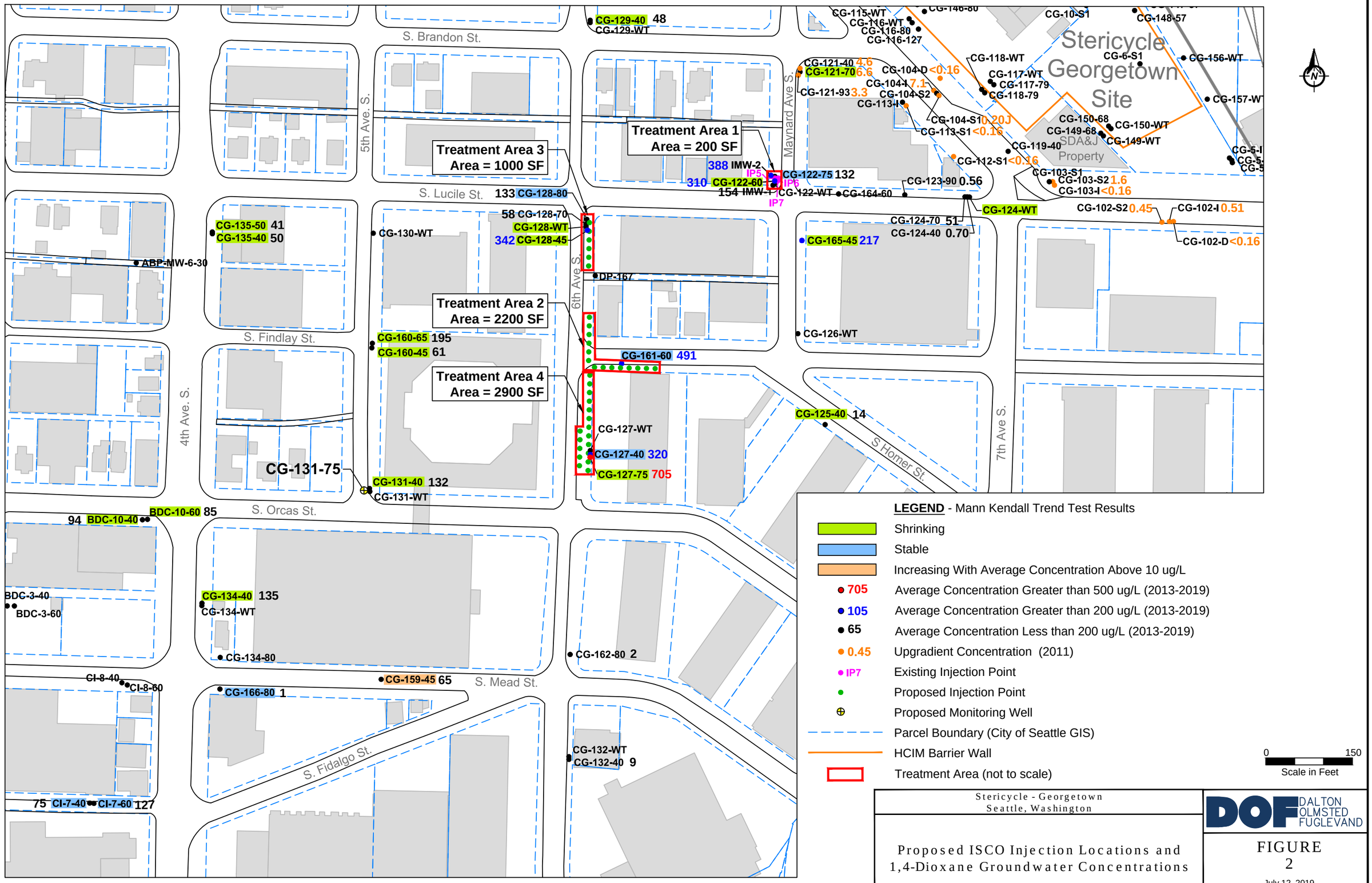
ESTIMATED TREATMENT PROGRAM COSTS				
Item (description)	**Quantity**	**Unit**	**Unit Cost**	**Cost**
ISCO Injections – MFR+CHASP • Mobilization demobilization of staff, equipment, and materials to the site to perform the work • Injection of reagents as per Table 3 • Includes all staff and equipment to complete the work. • Includes remedial amendments with shipping • Field Implementation – includes site supervisor and 2 technicians (includes drilling personnel) and field injection. • Lockable storage container for oxidant storage • Estimated 18 days field injection • Project management, health and safety plan	**1**	**LS**	**$239,650**	**$239,650**
Additional Injection Days (if needed including DPT)	**1**	**LS**	**$6,850**	

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



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Stericycle - Georgetown
Seattle, Washington

Proposed ISCO Injection Locations and 1,4-Dioxane Groundwater Concentrations

DOF DALTON OLMSTED FUGLEVAND

FIGURE
2

July 12, 2019

ATTACHMENT A

IN-SITU CHEMICAL OXIDATION DESIGN QUANTITIES

Table A. In-Situ Chemical Oxidation Design Quantities
Stericycle Georgetown Site
Seattle, WA

Treatment Area	Location	Nearby Well Clusters	Estimated Area (SF)	Injection Points	Target Treatment Interval	Injection Intervals Per Point	Injection Interval Per Point	Injection Volume	Sodium Persulfate Solution Volume	Sodium Persulfate Weight	Persulfate Dosage	Iron Catalysis Volume	H2O2 Solution Volume	Hydrogen Peroxide Weight	H2O2 Dosage (g/kg)	**Total Oxidant Dosage**
				#	(ft bgs)	(ft bgs)	(ft)	(gallons)	gallons	(lbs)	(g/kg)	(gallons)	(gallons)	(lbs)	(g/kg)	**(g/kg)**
1	Right of Way West side of Maynard Ave. north of S. Lucile St.	CG-122	200	3	50-60	50-60	10	700	280	308	1.4	140	280	264	1.2	**2.55**
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.)	CG-161	2200	12-15	50-60	50-60	10	7700	3080	3388	1.4	1540	3080	2903	1.2	**2.55**
3	Right of Way on east side of 6th Ave. S. (North Row, South of Lucile St.)	CG-128	1000	5-7	35-45	35-45	10	3500	1400	1540	1.4	700	1400	1319	1.2	**2.55**
4	Right of Way on east side of 6th Ave. S. (Row Near and South of Findlay St.)	CG-127-45, CG-127-75	2900	10-13	35-75	[35-43, 50-60, 65-75] or [38-52, 58-72]	28	28400	11360	12496	1.4	5680	11360	10706	1.2	**2.55**
Total			6,300	30 - 38				40,300	16,120	17,732		8,060	16,120	15,192		

Assumptions

Assumed effective porosity	0.26
Injection pore volume target	18.0%
Soil Density (lb/CF)	112

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

    - 25-34% Hydrogen Peroxide (aqueous) (concentration dependent on supplier)
    - 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. Recommendations on SDS should be followed. If hydrogen peroxide and the catalyst come into contact, an exothermic reaction will occur.
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. Recommendations on SDS should be followed.

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 potable water, and one or more for mixing catalyst solution.
4. Place two or more tanks in the oxidizer truck – one for potable water (if potable water is not stored on the catalyst truck), and one or more for oxidizer solution.
5. Place catalyst and oxidizer mixing tanks in polypropylene spill containment area large enough to contain the largest vessel within the containment area.

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 (6-10%) 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 potassium phosphate (stabilizer) granular powder to oxidizer mixing tank. The stabilizer slows the chemical reaction.
4. While filling oxidizer tank with potable 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 25-34% 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 25-34% 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 25-34% 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 (10-12%) 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 (3-5 wt %) and sodium hydroxide (.25-.50%) 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 25-34% 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 safety 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 likely sodium hydroxide (caustic) to prevent corrosion of drill rods) into the subsurface. Typically, one gallon of 25% sodium hydroxide is used for each 50-60 gallon batch tank of persulfate, this is equivalent to approximately 0.5% in the injection solution which translates to approximately 675 gallons of caustic used over the duration of the project.
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 one or 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 four batch tanks (see Figure 3 of main text), which allows the field team to record specific volume into each point and injection flow rate to each individual point. Injection points will be selected to maximize the distance between points to reduce the likelihood of mounding and reactions between injection points. Simultaneous injection points will not be utilized if closer than 20 to 25 feet, except when utilizing the existing wells in Area 1. Injections in Area 1 will require injections within the minimum distance, but will be managed to reduce mounding and reactions, potentially reducing injections to one to two wells at a time.

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 1 to 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 4 will vary slightly from the other two areas. Specifically, half of the estimated 15-20 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 half of the injection locations will divided into two separate intervals; 38 to 52 feet bgs and 58 to 72 feet bgs. Alternating injection depths as injections progress north/south will allow for even distribution of oxidant in the subsurface throughout the treatment interval. 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 20 pounds per square inch (psi)]. In the event that the target injection pressure exceeds 45 psi at a given interval per the 2015 In Situ Chemical Oxidation Pilot Study Work Plan, 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, with the target flow rate of 1-2 gallons per minute as identified during the pilot study. 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 acceptance, radius of influence noted during injection, and the distance of the injection point from the nearest monitoring point.

Field Monitoring

Secondary injection indicators will be observed 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.

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 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

ISOTEC INJECTION LOG

Client: _____ **Project No:** _____

Project Name: _____ **Event No:** _____

Address: _____ **Date:** _____

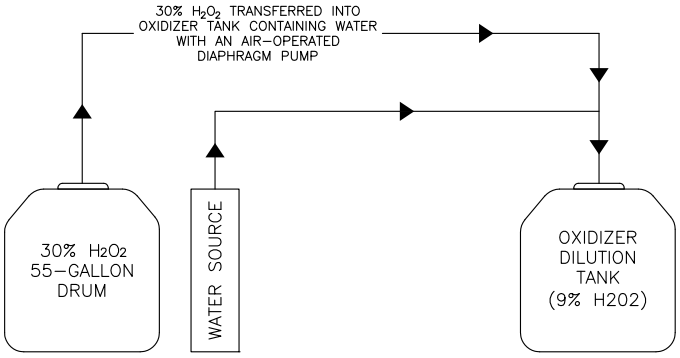
Injection Point	Start Time	Stop Time	Material	Quantity	Injection Interval	Initial Flow Rate	Initial Pressure	Notes (surfacing, refusal, flow rate or pressure changes, etc.)

Page _____ of _____

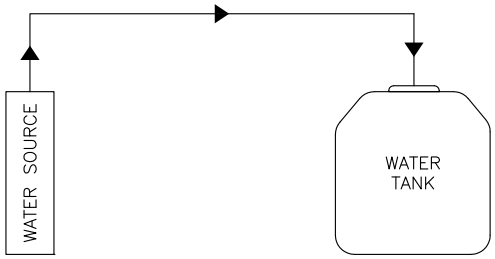
ATTACHMENT B

CATALYZED HYDROGEN PEROXIDE MIXING POCEDURES

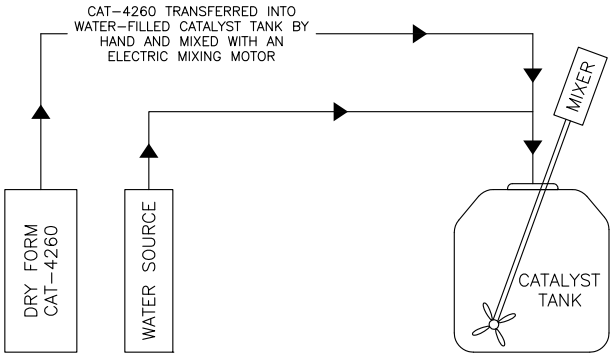
OXIDIZER TANK POCEDURES



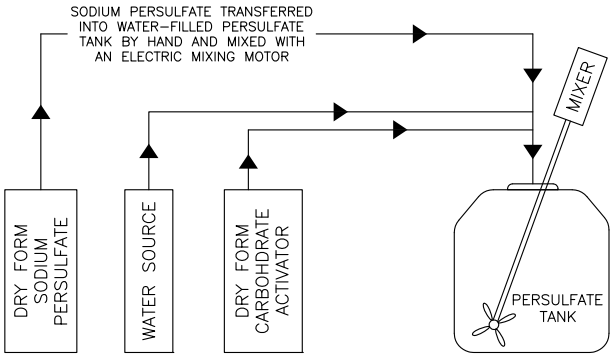
WATER TANK PROCEDURES



CATALYST TANK PROCEDURES

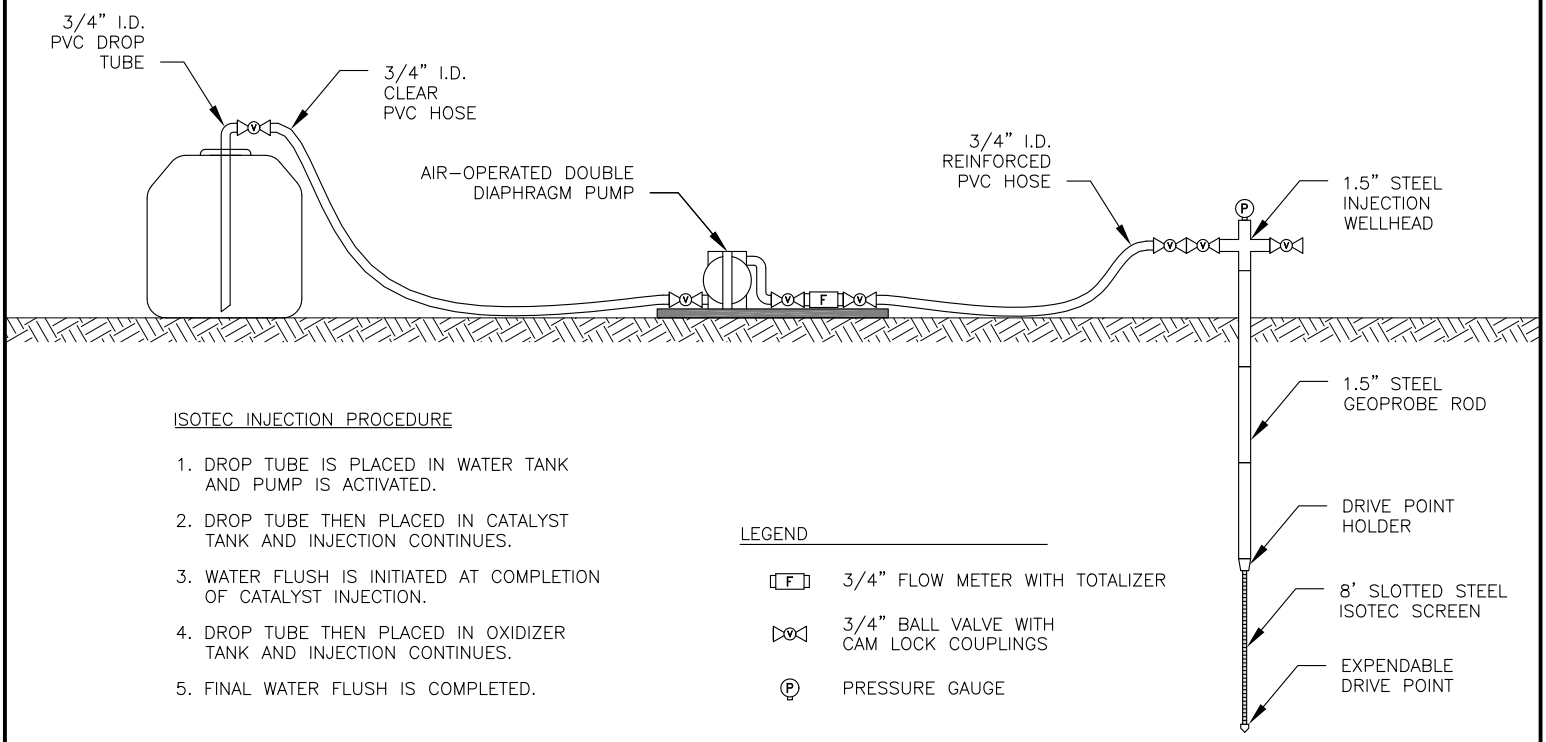


SODIUM PERSULFATE WITH CARBOHYDRATE MIXING POCEDURES



ATTACHMENT C

REAGENT INJECTION DIAGRAM



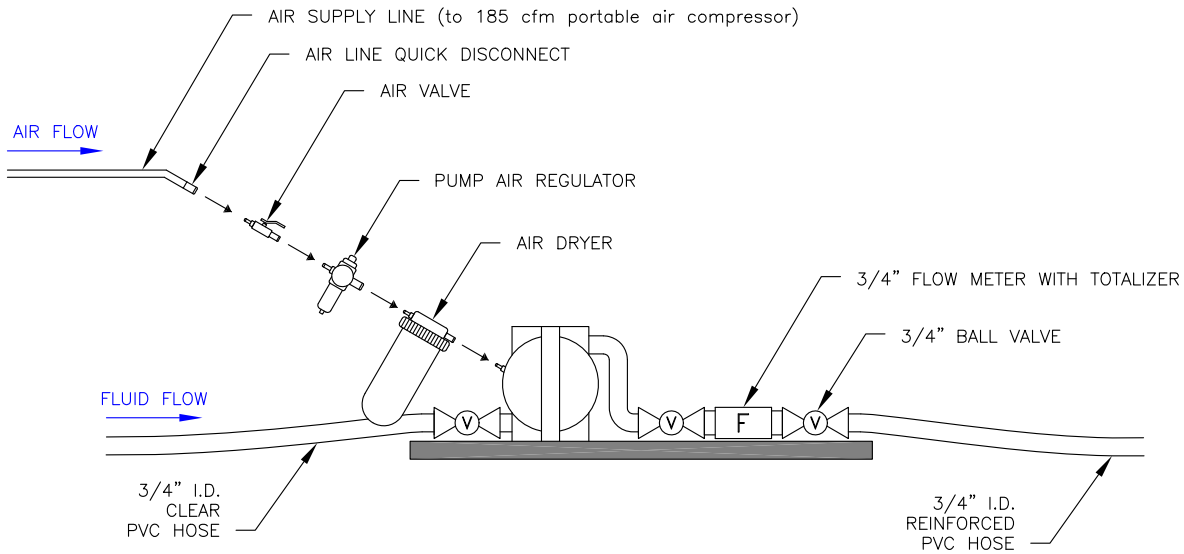
ISOTEC INJECTION PROCEDURE

1. DROP TUBE IS PLACED IN WATER TANK AND PUMP IS ACTIVATED.
2. DROP TUBE THEN PLACED IN CATALYST TANK AND INJECTION CONTINUES.
3. WATER FLUSH IS INITIATED AT COMPLETION OF CATALYST INJECTION.
4. DROP TUBE THEN PLACED IN OXIDIZER TANK AND INJECTION CONTINUES.
5. FINAL WATER FLUSH IS COMPLETED.

LEGEND

- F — 3/4" FLOW METER WITH TOTALIZER
- 3/4" BALL VALVE WITH CAM LOCK COUPLINGS
- P — PRESSURE GAUGE

INJECTION PUMP INSTALLATION



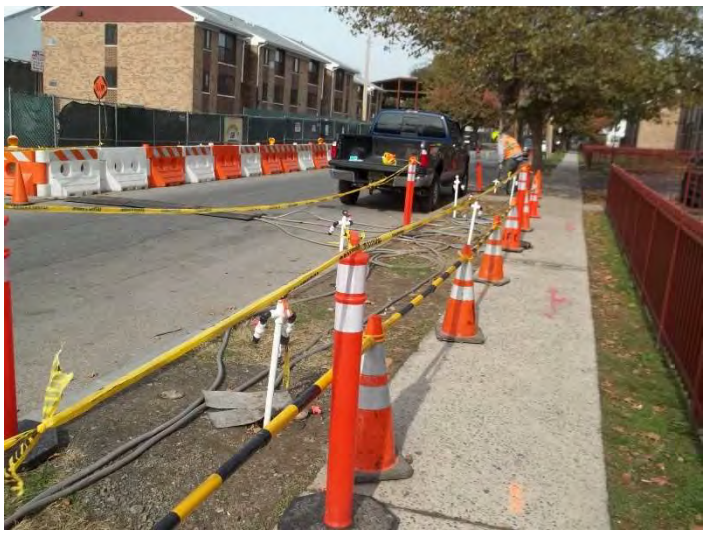
ATTACHMENT D

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

SAFETY DATA SHEET

1. Identification

Product identifier **Sodium Hydroxide Solution 10-30%**

Other means of identification

SDS number 10000014

Synonyms Caustic Soda, Caustic, Caustic soda solution, Sodium hydroxide, Caustic alkali, Lye, Caustic lye, Sodium Hydrate.

Recommended use Pulping and Bleaching, pH neutralizer, Detergent, Soaps.

Recommended restrictions None known.

Manufacturer / Importer / Supplier / Distributor information

Company name Olin Chlor Alkali Products

Address 490 Stuart Road, NE
Cleveland, TN 37312

Company name Pioneer Americas, LLC (d/b/a Olin Chlor Alkali Products)

Address 490 Stuart Road, NE
Cleveland, TN 37312

Company name Olin Canada ULC (d/b/a Olin Chlor Alkali Products)

Address 2020 University, Suite 2190
Montreal, Quebec H3A 2A5

General Information

Telephone (888) 658-6SDS (737)

Website olinchloralkali.com

Contact person ORC SDS Control Group

Emergency phone number CHEMTREC
US: 1-800-424-9300 Canada: 1-800-567-7455

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage.

Precautionary statement

Prevention 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.

Response 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.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) Not classified.

Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 3

Supplemental information

Hazard statement Harmful to aquatic life.

Precautionary statement

Prevention 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

Inhalation 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.

Skin contact 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.

Eye contact 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.

Ingestion 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.

Most important symptoms/effects, acute and delayed 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.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Symptoms may be delayed. Keep victim under observation.

General information 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

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media Do not use a solid water stream as it may scatter and spread fire. Do not use halogenated extinguishing agents.

Specific hazards arising from the chemical 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.

Special protective equipment and precautions for firefighters 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.

Fire-fighting equipment/instructions 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

Personal precautions, protective equipment and emergency procedures 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.

Methods and materials for containment and cleaning up 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.

Environmental precautions 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.

Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	23.76 mm Hg (approximately) (77 °F (25 °C))
Vapor density	Not available.
Relative density	1.33 (30% solution)
Relative density temperature	68 °F (20 °C)
Solubility(ies)	Completely miscible with water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	1.33 g/cm3 (68 °F (20 °C)) (30% solution)
Molecular formula	NaOH

10. Stability and reactivity

Reactivity	Contact with metal may release flammable hydrogen gas.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	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).
Incompatible materials	Oxidizing agents. Acids. Phosphorus. Aluminum. Zinc. Tin. Initiates or catalyzes violent polymerization of acetaldehyde, acrolein or acrylonitrile.
Hazardous decomposition products	Contact with metals (aluminum, zinc, tin) and sodium tetrahydroborate liberates hydrogen gas.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Causes digestive tract burns. Harmful if swallowed.
Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact 500 Standard Draize test Species: Rabbit Test Duration: 24 hours Severity: Severe	Causes severe eye burns. Causes serious eye damage.
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%		
Acute		
Dermal		
LD50	Rabbit	> 2 g/kg
Oral		
LD50	Rat	300 - 500 mg/kg
Other		
LD50	Mouse	40 mg/kg, Intraperitoneal

Skin corrosion/irritation Causes severe skin burns and eye damage.
Standard Draize Test: 500 mg/24 hour(s) skin - rabbit severe.

Serious eye damage/eye irritation Causes severe eye burns. Causes serious eye damage.
Standard Draize Test: 400 µg eyes - rabbit mild; 1 percent eyes - rabbit severe.

Respiratory sensitization No data available.

Skin sensitization No data available.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Reproductive toxicity No data available.

Specific target organ toxicity - single exposure Not available.

Specific target organ toxicity - repeated exposure Not available.

Aspiration hazard Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.

Chronic effects Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Harmful to aquatic life.

Product		Species	Test Results
Sodium Hydroxide Solution 10-30%			
Aquatic			
Fish	LC50	Bluegill (Lepomis macrochirus)	99 mg/l, 48 hours
		Mosquitofish (Gambusia affinis affinis)	125 mg/l, 96 hours

Persistence and degradability Expected to degrade rapidly in air.

Bioaccumulative potential The product is not expected to bioaccumulate.

Mobility in soil Not available.

Other adverse effects 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

Disposal instructions 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.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products 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).

Contaminated packaging 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

DOT

UN number UN1824

UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	8
Subsidiary class(es)	-
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	B2, IB2, N34, T7, TP2
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1824
UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	8
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	No
Labels required	8
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1824
UN proper shipping name	SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)	8
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	
Marine pollutant	No
Labels required	Not available.
EmS	F-A, S-B
Special precautions for user	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: AQUIRE 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 Na2O8S2

Chemical name	CAS-No	Weight %
Sodium Persulfate	7775-27-1	> 99
Sodium sulfate	7757-82-6	< 2

4. FIRST AID MEASURES

General Advice May produce an allergic reaction.

Eye Contact 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.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Flammable properties Contact with combustible material may cause fire

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions 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/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Provide local exhaust or general ventilation adequate to maintain exposures below permissable 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 25ºC
Vapor density	No information available
Density	2.59 g/cm³ (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 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/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity	None under normal use condtions. 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

Sodium Persulfate (7775-27-1)				
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

Waste disposal methods 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.

Contaminated Packaging Empty remaining contents. Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

TDG

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

MEX

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ICAO

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ICAO/IATA

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

IMDG/IMO

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	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/ELINCS (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

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** 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

PeroxyChem believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specified product designated and may not be applicable where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use are beyond the control of PeroxyChem, PeroxyChem expressly disclaims any and all liability as to any results obtained or arising from any use of the products or reliance on such information.

Prepared By:

PeroxyChem

End of Safety Data Sheet

SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Name: ISOTEC[SM] 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

SECTION 2 – HAZARDS IDENTIFICATION

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^{o}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
TYPICAL PHYSICAL DATA:	
pH (10% aqueous)	3.5-3.9
VAPOR PRESSURE (mm Hg)	0
VAPOR DENSITY (Air = 1)	Not Applicable
BOILING POINT	Decomposition at 300^{o}C
FREEZING/MELTING POINT	Not Applicable
SOLUBILITY IN WATER	57% by weight @ 158^{o}C
SPECIFIC GRAVITY (Water = 1)	1.899 @ 14^{o}/ 8^{o}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

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

Ecotoxicity:	No data available
Persistence and degradability:	No data available
Bioaccumulation:	No data available
Other adverse effects:	No data available
Mobility in soil:	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

UN No.:	Not Regulated
DOT SHIPPING NAME:	Not Regulated
IMO SHIPPING NAME:	Not Regulated as dangerous goods
LATA SHIPPING NAME:	Not Regulated as dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods
ADG Code:	Not dangerous goods

SECTION 15 – REGULATORY INFORMATION

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.

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. 3

SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Name: ISOTEC[SM] 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

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 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(NOX), Sodium oxides.
Hazcchem 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^{o}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^{o}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

Ecotoxicity:	No data available
Persistence and degradability:	No data available
Bioaccumulation:	No data available
Other adverse effects:	No data available
Mobility in soil:	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

UN No.:	Not Regulated
DOT SHIPPING NAME:	Not Regulated
IMO SHIPPING NAME:	Not Regulated as dangerous goods
LATA SHIPPING NAME:	Not Regulated as dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods
ADG Code:	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[SM] 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.
Hazcchem 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^{o}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

SECTION 10 – STABILITY AND REACTIVITY

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

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

Ecotoxicity:	No data available
Persistence and degradability:	No data available
Bioaccumulation:	No data available
Other adverse effects:	No data available
Mobility in soil:	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

UN No.:	Not Regulated
DOT SHIPPING NAME:	Not Regulated
IMO SHIPPING NAME:	Not Regulated as dangerous goods
LATA SHIPPING NAME:	Not Regulated as dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods
ADG Code:	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[SM] 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.
Hazcchem 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^{o}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^{o} C
SOLUBILITY IN WATER	20% by weight @ 25^{o}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

Ecotoxicity:	No data available
Persistence and degradability:	No data available
Bioaccumulation:	No data available
Other adverse effects:	No data available
Mobility in soil:	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

UN No.:	Not Regulated
DOT SHIPPING NAME:	Not Regulated
IMO SHIPPING NAME:	Not Regulated as dangerous goods
LATA SHIPPING NAME:	Not Regulated as dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods
ADG Code:	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.

SAFETY DATA SHEET

SECTION 1 – IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Name: ISOTEC^{SM} 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.
Hazcchem 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^{o}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

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

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

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: Strong oxidizing agents
Hazardous Decomposition Products: Other decomposition products – no data available. In the event of a fire - Carbon oxides.

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

Ecotoxicity:	No data available
Persistence and degradability:	No data available
Bioaccumulation:	No data available
Other adverse effects:	No data available
Mobility in soil:	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

UN No.:	Not Regulated
DOT SHIPPING NAME:	Not Regulated
IMO SHIPPING NAME:	Not Regulated as dangerous goods
LATA SHIPPING NAME:	Not Regulated as dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods
ADG Code:	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

3075 Highland Pkwy, Ste 200, Downers Grove, IL 60515
(425) 889 3400

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

Signal Word	Danger
Hazard Statement	Causes serious eye damage. Harmful if swallowed. Harmful if inhaled. May cause irritation to the respiratory system. Causes skin irritation. May intensify fire; oxidizer.
Precautionary Statements	
Prevention	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.
Response	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.
Storage	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.
Disposal	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 (H2O2)		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)
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 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

General information:	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.
Eye/face protection:	Wear tight-fitting goggles or face shield.
Skin Protection	
Hand Protection:	Use suitable protective gloves if risk of skin contact.
Other:	Wear suitable protective clothing as protection against splashing or contamination.
Respiratory Protection:	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.
Hygiene measures:	No data available.

9. Physical and chemical properties

Physical state:	liquid liquid
Form:	Clear Liquid
Color:	Colorless
Odor:	Odorless
Odor threshold:	No data available.
pH:	3.7 3.7
Melting point/freezing point:	-33 - -15 °C -33 - -15 °C
Initial boiling point and boiling range:	100 - 176 °C 100 - 176 °C
Flash Point:	Does not flash
Evaporation rate:	> 1
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.

Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	30.664 hPa
Vapor density:	No data available.
Relative density:	1.13
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	1.5
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No data available.
Chemical Stability:	No data available.
Possibility of hazardous reactions:	No data available.
Conditions to avoid:	No data available.
Incompatible Materials:	Strong oxidizer - avoid contact with reducing agents.
Hazardous Decomposition Products:	No data available.

11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion:	No data available.
Inhalation:	No data available.
Skin Contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product:	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): >= 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 (H2O2)	LC 50 (Chameleon goby (Tridentiger trigonocephalus), 24 h): 155 mg/l 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 Kow)

Product:	Log Kow: 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 RegulationsUS. 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 (H2O2)	Listed
Hydrogen peroxide (H2O2)	Listed

US. Massachusetts RTK - Substance List

Hydrogen peroxide (H2O2)	Listed
Hydrogen peroxide (H2O2)	Listed

US. Pennsylvania RTK - Hazardous Substances

Hydrogen peroxide (H2O2)	Listed
Hydrogen peroxide (H2O2)	Listed

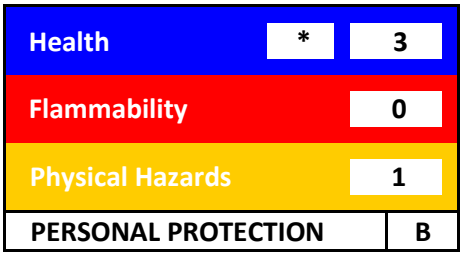
US. Rhode Island RTK

Hydrogen peroxide (H2O2)	Listed
Hydrogen peroxide (H2O2)	Listed

Inventory Status: 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

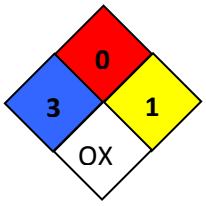
HMIS Hazard ID



B - 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

Issue Date:	10/12/2016
Revision Date:	No data available.
Version #:	1.4
Further Information:	No data available.

Univar USA Inc Safety Data Sheet

For Additional Information contact SDS Coordinator during business hours, Pacific time: (425) 889-3400

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Appendix G

QAPP

QUALITY ASSURANCE PROJECT PLAN
1,4-DIOXANE REMEDIATION

STERICYCLE GEORGETOWN FACILITY -DOWNGRADIENT AREA

SEATTLE, WASHINGTON

July 15, 2019

Prepared by:

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DOF DALTON OLMSTED FUGLEVAND

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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 Technical Memorandum: Revised Full Scale In-Situ Chemical Oxidation (ISCO) Work Plan (DOF, 2019), which was prepared for the area downgradient of the Stericycle Georgetown facility located in the Georgetown area of Seattle, Washington. The Work Plan was initially submitted to the Washington State Department of Ecology (Ecology) in April, 2019 and was subsequently revised in July 2019. The 1,4-dioxane remedial design includes ISCO of groundwater downgradient of the closed Stericycle Georgetown facility (the downgradient area).

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).

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.[1] The implementation plan and associated monitoring plan are included in the Revised Full Scale ISCO Work Plan (DOF, 2019).

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 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.

1 http://www.ecy.wa.gov/programs/eap/qa/docs/nepqapp/index.html.

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 in the Revised Full Scale ISCO Work Plan (DOF, 2019) 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. The selected contingent remedy involves the use of ISCO followed by monitored natural attenuation (MNA) to achieve cleanup levels within the restoration timeframe, currently 2032.

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 four treatment areas adjacent to monitoring well clusters CG-122, CG-128, CG-127; and well CG-161-60
- Groundwater monitoring prior to, during, and following implementation of the ISCO remedy to assess effectiveness of the injections.

This QAPP addresses the ISCO remedy and may be revised or amended in the future to address components of the MNA 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. The site-specific cleanup level for groundwater set forth by Ecology for 1,4-dioxane at the site is 78.5 micrograms per liter (µg/L).

3.2 PROJECT OBJECTIVES

The short-term objective of the Full Scale ISCO implementation is to reduce overall mass of 1,4-dioxane following treatment within the four ISCO treatment areas up to 50%.

The long-term objectives of the Full Scale ISCO implementation is to meet the cleanup goals of reducing 1,4-dioxane mass and attaining the groundwater cleanup level set forth by Ecology.

3.3 TASKS REQUIRED

The 1,4-dioxane cleanup includes the following specific tasks:

- Permitting,
- Site preparation,
- Setup of ISCO spill prevention controls;
- Setup of ISCO injection equipment and batching area;
- Batch activated sodium persulfate (11-12%) solution as needed for all injection locations;
- Batch hydrogen peroxide (6-10%) solution as needed for all injection locations;
- Batch catalyst solution as needed for all injection locations;
- Injection of chemical oxidant 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 Full Scale ISCO 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 – DOF will perform the functions of the engineering team. Specific functions of this role are to:

- Review and follow relevant aspects of the Full Scale ISCO work plan and this QAPP.
- Implement the remedial action as described in the work plan, including managing subcontractors performing construction activities, such as drilling and injection.
- Document completed implementation and monitoring tasks.

- Verify ISCO injection locations via global positioning system (GPS) and hand measurements.
- Verify injection depths during ISCO.
- 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 Full Scale ISCO work plan and this QAPP.
- Perform monitoring tasks prior, 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.

Injection Contractor– The injection contractor (In-Situ Oxidative Technologies, Inc. (ISOTEC) will be required to perform the injection activities to treat groundwater during ISCO implementation. ISOTEC will monitor primary injection indicators, including flow and pressure during injections to monitor progress at each injection location. ISOTEC will also monitor secondary injection indicators to help assess potential adjustments, should primary injection

indicators warrant adjustment to the injection location.

Drilling Contractor– The drilling contractor will be under contract to ISOTEC and will be required to perform the construction activities of drilling borings for the purposes of injection of material to treat groundwater during ISCO and for installation of temporary injection and sampling locations, and new groundwater monitoring wells.

Laboratories– Analytical Laboratory Services (ALS) in Kelso, Washington will provide analytical services for the 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 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 Full Scale ISCO remedy for the cleanup action will take two weeks to implement, followed by one year 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 is provided in the work plan 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, Table 1, and the Full Scale ISCO Work Plan.

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, permanent and 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 Full Scale ISCO work plan 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 chemical oxidant dose of 2.50 g/kg will be delivered into the aquifer to account for the potential heterogeneity of aquifer soils as identified in the ISOTEC Bench-Scale Treatability Study Report dated March 26, 2019.
- The activated sodium persulfate solution will be prepared on the site for ISCO injections and the engineer will be present to verify the required solution strength is prepared (11-12%).
- The catalyst solution will be prepared on the site for ISCO injections and the engineer will be present to verify the required proportions of the two-part catalyst are prepared.
- The hydrogen peroxide solution will be prepared on the site for ISCO injections and the engineer will be present to verify the required solution strength is prepared (6-10%)
- The volume of sodium persulfate, catalyst, and hydrogen peroxide solution delivered into the aquifer will be carefully controlled with batches mixed separately for each injection location. The ISCO injection pump will be carefully controlled using a hand valve, while the flow meter and flow totalizer are closely monitored.

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 double diaphragm 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 ±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, sulfate, hydrogen peroxide, and iron will be used during ISCO injections to evaluate the distribution and concentration of persulfate at different locations in 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 Full Scale ISCO work plan.

The pressures and flow rates during each injection location will be monitored continuously to document variation from design, and adjustments will be made in the field as discussed in the Full Scale ISCO work plan. Control valves will be adjusted so that the pressure does not exceed the maximum design pressure. Flow rates and total flow quantities will be logged to monitor the total amount of oxidant added at each injection location and verify flow rates do not exceed maximum design flows.

5.1.2.2 Representativeness

Representativeness for this project was determined by using general historical and investigative information identified during the pilot study to determine proper locations for sampling and injection points that represent the areas of concern. Sampling and measurement methods detailed in the Full Scale ISCO work plan 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 full scale injections, ISCO full scale monitoring events, 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 Full Scale ISCO work plan.

7.0 FIELD PROCEDURES

Procedures for all field activities are described in the Full Scale ISCO work plan. 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 specific field measurements and calculations listed below. Measurements and calculations will be recorded daily in field notes and/or forms and checked against design requirements per the frequencies listed below.

- Location measurement:
  - A GPS with an accuracy of ±0.5 foot will be used to locate 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 as per Table 2 and Figure 2 of the Full Scale ISCO Work Plan (with minor changes in location as necessary based on utility conflicts or drilling conditions).
  - 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.

- Injection apparatus:
  - Prior to preparation of ISCO injection solutions, the engineer will inspect the secondary containment area for signs of damage or potential leak points within the containment area.
  - Prior to commencement of ISCO injections, all fittings and hoses will be checked for leaks by pumping potable water prior to use of injection solutions. If leaks are detected, repairs will be completed prior to start of injections.
  - As injections progress, leak checks will be completed
    - At minimum daily for ongoing injections locations, and
    - Prior to starting injection at each location using potable water.
  - All equipment, hoses, and fittings will be pressure rated for greater than the maximum planned injection pressures.

- Injection solutions:
  - The engineer will verify oxidant chemicals shipped to the site match the Full Scale ISCO Work Plan requirements for use in preparation of the injection solutions.
  - Prior to injection at each location, the engineer will develop an injection plan for that specific location (consistent with the design targets for each treatment area in the Full Scale ISCO Work Plan as per Table 5) with the injection contractor (ISOTEC design documents in Appendix F [ISOTEC proposal Table A]), that will include target injection amount per depth interval and total target injection volume for that location.
  - Prior to injection at each location, the engineer will record volumes and concentrations for batch preparation of the following solutions and confirm they are consistent with volumes and concentrations specified in the Full Scale ISCO Work Plan.
    - Sodium persulfate injection solution
    - Hydrogen peroxide injection solution, and
    - Catalyst injection solution.
  - Measurements of batch materials will be recorded at the start and completion of injection at each location (at minimum twice daily, should injection at a location take longer than one day).
  - Prior to completion of injection at each location, the engineer will verify the total chemical amounts injected are consistent with volumes and concentrations specified in the Full Scale ISCO work plan.
  - Prior to completion of injection in each treatment area, the engineer will verify the total chemical amounts injected are consistent with volumes and concentrations specified in the Full Scale ISCO work plan (Table 5).

- 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 Full Scale ISCO Work Plan. The injection skids and batching area/trailer used to deliver chemical oxidant 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 injected into the target treatment areas and injection depths.

- Injection flow rates, pressures, and total volumes will be recorded during injections to verify quantities specified in the Full Scale ISCO Work Plan are achieved.

- Groundwater sample analyses: Standard protocols will generally be used to collect groundwater samples for characterization and compliance sampling at the site (as described in the Long Term Monitoring Plan QAPP), with exceptions/additions as noted below.

  - Monitoring during injection will be completed by grab sample, with no purging.

  - Monitoring during sampling Events #2 and #3 will be completed as per Section 5.1.3 of The Full Scale ISCO Work Plan.

  - For monitoring in locations where oxidant could be present, 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.

  - Monitoring at ISCO treatment areas will include the following additional tasks:

    - Persulfate will be measured using a colorimetric field test kit at the time of sample collection.

    - Sulfate will be measured using an extinction/turbidimetric field test kit at the time of sample collection.

    - Hydrogen peroxide will be measured using a drop count titration field test kit at the time of sample collection.

    - Iron will be measure using a visual test kit method in the field at the time of sampling.

  - All field test kits will be calibrated per manufacturer recommended intervals prior to use in the field.

7.2 EQUIPMENT, CONTAINERS, PRESERVATION METHODS, HOLDING TIMES

Specific equipment are described in the Full Scale ISCO Work Plan and the Long Term Monitoring Plan QAPP (Appendix D of EDR; Amec Geomatrix, 2011). Containers, preservation methods, and hold times are described in Table 2.

The addition of oxidant does not alter the collection methods (other than the preservation method noted below) 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 future portions of the remedial implementation, the issue of compatibility will be reassessed.

For monitoring in locations where oxidant could be present, 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.

7.3 EQUIPMENT DECONTAMINATION

Equipment decontamination methods will follow those outlined in Stericycle's Decontamination SOP 200, included in the Long Term Monitoring Plan QAPP. All non-dedicated 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 full scale injections, ISCO full scale monitoring events, 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 Full Scale ISCO Work Plan, 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, major cations/anions, 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 Table 3. 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 Full Scale ISCO Work Plan. 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, 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.

13.0 REFERENCES

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TABLE 1
MEASUREMENT QUALITY OBJECTIVES
Stericycle Tacoma 1,4-Dioxane Remediation Monitoring, Seattle Washington

Analyte	Analytical Method	LCS %Recovery Limits	MS %Recovery Limits	Sample Surrogate %Recovery Limits	MS/MSD, or Laboratory Duplicate RPD Limits (%)	Field Duplicate RPD Limits (%)
Dissolved Metals	EPA 6020	80-120	75-125	NA	≤20	≤30
1,4-Dioxane	EPA 8270C-SIM	52-105	40-114	42-112	≤30	≤30
Sulfate	EPA 300.0	90-110	90-110	NA	<20	<30
Sulfide	SM4500	85-115	85-115	NA	<20	<30
Calcium	EPA 200.7	85-115	85-115	NA	<20	<30
Potassium	EPA 200.7	85-115	85-115	NA	<20	<30
Cloride	EPA 300.0	90-110	90-110	NA	<20	<30
Sodium	EPA 200.7	85-115	85-115	NA	<20	<30
Nitrate	EPA 300.0	90-110	90-110	NA	<20	<30
Alkalinity/carbonat	SM2310	90-110	90-111	NA	<20	<30
Bicarbonate	SM2310	90-110	90-112	NA	<20	<30

Notes:
Recovery limits are those previously provided by the project laboratory; data will be evaluated during data review using the most current control limits provided by the laboratory.

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TABLE 2
SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES
Stericycle Tacoma 1,4-Dioxane Remediation Monitoring, Seattle Washington

Analyte	Analytical Method[1]	Sample Container	Preservation / Temperature	Holding Time[2]
Dissolved Metals	EPA 6020	500 mL HDPE	2.5 mL 1:1 HNO_3; ≤6°C	6 months
1,4-Dioxane (with persulfate present)	EPA 8270C-SIM	1 x 250 mL amber glass	ascorbic acid; <6°C	7 days
1,4-Dioxane	EPA 8270C-SIM	1 x 250 mL amber glass	≤6°C	7 days
Sulfate	EPA 300.0	125 mL HDPE	zinc acetate; <6°C	28 days
Sulfide	SM4500	250 mL HDPE	<6°C	7 days
Calcium	EPA 200.7	125 mL HDPE	HCL, Field Filtered; <6°C	6 months
Potassium	EPA 200.7	125 mL HDPE	HCL, Field Filtered; <6°C	6 months
Chloride	EPA 300.0	125 mL HDPE	<6°C	28 days
Sodium	EPA 200.7	125 mL HDPE	HCL, Field Filtered; <6°C	6 months
Nitrate	EPA 300.0	125 mL HDPE	≤6°C	48 Hours
Alkalinity/carbonate/bicarbonate	SM2310	250 mL HDPE	≤6°C	14 days

Notes:
1. Method numbers refer to SW-846 EPA Analytical Methods (EPA,1986), or Washington State Department of Ecology analytical methods, or Standard Methods (SM) for the Examination of Water and Wastewater.
2. Holding times are based on elapsed time from date and time of collection.

Abbreviations:
°C = degree Celsius
EPA = U.S. Environmental Protection Agency HCl = hydrochloric acid
HDPE = high density polypropylene HNO_3 = nitric acid
L = liter
mL = milliliter
SIM = selective ion monitoring

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TABLE 3
QUALITY CONTROL SAMPLE TYPES AND FREQUENCY
Stericycle Tacoma 1,4-Dioxane Remediation Monitoring, Seattle Washington

Parameter	Field QC			Laboratory QC			
	Field Duplicates[3]	Field Blank	Trip Blanks	Method Blanks	LCS	MS/MSD	Lab Duplicates
Dissolved Metals	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
1,4-dioxane	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Sulfate	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Sulfide	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Calcium	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Potassium	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Cloride	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Sodium	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Nitrate	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Alkalinity/carbonate	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR
Bicarbonate	1/20 samples per sampling event	1/20 samples per sampling event	NR	1/batch	1/batch	1 set/batch	NR

Notes:

1. A sampling event is defined as consecutive days of sampling not separated by more than two days of inactivity.
2. A batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/MSD (or MS and lab duplicate). No more than 20 field samples can be contained in one batch.
3. Field duplicates will be collected only for events with more than five samples.

Abbreviations:

LCS = laboratory control sample
MS = matrix spike sample
MSD = matrix spike duplicate sample
QC = quality control
VOCs = volatile organic compounds
NR = not required

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Appendix H

Persulfate Kit

Persulfate

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, 2nd 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 ($Na_2S_2O_8$).

Visual Kit

Range: 0-5.6 & 7-70 ppm as $Na_2S_2O_8$
MDL: 0.35 ppm / Method: Ferric Thiocyanate

CHEMets Kit	Cat# K-7870
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.