RSEC

August 18, 2023

Mr. Gregory Gould, P.E.
Environmental Engineer
Washington State Department of Ecology
Solid Waste Management, Industrial Section
POB 47600
Olympia, WA 98504-7600

RE: 2022 – 2023 Annual Remedial Action Report, Emerald Kalama Chemical, LLC, Kalama, Washington.

Dear Mr. Gould:

On behalf of Emerald Kalama Chemical, LLC (EKC), RSEC Environmental & Engineering Consulting, Inc. (RSEC) is pleased to provide the attached 2022 – 2023 Annual Remedial Action Report for the Emerald Kalama Chemical facility in Kalama, Washington.

In summary, the remedial systems at the facility continue to operate as designed. The Annual Report follows the same format and organization as the past several years. Note that additional tasks requested by Ecology are referenced in Section 1.4 of this report. A PDF of the entire report and appendices has also been sent via email.

Please feel free to contact me (541) 490-4223 / rich@rsecinc.com if you have any questions or need additional copies of the document.

Sincerely,

RSEC Environmental & Engineering Consulting, Inc.

Richard Truax, P.E.
Senior Project Manager

cc: C. McKinney, EKC

RSEC

Prepared for:

Emerald Kalama Chemical, LLC
Kalama, Washington

Prepared by:

RSEC Environmental &
Engineering Consulting

2022-2023
Annual Remedial Action Report
Emerald Kalama Chemical, LLC

August 2023

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2022-2023
Remedial Action Annual Report
Emerald Kalama Chemical, LLC

August 2023

Prepared by: RSEC Environmental & Engineering Consulting, Inc.
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Reviewed and certified by Richard H. Truax, P.E.
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State of Washington #52861

8/15/2023

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1.0 Introduction

This document presents the annual monitoring report for ongoing remediation activities pursuant to the 2008 Consent Decree (CD) between the Washington State Department of Ecology (Ecology), and BF Goodrich, Inc. and Emerald Kalama Chemical, LLC (Emerald), at the Emerald facility in Kalama, Washington. The CD requires operation of the remedial actions (RA) presented in the *Cleanup Action Plan* (CAP) (Exhibit B of the CD; RETEC 2004a). The RAs presented in the CAP constitute the final cleanup actions for the site. This report describes maintenance, operation, and compliance monitoring of the RAs from May 2022 through April 2023.

The remediation systems design, operations, and compliance monitoring are described in the following documents:

- *Revised Design Report – North Impacted Area Interception Trench* (EMCON 1994)
- *West Impacted Area Interim Corrective Measure Phase 3 Final Design Report* (EMCON 1995)
- *Shallow Interception Trench System Operation and Maintenance Guidelines* (RETEC 1997)
- *Feasibility Study* (RETEC 2003)
- *Corrective Action Plan* (CAP; RETEC 2004a)
- *Compliance Monitoring Plan* (CMP; RETEC 2007)
- *Engineering Design Report* (EDR; ENSR/AECOM 2008)
- *Operations and Maintenance Plan* (O&M Plan; AECOM 2009).

Cleanup levels (CUL's) referred to in this document are those presented in the CAP and approved by Ecology on October 11, 2004 (RETEC 2004a). Additional relevant discussion of the location and behavior of contaminants in the intermediate sand at the site are also available in the RCRA WIA ICM Dispute Resolution September 23 – October 4,1996 Documents, ICM Scope of Work WIA (RETEC, November 1996), and ICM Annual Report (RETEC, April 1998) – collectively referred to herein as "ICM DR Documents".

1.1 Background

Historic spills at the Emerald facility resulted in impacts to the subsurface. These releases are described in the *Remedial Investigation Report, Rev. 2* (ThermoRetec 2000). As detailed in the Remedial Investigation Report, the impacts are contained within the upper sand unit at the remediation areas identified as the NIA and WIA, and the intermediate sand layer that extends under the WIA. The remediation monitoring and systems are therefore located in the North Impacted Area (NIA, shallow sand), West Impacted Area (WIA, shallow sand), and the intermediate sand unit beneath the WIA shallow sand. The layout of the Emerald facility is shown on Figure 1-1.

1.2 Summary of Remediation Activities and Contaminant Status

This section provides a summary description of remediation activities at the facility, and current contaminant(s) status in each area.

1.2.1 North Impacted Area

The NIA remediation consists of a 1,500-foot-long interception trench with two sumps (east and west) (Figure 1-1). The NIA system was constructed between October and November 1995 and continues to operate pursuant to the CD. The system objectives are to capture affected groundwater in the NIA upper sand aquifer and thereby prevent migration to the wetland north of the NIA trench. The combined east and west sumps of the NIA pump an average of 30-million gallons of water through the EKC water treatment plant each year. Benzene and diphenyl oxide (DPO) continue to slightly exceed their cleanup levels (CUL) in the west sump but have been below their CUL in the east sump since 2012 excepting a benzene exceedance in 2020/21. Toluene has not been detected in the east sump and more than an order of magnitude below CUL in the west sump for over a decade.

1.2.2 Central Impacted Area

The Central Impacted Area (CIA, Figure 1-1) contains portions of the shallow sand aquifer upgradient of the WIA and NIA. Remediation efforts in the CIA have targeted mass reduction of toluene via use of a soil vapor extraction system and mass reduction of DPO via use of Waterloo Emitters™; a device intended to provide controlled release of oxygen to groundwater to enhance biodegradation. The soil vapor extraction system was successful in achieving the intended toluene removal goal and was closed with the approval of Ecology in December 2013. The Waterloo Emitter™ system was closed following Emerald's request and Ecology approval in May 2017. Gauging data has shown the CIA potentiometric gradient to be shallow and at times to reverse gradient direction. CIA data is reported in the NIA and WIA data tables and maps according to the shallow sand aquifer groundwater flow direction at the wells (northerly [NIA] and westerly [WIA]).

1.2.3 West Impacted Area

The WIA remediation has consisted of two components (Figure 1-1):

- Two shallow interception trenches (identified as north and south) parallel to the river in the upper sand aquifer. This portion of the WIA remediation has reached CUL and was shut down with Ecology approval in November 2018.
- A groundwater capture system comprised of ten recovery wells with submersible pumps in the intermediate sand aquifer (separate and below the shallow sand aquifer) and aligned parallel to the river (ISRW system).

Summaries of WIA systems are provided in the following subsections.

1.2.3.1 WIA Shallow Interception Trench

The WIA shallow interception trench system was constructed as an ICM during November 1997. The system is comprised of a south and a north trench each with sump and pump. The system objective was to collect contaminated groundwater (originally focused on toluene) from the upper sand aquifer, preventing discharge to the Columbia River. Toluene has been below the CUL since 2008. With the absence of toluene, DPO was the only constituent that continued to be detected but has been below the CUL since 2013 in the North sump and 2011 in the South sump. Based on the below CUL concentrations and lack of constituent mass, EKC requested Ecology approval to cease operation of the trenches. Ecology approved EKC's request in the November 14, 2018 recommended changes to system operations letter. Per EKC's proposal and Ecology's approval the WIA shallow trench system

remains in place and operable but is no longer operated unless future groundwater data indicates a reason to restart the system.

1.2.3.2 WIA Intermediate Sand Recovery Wells (ISRW)

The ISRW system is the most active remaining remedial system at the site. The system consists of ten intermediate sand recovery wells (ISRW's); wells one through seven were installed as an ICM during April 1997, and eight through ten added pursuant to the CAP during February 2009. The system objective is to minimize discharge of benzene and toluene affected intermediate sand aquifer groundwater to the Columbia River and reduce the mass of these constituents in the aquifer. This is accomplished by maintaining an inward gradient to the recovery wells from upgradient and somewhat from the river. Submersible pumps in the recovery wells transfer water to the Emerald low COD ModuTank (Fig 1-1) which discharges to the wastewater treatment plant.

The ISRW benzene and toluene data set indicates decreasing concentrations and areal extent at the upgradient (east), north and south boundaries of the alignment, and somewhat more consistent concentrations in the central area. Emerald continues to utilize the collected data to focus ISRW operations on constituent mass removal and minimizing discharge to the river. The ISRW wells pumped 987,000 gallons of water to the EKC water treatment plant in 2022 – 2023 resulting in the removal of 280 pounds of toluene and 0.5 pounds of benzene.

1.3 Report Format

The NIA area groundwater monitoring and interception trench performance is described in Section 2. The WIA shallow groundwater monitoring is described in Section 3. The WIA intermediate sand groundwater monitoring and ISRW system performance is described in Section 4. References are provided in Section 5.

Supporting documentation includes Appendix A – potentiometric surface water level data tables, Appendix B - laboratory analytical reports (transmitted via e-file with e-copy of this report), and Appendix C – ISRW benzene and toluene concentration trend charts.

A PDF of this entire document has also been transmitted via email e-file.

1.4 Ecology Periodic Review Requested Tasks

In accordance with the CD Ecology conducted a review of " ….post-cleanup Site conditions and monitoring data to assure human health and the environment are being protected…." at the Kalama site. The results of this review are provided in Ecology's "Periodic Review" document dated October 2022.

Section 4.0 "Conclusions" of the Periodic Review lists the following statements:

- "The cleanup actions completed at the Site still appear to be protective of human health and the environment."
- "Cleanup actions for the WIA, NIA, and CIA continue to eliminate exposure to contaminated soils and groundwater."
- "The cleanup actions have been determined to comply with MTCA cleanup standards."
- "The Covenant recorded for the property in 2008 is in place and continues to be effective in protecting human health and the environment from exposure to hazardous substances and in protecting the integrity of the cleanup action."
- The conclusions also list Emerald requested and Ecology approved changes to the groundwater monitoring program, and the Waterloo Emitter system.

Ecology requested three tasks for Emerald to perform and report in this 2022-23 annual report:

1. Take one sample each from the North and South sumps of the WIA trenches for benzene, toluene, biphenyl, bis (2-ethylhexyl) phthalate, and DPO.
   This task was completed by EKC and re-confirmed the below CUL data that was the basis of shutdown of the WIA north and south trench pumps; this is further reported in Section 3.4.3.

2. Evaluate whether the ISRW system adequately captures groundwater contamination with respect to river in-flow, specifically if well MW-243 is located such that if river in-flow allows groundwater contamination to extend beyond the ISRW system, groundwater sampling at well MW-243 would show the contamination moving beyond the ISRW system.
   This task was completed by EKC with the conclusion that MW-243 is well positioned as further discussed in Section 4.2.

3. Evaluate whether the ISRW system is adequately reducing the contaminant mass in the intermediate sand aquifer and provide restoration time frames for the WIA shallow and intermediate sand aquifers according to the procedures in WAC 173-340-360."
   This task was completed by EKC including review of the 53,000 pounds of toluene removed since ICM startup (1997) and the 108 pounds of benzene removed since 2011 (not quantified in earlier years); the shut-down of shallow WIA remedial systems due to achievement of CULs; and clarification of the 30-year presumptive timeframe for the intermediate sand aquifer ISRW system. Further detail and discussion of this task are provided in Section 4.4.1.

2.0 NIA Well Monitoring & Interception Trench System

In the NIA, the upper sand aquifer consists of approximately 9 to 17 feet of hydraulically placed sand fill overlying 3 to 7 feet of interbedded sands and silts. The upper sand aquifer is the uppermost hydrostratigraphic unit at the facility. The NIA interception trench is approximately 1,500 feet long and is constructed to variable depths such that it extends to the top of the underlying upper silt (collects groundwater from the shallow formation above the silt). The trench includes two collection sumps: an east sump collecting from approximately 950 feet of the trench, and a west sump collecting from the remaining approximately 550 feet of trench. Water from the sumps is pumped to the Emerald Low/High COD ModuTanks and then to the Emerald wastewater treatment system. The base and downgradient faces of the trench are lined with an impermeable geosynthetic liner. The liner contains groundwater within the trench and reduces the inflow of standing water that may be seasonally present in a wetland downgradient (north) of the trench.

2.1 Monitoring Program Description

The monitoring plan for the upper sand aquifer NIA interception trench consists of three primary components:

1. Collection of data to evaluate the ongoing groundwater quality in the NIA.
2. Collection of groundwater elevation data to monitor ongoing flow direction and gradient in the NIA including the barrier trench and sumps.
3. Visual inspection of ground surface integrity to assure no erosion or other damage of the length of interception trench.

The NIA monitoring program scope is described in the following sections and summarized in Table 2-1. All NIA monitoring locations are provided in Figure 2-1.

2.2 Visual Inspection of Integrity of NIA Trench

The entire 1,500-foot length of the NIA trench and barrier wall was inspected for ground surface indications of damage, leaks, or erosion during the April 2023 groundwater sampling event. This inspection involved walking the top of the soil berm above the barrier wall / trench alignment. No indications of damage, leaks or erosion were observed. The entire length is heavily vegetated, firm, and well established. As in the past, the inspection included removing areas of downed trees and brush presenting obstructions to trench operation and monitoring locations.

2.3 Groundwater Levels and Flow

NIA groundwater levels are measured annually (during the April monitoring event) at the following locations:

- Shallow (upper) sand monitor wells and piezometers (KC-8, KC-9, KC-21, KC-23, PZ-102, PDW-117, MW-210, MW-230, MW-232, MW-245, and MW-256) located upgradient of the trench. These locations include NIA and CIA areas from which groundwater is generally flowing northerly towards the NIA barrier and recovery trench.
- Three piezometers (NTP-1, NTP-2, NTP-3) along the length of the trench that monitor groundwater elevations in the trench.
- Wetland staff gauge.

Tables B NIA and CIA (Appendix A) summarize the groundwater and wetland elevation data. The data were used to construct a shallow sand potentiometric surface map (Figure 2-1) for April 2023.

The wetland staff gauge indicated a water depth of 1.8-feet during the April 2023 monitoring event. This is in the typical range of historical data for the wetland during spring-runoff. As shown on Figure 2-1 water elevations in the trench were below up-gradient groundwater elevations indicating the ongoing normal operation of the trench.

NIA aquifer groundwater flow is towards the north (Figure 2-1) and is consistent with historical monitoring results. The groundwater gradient is shallow in the CIA region of northerly flow and steepens as it approaches the containment recovery trench. The overall average northerly gradient was 0.006 ft/ft.

2.4 Groundwater Quality

The NIA groundwater quality monitoring network is comprised of four wells (MW-245, MW-256, PDW-117, and KC-9), and the east and west NIA trench sumps.

Monitoring results are described below and presented in Table 2-2. Areal distributions for benzene and DPO are provided on Figures 2-2 and 2-3 respectively and include an overlay of the potentiometric contours. Laboratory data reports are provided in Appendix B (e-file).

2.4.1 Sampling and Analytical Procedures

All sampling and laboratory analyses were completed in accordance with the *Sampling and Analysis Plan* (SAP; RETEC 2004c). The April 2023 samples were submitted to ALS Laboratories (Kelso, WA). The following analytical methods we utilized per the sample requirements (Table 2-1):

- Volatile organic compounds (VOCs) [benzene and toluene] using EPA Method 8260C.
- Semi-volatile organic compounds (SVOCs) [diphenyl oxide (DPO), and biphenyl (east and west sumps only)] using EPA Method 8270D.

2.4.2 Upper Sand Aquifer Sampling Results

The analytical results are detailed on Table 2-2. Benzene was detected above the CUL (1.2 ug/L) at one location (west sump [2.3 ug/L]). DPO was detected above the CUL (410 ug/L) at three locations (west sump [410 ug/L], PDW-117 [1,900 ug/L] & KC-9 [1,800 ug/L]). Figures 2-2 (benzene) and 2-3 (DPO) provide areal map views of concentration data for these constituents. These data agree with historical location and concentration trends for the NIA. The east sump has typically shown below CUL / ND results, with the exception of benzene in 2020/2021 as discussed in prior reports. The west sump has typically shown above but near CUL results similar to the 2023 data. Wells PDW-117 and KC-9 DPO concentrations have been persistent similar to the 2023 results. Biphenyl is sampled in the sumps and results continued consistent at non-detect in the east sump and just above detection at 7.0 ug/L far below CUL (230 ug/L) in the west sump.

2.5 NIA Trench & Sump System Monitoring

The NIA interception trench system operated continuously throughout the monitoring period. Monitoring results are described below and summarized in Tables 2-3 and 2-4.

2.5.1 Groundwater Extraction

Table 2-3 summarizes the east and west sump pump operation data, the volume of water removed from the trench, and the average pumping rates during the 2022 - 2023 and past performance periods. Approximately 33 million gallons of water were pumped from the NIA interception trench

during 22/23. The 33-million-gallon total volume is above average of typical annual volumes (26.4 million gallons is annual average since 1999). The NIA trench water volumes are dependent on annual precipitation and the flows vary with wetter / drier seasons.

2.5.2 Mass Removal

Table 2-4 provides data for the east and west sump discharges and the approximate mass of contaminants removed during the 22/23 performance period. The contaminant mass calculations were determined by multiplying semi-annual sump sample concentration data by the cumulative pump discharge volume for the corresponding 6-month period. Approximately 0.2-pounds of benzene, 0.1-pounds of toluene, and 93 pounds of DPO were removed during this reporting period.

As discussed in Section 2.4.2, the concentrations of benzene, toluene and DPO in the NIA have decreased over the system operating time frame. The annual quantities of benzene, toluene and DPO removed from the 2007-2008 monitoring period to present are summarized in the table below. Historical soil vapor extraction system operations also played a role in the NIA VOC reductions as shown by the significant reductions in benzene and toluene mass removals (and analytical sample concentrations) in the earlier years of NIA operations.

Performance Period	Benzene removed (lbs)	Toluene removed (lbs)	DPO removed (lbs)
2022-23	0.2	0.1	93
2021-22	0.2	0	39
2020-21	4.2	0.3	103.3
2019-20	0.5	0.5	89.9
2018-19	0.9	0.5	82.7
2017-18	1.5	0.7	97.8
2016-17	4.5	2.9	58.9
2015-16	3.5	2.4	35.1
2014-15	3.2	3.4	91.3
2013-14	5.4	7.5	90.1
2012-13	5.1	7.8	103.5
2011-12	6.4	24.0	98.0
2010-11	7.6	16.6	105
2009-10	6.0	38.1	103
2008-09	6.6	46.1	127
2007-08	26.4	254	207
Total	**82**	**405**	**1,525**

2.5.3 System Maintenance

EKC has maintained system flows via regular maintenance including pipe cleaning using compressed air agitation and line-pigging. Other significant maintenance efforts conducted from time to time as needed include vacuum removal of sediments from the sump bottoms, flushing the NIA trench collection pipe, replacing old PVC piping with stainless steel piping, and replacing/repairing pumps. In addition, the sump areas and outlying NIA wells and piezometers are maintained with tree and brush clearing for access along with paint and label identification upkeep.

2.6 Performance Evaluation

The NIA data set dating back to October 2007 is indicative of the groundwater constituent plume being in a state of ongoing intrinsic biodegradation, decreasing constituent concentrations, and continued recovery trench operation to contain any residuals that may eventually migrate to the trench. The trench system continues to fulfill its purpose of hydraulic control of the NIA, preventing discharge of groundwater from the upper sand aquifer to the wetland.

2.7 Recommended Changes to NIA Operation / Monitoring

No changes are proposed for the NIA operations and monitoring program.

3.0 WIA Shallow Wells & Interception Trench System

3.1 Monitoring Program Description

The WIA shallow well monitoring is described in the following sections and summarized in Table 3-1. All monitoring locations are shown on Figure 2-1. The monitoring plan for the shallow WIA wells consists of two primary components:

1) collection of water elevation data to define groundwater flow direction and gradient, and

2) collection of water quality data to evaluate the occurrence and movement, if any, of dissolved residual constituents of interest.

3.2 Groundwater Levels and Flow

Water levels are measured annually at the following upper sand (shallow) locations:

- KC-24R, PZ-104, PZ-107, USRW-2, KC-13, MW-238, MW-255, PZ-110, and the North and South trench sumps.

Table B-4 (Appendix A) summarizes annual groundwater elevation data. The data were used to construct the shallow potentiometric surface map for April 2023 (Figure 2-1).

3.3 WIA Upper Sand Aquifer Groundwater Flow

In the WIA, groundwater flow within the upper sand aquifer is westerly from a nearly flat gradient in the PZ-104 / -107 / MW-230 area to the westerly USRW-2 / MW-255 area (Figure 2-1). The average hydraulic gradient across this area is 0.007 ft/ft.

3.4 WIA Upper Sand Groundwater Quality

Groundwater samples were collected from WIA upper sand wells USRW-2, PZ-104, and PZ-107. In addition, a one-time sampling of the north and south sumps was completed as requested by Ecology and is reported in Section 3.4.3.

3.4.1 Sampling and Analytical Procedures

All sampling and laboratory analyses were completed in accordance with the SAP and analyte revisions approved by Ecology. The April 2023 samples were submitted to ALS Laboratories (Kelso, WA). Samples were analyzed using one or both of the following methods per the sample analytical requirement (Table 3-1):

- Volatile organic compounds (VOCs) [benzene and toluene] using EPA Method 8260C.
- Semi-volatile organic compounds (SVOCs) [DPO, biphenyl, and bis(2-ethylhexyl) phthalate] using EPA Method 8270D.

Laboratory data are included in Appendix B (e-file).

3.4.2 Upper Sand Aquifer Sampling Results

The WIA upper sand data are summarized in Table 3-2 and shown on Figures 2-3 (benzene) and 2-4 (DPO).

DPO concentrations in the area of the WIA shallow trench (USRW-2) agree with the 21/22 results indicating non-detect (<1.0 ug/L). USRW-2 DPO concentrations have been below the CUL (410 ug/L) since 2013 with one exception in 2015. The data set continues to support the approved November 2018 shutdown of the WIA Shallow Trench System (Section 3.4.3 provides results of a one-time Ecology requested additional sampling of the north and south sumps).

Over 300-feet upgradient of the WIA trenches, in the shallow westerly flow gradient portion of the CIA area, wells PZ-104 and PZ-107 continue to show detections of DPO and biphenyl. The concentration of DPO at PZ-104 has been relatively consistent over time and indicated 2,900 ug/L in April 2023. PZ-107 indicated 480 ug/L DPO in April 2023, which is above recent below CUL concentrations but below more historical results. Biphenyl concentrations continued below the CUL (230 ug/L) at both wells with 40 ug/L at PZ-104 and 150 ug/L at PZ-107.

Benzene concentrations followed recent results at both wells with just above the CUL at PZ-104 (2.3 ug/L) and non-detect at PZ-107 (<0.50 ug/L). Toluene has never been detected at PZ-104 (excepting a one-time 6.8 ug/L detection in 2018), and far below the CUL at PZ-107 since 2013 with non-detects in more recent data.

Bis (2-ethylhexyl) phthalate was detected in both PZ-104 and PZ-107 samples and the laboratory blank at very similar concentrations (2.5 / 2.7 ug/L). Based on the overall data-set absence of bis (2-ethylhexyl) phthalate at both wells, EKC proposes that continued monitoring of this analyte is not warranted as further discussed in Section 3.6.

3.4.3 One-Time Re-Sampling of WIA North and South Sumps

Ecology requested that EKC collect one sample each from the WIA north and south sumps for benzene, toluene, biphenyl, bis (2-ethylhexyl) phthalate and DPO analysis. Ecology indicated this request was to confirm Ecology's prior decision to reduce sampling and cease operation of the shallow WIA trench pumps.

The north and south sump samples were collected on October 18, 2022 including a duplicate of the south sample. Table 3-2 includes the north and south sump data sets; the October 18, 2022 data confirms the historical data and decision to cease operation of the sumps. Benzene, toluene, and biphenyl were non-detect in the north and south samples as had been seen in historical samples. DPO was detected at 110 ug/L in the north sump, and 6.2 ug/L in the south sump (5.1 ug/L in the duplicate). These DPO results are below historical concentrations at both sumps. Bis (2-ethylhexyl) phthalate is shown at 2.0 ug/L in both samples and was also shown in the lab blank.

3.5 WIA Shallow Trench Operations

The WIA shallow interception trench system was recommended to be shut down in the 2017-18 Annual Report and Ecology approved this recommendation in the November 14, 2018, Recommended Changes letter. Pumping of the shallow trench ceased on November 28, 2018. In accordance with Ecology's approval the system remains in place and available for future operations if indicated by future monitoring.

3.6 Recommended Changes to WIA Shallow Monitoring

EKC proposes that bis (2-ethylhexyl) phthalate (DEHP) be removed from the laboratory analyte list for wells PZ-104 and PZ-107. As shown on Table 3-2, there are two CUL exceedances of DEHP at PZ-104 since 2009 and both appear anomalous as the one-time concentrations are two orders of magnitude outside the consistently non-detect concentrations prior and after the detections. PZ-107 has an early history of DEHP CUL exceedances (2010 – 2015) but has been below the CUL since

2015 with one exception in 2017 and now the April 2023 result that also finds DEHP in the laboratory blank. In addition, due to the lack of DEHP at downgradient locations USRW-2 and the north and south trenches, DEHP monitoring at these locations was approved for removal since 2015. EKC does not believe there is a constructive benefit to continued monitoring of DEHP at PZ-104 and PZ-107.

4.0 WIA Intermediate Sand System

The ISRW system includes 10 recovery wells (ISRW-1 through ISRW-10). Seven of the recovery wells (ISRW-1 through ISRW- 7) were installed as part of interim corrective measures (ICM) in February and March 1997. Recovery wells ISRW-1, ISRW-2b, ISRW-3, and ISRW-4 began operation during April 1997; groundwater modeling provided in the ICM Scope of Work (RETEC, 1986) indicated pumping these four wells at one gallon per minute would capture the targeted intermediate sand aquifer flow. Subsequent operation data (ICM Annual Report, RETEC 1998) confirmed the modeled design basis, however at the request of Ecology, pumping of recovery wells ISRW-5, ISRW-6, and ISRW-7 was added during November and December 1997; this was done for added groundwater capture protection and operational backup redundancy of the system. Recovery wells ISRW-8, ISRW-9, and ISRW-10 were then added during February 2009 pursuant to the CAP and began operation during March 2009. These additional wells were requested by Ecology to further ensure containment capability and redundancy.

An important ISRW operations understanding is that the 10-well system provides significant capture zone overlap and dewatering redundancy. As a result, the capture alignment is maintained even in the event of some ISRW's being temporarily off-line; for example, ISRW-1, -2, -3, and -4 captured the entire targeted alignment on their own when first constructed as documented in Section 4 of the 1998 ICM Annual Report (RETEC, 1998). EKC continues to maintain the system in a manner to keep all wells operational and maximize benzene and toluene mass removal.

4.1 Monitoring Program Description

The monitoring plan for the WIA intermediate sand recovery well (ISRW) system consists of the following components: 1) weekly monitoring of recovery system operation and water volume production with appropriate operation adjustments; 2) semi-annual sampling of recovery wells discharge water quality; and 3) semi-annual water quality sampling and water elevation gauging of monitoring wells. WIA intermediate sand monitoring is described in the following sections and is summarized in Table 4-1.

In 2018 EKC elected to voluntarily increase the sampling frequency at the 10 ISRW wells from semi-annual to quarterly. The additional ISRW data are to assist in focusing benzene and toluene mass removal efforts at the ISRW wells as described further in the following sections.

4.2 Groundwater and River Elevations and Groundwater Flow

Intermediate sand aquifer groundwater elevations were measured quarterly in July & October 2022, and January and April 2023. Groundwater elevations are recorded at the following locations:

- Recovery wells ISRW-1 through ISRW-10
- Monitoring wells KC-6, KC-14, MW-239, MW-243, and MW-250
- Piezometers PZ-117 and PZ-118

Table B Intermediate Sand (Appendix A) summarizes the quarterly groundwater elevation data. The data was used to construct WIA potentiometric surface maps quarterly for the intermediate sand zone (Figures 4-1 through 4-4). As shown on Figures 4-1 through 4-4, the ISRW well alignment maintains an inward groundwater depression capturing intermediate sand groundwater and some portion of river water. The ISRW system is designed and operated to maintain ISRW well pumping elevations below the river elevation and thereby maintain some inward gradient from the river.

Ecology October 2022 Periodic Review Task 2 – ISRW Flow / MW-243

Ecology's Periodic Review document (October 2022) requested evaluation of "…whether the ISRW system adequately captures groundwater contamination with respect to river in-flow, specifically if well MW-243 is located such that if river in-flow allows groundwater contamination to extend beyond the ISRW system, groundwater sampling at well MW-243 would show the contamination moving beyond the ISRW system."

The existence or actuality of river in-flow is not something that EKC has observed, but EKC has considered in the past that aquifer conditions in the area of well ISRW-7 may provide more availability of river water to this well when the pump is active. Per Ecology's request, EKC evaluated the theoretical condition of a northerly water flow from the ISRW pumping alignment (a water flow that would pass several ISRW pump locations with groundwater elevations several feet below the naturally occurring water elevation). In this theoretical condition, as the water moved north of the ISRW alignment it would be increasingly influenced by the westerly flow of the intermediate sand aquifer outside of the ISRW area toward the river. The combined flow would then have a northwesterly gradient and well MW-243 is appropriately located for such an event.

4.3 Groundwater Quality

Groundwater samples were collected semi-annually (October and April) from 10 recovery wells (ISRW-1 through ISRW-10) and four monitoring wells: KC-14, MW-239, MW-243, and MW-250. Laboratory data reports are included in Appendix B (e-file). As noted earlier, EKC also elected to continue to collect two additional rounds (January and July) of groundwater samples for benzene and toluene analysis from just the 10 ISRW wells resulting in quarterly data for the ISRW wells.

4.3.1 Sampling and Analytical Procedures

All monitoring program sampling and laboratory analyses were completed in accordance with the SAP (RETEC 2004c), and Ecology approved revisions reported in past Annual Reports. All samples were submitted to ALS Laboratories (Kelso, WA) with all analyses being conducted using EPA Method 8260C (as noted on Table 4-2).

4.3.2 Intermediate Sand Aquifer Sampling Results

The monitor well and ISRW groundwater quality analytical results are summarized in Table 4-2, and Figures 4-5 (benzene) and 4-6 (toluene). In summary, the 2022-23 data set compares similarly with the recent past few years at the respective wells and the overall trends for the ISRW area. Benzene and toluene concentration trend charts for each of the ISRW wells are provided in Appendix C and help visualization of concentration trends. Several specific notes include:

Five of the ISRW Wells (1 & 2, 4 & 7, and 6) located at the up-gradient (east), southern, and northern plume boundaries respectively, indicate reduced concentrations and receding of the plume:

1. ISRW's 1&2 both indicate significant decreasing concentration averages over the sampling timeframe. ISRW's 1&2 are located on the upgradient (east) side of the original plume – adjacent to the original recovery trench believed to have provided the conduit for contaminant mass to the intermediate sand. The significantly dropping concentrations at these wells indicates reduction of the plume from the origination upgradient area.
2. ISRW-7 is the southern boundary of the ISRW alignment and concentrations have dropped from one- to two-orders of magnitude above CULs to consistently below CUL / ND for both

benzene and toluene for several years now. ISRW-4 is north and closer to the river from ISRW-7. ISRW-4 concentrations have dropped over the sampling period (significantly from early operations), and more recently vary above/below CULs. The ISRW-7 & 4 data indicate reduction of the plume from the original southern boundary area.

3. ISRW-6 is located at the northern boundary of the ISRW alignment. ISRW-6 concentrations have also dropped significantly from early operations, and more recently vary above/below CUL. The ISRW-6 concentration variations do not suggest near term shut-down but are indicative of a well on the plume boundary including below CUL results.

The remaining five ISRW wells (10, 5, 9, 3, and 8, moving south to north along the river) are located centrally in the plume area and continue comparatively higher mass removal:

1. ISRW's 5, 9, and 10 concentration averages are similar over the sampling timeframe – these wells are centrally located in the plume alignment and can be expected to maintain higher contaminant concentrations and mass removals.
2. ISRW's 3 and 8 concentrations are also similar over the sampling timeframe. LNAPL was occasionally reported in ISRW-3 during the ICM operations timeframe (1997 – 2007). ICM and dispute resolution documents suggest ISRW-3 and -8 are located in an area of the intermediate sand with a "sand dome" creating a possible collection area for LNAPL during the original spill timeframe. Based on their location in the plume, these wells are expected to be later in showing significant concentration reductions.

During the 22/23 monitoring period, three of the four intermediate sand monitoring network wells (MW-243, KC-14, MW-250) indicate non-detect results for benzene and toluene. These results agree with the historical data at these wells. Monitor well MW-239 results were above the CUL (1.2 ug/L) for benzene for both the fall (22 ug/L) and spring (5.7 ug/L) sample events, but notably below historical concentrations that were often above 100 ug/L. The MW-239 toluene fall 2022 result is equivalent to the CUL (2,000 ug/L) and the spring 2023 result is far below the CUL at 82 ug/L. These toluene results for MW-239 are also notably below historical concentrations and continue what may become a trend since fall 2021.

4.4 ISRW System Description and Performance

The following sections provide a description of the ISRW system operations and performance.

4.4.1 ISRW Mass Removal

Table 4-3 presents the ISRW water extraction volumes for the monitoring period including the total volume of groundwater pumped from each well. As shown, approximately 1-million gallons of groundwater were extracted from the WIA intermediate sand aquifer during the 2022–2023 performance period. Table 4-4 combines the 2022 – 2023 groundwater extraction volumes and average benzene and toluene concentrations to calculate the mass removals for the ISRW wells. Approximately 0.5-pounds of benzene and 280 pounds of toluene were removed during the 2022-2023 performance period.

Based on statements from historical reports and calculation of more recent data, estimated benzene and toluene removals to date:

Toluene Removed Since ISRW Startup April 1997: 52,826 pounds

Benzene Removed Since 2011 (earlier data not specific): 108 pounds

Table 4-5 provides a partial selection of annual water extraction volumes and mass removals for several years of system operations dating back to 1997-1998. Please note this table is NOT all inclusive for all years, but is helpful for year to year numeric comparison. The Table 4-5 data over time indicates that the annual mass contaminant removals are decreasing, as expected with the decreasing VOC concentrations compared to earlier years of operations. The Table 4-5 data also indicates that the volume of water extracted has been decreasing over the period of operations. The lower extraction volumes are associated with multiple factors including below average precipitation for several years dating back to 2010, the more recent shut-down of ISRW-7 due to below CUL and non-detect results (ISRW-7 previously pumped 600,000 gallons of water in 2018 for example), and the continued pumping of the somewhat isolated intermediate sand has reduced the overall available water volume.

Ecology October 2022 Periodic Review Task 3 – ISRW Restoration Time Frame

Ecology's Periodic Review document (October 2022) requested evaluation of "….whether the ISRW system is adequately reducing the contaminant mass in the intermediate sand aquifer, and provide restoration time frames for the WIA shallow and intermediate sand aquifers according to the procedures in WAC 173-340-360."

The data provided in Sections 4.3.2 and 4.4.1 indicate successful ongoing mass removal by the ISRW system. Section 4.3.2 and the referenced concentration trend charts (Appendix C) show half the ISRW wells (five of the ten) indicate decreasing benzene and toluene concentrations over the operational timeframe to date. These wells represent the up-gradient, north, and south boundaries of the ISRW alignment. The remaining five wells continue successful mass removal as designed. Section 4.3.2 references nearly 53,000 pounds of toluene removed since the 1997 system start-up. Benzene removal is less confidently calculable as early year samples were not quantified due to interference from elevated toluene concentrations; however, since 2011 it is estimated 108 pounds of benzene (which exists at much lower concentrations compared to toluene) have been removed.

The shallow WIA is below CULs (WIA shallow trench system is off, re-sampled fall 2022, and continued below CULs). The shallow WIA area was remedied by a combination of SVE and the shallow aquifer containment trench / sump system. These systems remediated the area as intended to below CUL concentrations, Ecology approved shut-down of these systems, and this was re-confirmed with no indication of rebound with the fall 2022 sampling.

The restoration timeframe for the intermediate sand ISRW system is the presumptive 30-year period for pump and treat systems as included in the December 2003 Final FS cost estimate (RETEC). These FS cost values are referenced in the CAP and are utilized for the financial assurance requirements of the CD. Unfortunately, there is confusion in the historical documents between different aquifers and referenced restoration timeframes. For example, the CAP discusses reasonable restoration timeframe and includes the comment "…groundwater treatment is expected to last 11 to 15 years…." and references modeling provided in Appendix B of the CAP. The model in Appendix B of the CAP specifies the shallow aquifer, but not the intermediate sand. The possible inclusion of the 11 to 15-year timeframe for the intermediate

sand aquifer in the CAP is an oversight as Appendix B specifically states that estimating is for the shallow aquifer.

4.4.2 ISRW System Maintenance

The ISRW system operated continuously throughout the monitoring period, except during short-duration individual well shutdowns (typically 1 – 2 hours for an individual well while other wells continue to operate). The ISRW maintenance activities for the current reporting period included:

- Pump and float removal, cleaning, and reinstallation. This maintenance is conducted on an approximately monthly per well rolling schedule.
- As-needed replacement of electrical system fuses, capacitors, level floats, totalizers, and power cables due to normal wear.
- Replacement of submersible pumps and/or motors when required – typically due to wear of bearings, pump mechanisms, and pump motors.
- Ongoing maintenance of above ground apparatus including well-heads, hoses, and connections.

These ongoing maintenance efforts have ensured continued uninterrupted operation of the ISRW system.

4.4.3 ISRW Future Operations Plan

The WIA ISRW system continues to minimize discharge of affected intermediate sand groundwater to the Columbia River and reduce the mass of constituents in the aquifer. Ongoing appropriate system monitoring and maintenance will continue to minimize pump down times and equipment replacement requirements.

ISRW operations will continue much as they have in the recent past. ISRW-7 is currently shut-down and expected to remain that way unless groundwater samples return to above CULs. EKC will continue to operate the system in accordance with the requirements and goals described herein.

4.5 Recommended Changes to System Operation

EKC is not proposing any revisions to the ISRW operations and monitoring program.

5.0 References

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RETEC, 2004c. *Sampling and Analysis Plan*. Prepared for Noveon Kalama, Inc., and Rogers Sugar Ltd., by the RETEC Group, Inc., Seattle, Washington. April 21.

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ThermoRetec, 2000. *Remedial Investigation, Revision 2.* Prepared for BFGoodrich Kalama, Inc., and Rogers Sugar, Ltd., by ThermoRetec Consulting Corporation, Seattle, Washington. December 15.

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Tables

Table 2-1
NIA Monitoring Program 2022 - 2023
Emerald Kalama Chemical, Kalama, WA

Well Location	Sampling Frequency	Field Parameters	Analytical Parameters	Gauging Frequency
NTP-1, NTP-2, NTP-3, KC-8, KC-9, KC-21, KC-23, MW-210, MW-232, MW-230, PZ-102, PDW-117, MW-245, MW-256, Wetland Staff Gauge	—	—	—	Annually
East Sump, West Sump	Semiannually	—	Benzene, Toluene, Biphenyl, DPO	
KC-9, PDW-117	Annually	Temperature, pH, ORP, conductivity, turbidity, DO	Benzene, Toluene, DPO	
MW-245, MW-256	Annually	Temperature, pH, ORP, conductivity, turbidity, DO	DPO	
Observation Walk Length of NIA Containment Trench Ground Surface	Annually	Visual observation for surface damage that may impact trench & subsurface containment berm	—	—

Notes:
DO = dissolved oxygen; ORP = oxidation reduction potential; NIA = North Impacted Area; DEHP / Bis(2-ethylhexyl)phthalate not required at MW-232, -245 & -256 Ecy 112916 & 111418; DPO = Diphenyl Oxide; biphenyl add NIA E&W, remove -210, -231, -230, -9, -117 Ecy 111418. Cease sampling MW-210 & -232 (continue gauging) Ecy 111418.

Table 2-2
NIA Groundwater Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
MW-210	10/20/2009	**51**	< 1.0	< 9.6 J	**74**	< 0.96	**1,800**	**19**
	4/22/2010	**23**	< 1.0	<10 J	**79**	< 1.0	**820**	**27**
	10/21/2010	**22**	< 1.0	< 9.8	**39**	<0.98	**1,700**	**17**
	10/10/2011	**7.7**	< 1.0	<9.3	**100**	**<2.4**	**1,400**	**11**
	4/18/2012	**16**	< 1.0	**9.6**	**150**	<0.93	**990**	**40**
	11/8/2012	**5.7**	< 1.0	<9.5 UJ	**21**	<0.95	**850**	**4.8**
	4/11/2013	**1.5**	< 1.0	<9.5	**10**	<0.95	**580**	**4.9**
	10/15/2013	< 1.0	< 1.0	<9.9 UJ	<0.99	<0.99	**250**	**7.6**
	4/16/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**490**	<1.9
	10/23/2014	< 0.060	< 0.11	< 0.39 H	< 0.095 H	< 0.26 H	**590 H**	**1.2 JH**
	4/22/2015	< 0.42	< 0.44	< 0.39	< 0.095	**1.2 JB**	**330**	**2.2 J**
	10/20/2015	< 1.0	< 1.0	< 9.5	< 0.95	< 0.95	**1,500 D**	**14**
	4/13/2016	< 1.0	< 1.0	< 9.5	< 0.95	< 0.95	**44**	**8.5**
	10/28/2016	< 1.0	< 1.0	NA	**1.6**	NA	**780 D**	NA
	4/11/2017	< 0.50	< 1.0	NA	**1.8**	NA	**32**	NA
	10/5/2017	< 0.50	< 1.0	NA	< 0.97	NA	**210**	NA
	4/26/2018	< 1.0	< 1.0	NA	< 0.96	NA	**88**	NA
	10/2/2018	< 0.30	< 1.0	NA	< 0.47	NA	**654 D**	NA
		MW-210 Ecy Approved Cease Sampling, Continue Water Level Gauging 11-14-18						
MW-230	10/22/2009	**32**	**9.9**	**91 J**	**380**	**1.7**	**520**	**12**
	4/23/2010	**18**	**5.9**	**< 200 J**	**350**	**<20**	**390**	**93**
	10/20/2010	**23**	**5.2**	**74**	**470**	**6.8**	**590**	**44**
	10/11/2011	**44**	**5.2**	**22**	**450**	**<2.4**	**460**	**27**
	4/18/2012	**10**	**1.3**	**180**	**160**	<0.95	**220**	**38**
	11/7/2012	**16**	**2.7**	**30 J**	**130**	<0.95	**220**	**48**
	4/11/2013	**31**	**5.4**	**130**	**160**	<0.95	**240**	**39**
	10/16/2013	**8.8**	**8.0**	**79,000 J**	**170**	<1.1	**420**	**210**
	4/15/2014	**7.9**	**6.0**	<48	**500**	**<4.8**	**520**	**22**
	10/23/2014	**6.4**	**1.2**	< 0.39 H	**490 H**	< 0.26 H	**690 H**	**22 H**
	10/23/2014 Dup	**4.8**	**0.87 J**	**9.3 JH**	**520 H**	< 0.26 H	**690 H**	**23 H**
	4/22/2015	**14**	**0.90 J**	**28**	**250**	**2.5 JB**	**320**	**20 J**
	10/21/2015	**7.4**	**3.8**	< 9.5	**150**	< 0.95	**480 D**	**7.4**
	10/21/2015 Dup	**7.5**	**3.6**	< 9.5	**160**	< 0.95	**400 D**	**6.8**
	4/12/2016	**11**	< 1.0	**15**	**200**	< 0.95	**260 D**	**11**
	10/28/2016	**10**	**1.0**	**60**	**190**	< 0.95	**450 D**	**51**
	10/28/2016 Dup	**11**	**1.0**	**64**	**200**	<0.95	**420**	**45**
	4/11/2017	**2.4**	< 1.0	NA	**110 D**	NA	**180 D**	NA
	4/11/2017 Dup	**2.3**	< 1.0	NA	**99 D**	NA	**160 D**	NA
	10/5/2017	**7.0**	< 1.0	NA	**190**	NA	**240**	NA
	10/5/2017 Dup	**6.8**	< 1.0	NA	**160**	NA	**230**	NA
	4/25/2018	**1.4**	< 1.0	NA	**120**	NA	**120**	NA
	4/25/2018 Dup	**1.5**	< 1.0	NA	**130**	NA	**130**	NA
	10/2/2018	**1.8**	**1.6**	NA	**109 D**	NA	**192 D**	NA
	10/2/2018 Dup	**2.5**	**2.0**	NA	**89**	NA	**172**	NA
	4/15/2019	**0.98**	< 1.0	NA	NA	NA	**119 D**	NA
	4/15/2019 Dup	**0.64**	< 1.0	NA	NA	NA	**129 D**	NA
	10/15/2019	**1.75**	**1.99**	NA	NA	NA	**312**	NA
	4/9/2020	<0.300	<1.00	NA	NA	NA	**74.6 D**	NA
	10/20/2020	**1.70**	**1.13**	NA	NA	NA	**312 D**	NA
	4/12/2021	**1.18**	**1.82**	NA	NA	NA	**373 D**	NA
	10/6/2021	**2.18**	<1.00	NA	NA	NA	**375 D**	NA
	4/21/2022	<0.50 U	<0.50 U	NA	NA	NA	**110**	NA
		MW-230 Ecy Apprvd Cease Sampling, Continue Gauging 10-2022						
MW-231	10/22/2009	**110**	**68,000**	**30 J**	**840**	<0.95	**2,300**	**14**
	4/22/2010	**48**	**18,000**	**14 J**	**410**	<0.95	**920**	**4.7**
	10/20/2010	**110**	**48,000**	**23**	**260**	<0.96	**710**	**2.5**
	10/11/2011	**50**	**48,000**	**13**	**560**	**<2.4**	**1,700**	**44**
	4/18/2012	**5.3**	**1,200**	<9.5	**32**	<0.95	**110**	**4.0**
	11/8/2012	**75**	**23,100**	**15 J**	**210**	<0.95	**730**	**5.5**
	4/11/2013	**25**	**14,000**	**22**	**220**	<0.95	**930**	**14**
	10/16/2013	**13**	**15,000**	**230 J**	**240**	<0.95	**820**	**3.9**
	4/15/2014	**9.1**	**6,200**	<9.5	**77**	<0.95	**370**	**3.4**
	10/23/2014	**< 60**	**6,600**	< 0.39 H	**450 H**	**0.86 JH**	**2,200 H**	**3.5 JH**
	4/22/2015	**< 21**	**3,600**	< 0.39	**320**	**1.3 JB**	**1,700**	**2.6 J**
	4/22/2015 Dup	**< 100**	**3,800**	< 0.39	**300**	**1.4 JB**	**1,800**	**3.8 J**
	10/19/2015	**13 D**	**14,000 D**	**11**	**200**	< 0.95	**1,700 D**	**3.3**
	4/11/2016	< 1.0	**52**	< 9.5	< 0.95	< 0.95	**1.3**	< 1.9
	4/11/2016 Dup	< 1.0	**63**	< 9.5	< 0.95	< 0.95	**5.5**	< 1.9
	10/27/2016	< 2.0	**1,800 D**	NA	**160**	NA	**850 D**	NA
	4/10/2017	< 1.0	**13**	NA	**17**	NA	**67.0**	NA
	10/4/2017	< 0.50	**3,600 D**	NA	**370 D**	NA	**1,200 D**	NA
	4/26/2018	< 1.0	< 1.0	NA	**5.6**	NA	**26**	NA
	10/2/2018	1.0	**1,110 D**	NA	**163**	NA	**639**	NA
	4/12/2019	**16.1**	**61.9**	NA	NA	NA	**1060 D**	NA
	10/15/2019	**1.1**	**2.68**	NA	NA	NA	**1190 D**	NA
	4/9/2020	**1,370 D**	**57,800 D**	NA	NA	NA	**91.0 D**	NA
	5/12/2020	**0.590**	<1.00	NA	NA	NA	NA	NA
	5/12/2020 Dup	**0.540**	<1.00	NA	NA	NA	NA	NA
	10/20/2020	**0.710**	**2.88**	NA	NA	NA	**1,670 D**	NA
	10/20/2020 Dup	**0.770**	**3.22**	NA	NA	NA	**1,650 D**	NA
	4/13/2021	< 0.300	< 1.00	NA	NA	NA	**56.1**	NA
	4/13/2021 Dup	< 0.300	< 1.00	NA	NA	NA	**52.9**	NA
	10/6/2021	**0.370**	**3.65**	NA	NA	NA	**51.1 D**	NA
	4/21/2022	**0.56**	<0.50 U	NA	NA	NA	**45**	NA
		MW-231 Ecy Apprvd Cease Sampling & Gauging 10-2022						
MW-232	10/22/2009	< 1.0	< 1.0	< 9.7 J	<0.97	<0.97	**280**	**7.3**
	4/22/2010	< 1.0	< 1.0	<10 J	< 1.0	< 1.0	**220**	**9.2**
	10/20/2010	< 1.0	< 1.0	<9.6	<0.96	<0.96	**260**	**3.5**
	10/10/2011	<1.0	< 1.0	<9.3	<0.93	<0.93	**190 J**	**10 J**
	4/19/2012	<1.0	< 1.0	<9.5	<0.95	**<2.4**	**110**	**3.3**
	11/8/2012	<1.0	< 1.0	**<9.5 UJ**	<0.95	<0.95	**200**	**7.0**
	4/10/2013	<1.0	< 1.0	11	<0.95	**1.9**	**160**	**6.7**
	10/15/2013	<1.0	< 1.0	<10 UJ	<1.0	<1.0	**130**	**23**
	4/16/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**140**	8.3
	10/21/2014	< 0.06	NA	NA	NA	< 0.26	**92**	NA
	4/21/2015	< 0.42	NA	NA	NA	1.3 JB	**190**	NA
	10/20/2015	< 0.50	NA	NA	NA	< 0.95	**150**	NA
	4/13/2016	< 0.50	NA	NA	NA	< 0.95	**84**	NA
	10/27/2016	NA	NA	NA	NA	NA	**180**	NA
	4/11/2017	NA	NA	NA	NA	NA	**96**	NA
	10/5/2017	NA	NA	NA	NA	NA	**160**	NA
	4/25/2018	NA	NA	NA	NA	NA	**68**	NA
	10/1/2018	NA	NA	NA	NA	NA	**52 D**	NA
		MW-232 Ecy Approved Cease Sampling, Continue Water Level Gauging 11-14-18						

Table 2-2
NIA Groundwater Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
MW-245	10/25/2007	**4.4**	< 1.0	<10 UJ	< 1.0	< 1.0	**870**	**18**
	4/17/2008	**3.2**	< 1.0	<9.6 UJ	<0.96	<0.96	**1,600**	**23**
	10/24/2008	< 1	< 1.0	NA	<0.98	<0.98	**700**	**17**
	4/20/2009	< 1.0	< 1.0	< 9.6 J	<0.96	<0.96	**770**	**12**
	10/22/2009	< 1.0	< 1.0	**< 9.6 J**	<0.96	<0.96	400	**7.3**
	4/22/2010	< 1.0	< 1.0	< 9.0 J	<0.99	<0.99	**470**	**14**
	10/21/2010	< 1.0	< 1.0	< 10	< 1.0	< 1.0	**320**	**15**
	10/10/2011	<1.0	< 1.0	<9.3	<0.93	<0.93	**330 J**	**12 J**
	4/19/2012	<1.0	< 1.0	<9.5	<0.95	**<2.4**	**350**	**8.3**
	11/7/2012	<1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**180**	**2.1**
	4/10/2013	<1.0	< 1.0	<9.6	<0.96	<0.96	**260**	**7.5**
	10/16/2013	<1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**150**	**5.7**
	4/15/2014	< 1.0	< 1.0	<9.5	<0.95	**21**	**130**	3.0
	10/21/2014	< 0.06	NA	NA	NA	< 0.26	**140**	NA
	4/21/2015	< 0.42	NA	NA	NA	**1.1 JB**	**200**	NA
	10/20/2015	< 0.50	NA	NA	NA	< 0.95	**77**	NA
	4/13/2016	< 0.50	NA	NA	NA	< 0.95	**180**	NA
	10/27/2016	NA	NA	NA	NA	< 0.96	**140**	NA
	4/11/2017	NA	NA	NA	NA	< 0.95	**130**	NA
	10/5/2017	NA	NA	NA	NA	< 2.5	**96**	NA
	4/26/2018	NA	NA	NA	NA	< 0.96	**120**	NA
	10/1/2018	NA	NA	NA	NA	< 0.50	**81**	NA
	4/12/2019	NA	NA	NA	NA	NA	**161 D**	NA
	10/15/2019	NA	NA	NA	NA	NA	**74**	NA
	4/7/2020	NA	NA	NA	NA	NA	**124 D**	NA
	10/20/2020	NA	NA	NA	NA	NA	**97.5 D**	NA
	4/12/2021	NA	NA	NA	NA	NA	**105 D**	NA
	10/4/2021	NA	NA	NA	NA	NA	**101 D**	NA
	4/21/2022	NA	NA	NA	NA	NA	**97**	NA
	4/19/2023	NA	NA	NA	NA	NA	**98**	NA
MW-256	10/25/2007	< 1.0	< 1.0	<11 UJ	< 1.1	< 1.1	**200**	**6.6**
	4/17/2008	< 1.0	< 1.0	**< 9.5 UJ**	<0.95	<0.95	**120**	**1.9**
	10/28/2008	< 1.0	< 1.0	17 J	<0.95	<0.95	**150**	4.7
	4/20/2009	< 1.0	< 1.0	<9.6 J	<0.96	<0.96	**47**	< 2
	10/22/2009	< 1.0	< 1.0	<9.5 J	<0.95	<0.95	**22**	<1.9
	4/22/2010	< 1.0	< 1.0	<9.0 J	<0.95	<0.95	**28**	<1.0
	10/21/2010	< 1.0	< 1.0	<9.9	<0.99	<0.99	**25**	<2.0
	10/10/2011	< 1.0	< 1.0	<9.3	<0.93	<0.93	**31 J**	<1.9
	4/18/2012	< 1.0	< 1.0	<9.7	<0.97	**<2.4**	**5.9**	<2.0
	11/8/2012	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**23**	<1.9
	4/10/2013	< 1.0	< 1.0	<9.5	<0.95	<0.95	**5.6**	<1.9
	10/16/2013	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**23**	<1.9
	4/15/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**24**	<1.9
	10/21/2014	< 0.06	NA	NA	NA	NA	**27**	NA
	4/21/2015	< 0.42	NA	NA	NA	NA	**26**	NA
	10/20/2015	< 0.50	NA	NA	NA	NA	**16**	NA
	4/13/2016	< 0.50	NA	NA	NA	NA	**30**	NA
	10/27/2016	NA	NA	NA	NA	NA	**10**	NA
	4/11/2017	NA	NA	NA	NA	NA	**1.5**	NA
	10/5/2017	NA	NA	NA	NA	NA	**23**	NA
	4/26/2018	NA	NA	NA	NA	NA	**5.0**	NA
	10/1/2018	NA	NA	NA	NA	NA	**14.9**	NA
	4/12/2019	NA	NA	NA	NA	NA	**17.5**	NA
	10/15/2019	NA	NA	NA	NA	NA	**21.3**	NA
	4/7/2020	NA	NA	NA	NA	NA	<0.517	NA
	10/20/2020	NA	NA	NA	NA	NA	**21.6**	NA
	4/12/2021	NA	NA	NA	NA	NA	**8.64**	NA
	10/4/2021	NA	NA	NA	NA	NA	**8.24 D**	NA
	4/21/2022	NA	NA	NA	NA	NA	**14**	NA
	4/19/2023	NA	NA	NA	NA	NA	**15**	NA
KC-9	10/22/2009	**28**	**1.7**	< 9.5 J	**1300**	< 0.95	**5,400**	**21**
	4/23/2010	**5**	< 1.0	< 9.0 J	**170**	< 0.98	**730**	**7.4**
	10/21/2010	**14**	< 1.0	< 9.6	**840**	< 0.96	**3,600**	**18**
	10/10/2011	**10**	<1.0	<9.3	**420**	**<2.4**	**1,900**	**21**
	4/18/2012	**3.6**	<1.0	<9.5	**150**	<0.93	**600**	**8.7**
	11/8/2012	**2.2**	<1.0	<9.5 UJ	**170**	<0.95	**1,000**	**10**
	4/10/2013	**3.7**	< 1.0	**11**	**110**	<0.95	**810**	**5.1**
	10/16/2013	**4.3**	< 1.0	<9.5 UJ	**99**	<0.95	**1,300**	**6.6**
	4/15/2014	**2.8**	< 1.0	<9.5	**51**	<0.95	**740**	**6.4**
	10/21/2014	**Inaccessible due to construction; not sampled**						
	4/21/2015	**5.8**	< 0.44	**5.4 J**	**150**	**1.2 JB**	**1,300**	**9.4 J**
	10/20/2015	**18**	< 1.0	< 9.5	**570 D**	< 0.95	**4,000 D**	**25**
	4/13/2016	**3.5**	< 1.0	< 9.5	**100**	**< 0.95**	**690 D**	**12**
	10/27/2016	**3.0**	< 1.0	NA	**120**	**NA**	**1,800 D**	NA
	4/11/2017	**1.3**	< 1.0	NA	**62**	NA	**810 D**	NA
	10/5/2017	**2.2**	< 1.0	NA	**73**	NA	**1,900 D**	NA
	4/26/2018	**2.9**	< 1.0	NA	**57**	NA	**1,600 D**	NA
	10/1/2018	**4.9**	< 1.0	NA	**53 D**	NA	**2,010 D**	NA
	4/15/2019	**2.09**	< 1.0	NA	NA	NA	**5,980 D**	NA
	10/15/2019	**3.58**	<1.00	NA	NA	NA	**3,290 D**	NA
	4/7/2020	<0.300	<1.00	NA	NA	NA	**1,930 D**	NA
	10/20/2020	**2.79**	<1.00	NA	NA	NA	**2,660 D**	NA
	4/12/2021	**2.37**	<1.00	NA	NA	NA	**2,870 D**	NA
	10/4/2021	**2.96**	<1.00	NA	NA	NA	**2,630 D**	NA
	4/19/2022	**1.0**	< 0.50 U	NA	NA	NA	**1,400 D**	NA
	4/19/2023	**0.9**	< 0.50 U	NA	NA	NA	**1,800 D**	NA
PDW-117	10/22/2009	**21**	**5.4**	**36 J**	**750**	**6.5**	**1,700**	**6.2**
	4/22/2010	**< 1.0**	< 1.0	<9.0 J	**47**	<0.95	**140**	**5.6**
	10/20/2010	**5.7**	< 1.0	<9.9	**180**	<0.99	**970**	**15**
	10/11/2011	**7.6**	< 1.0	<9.5	**57**	**<2.4**	**400**	**8.4**
	4/18/2012	**1.1**	< 1.0	<9.5	**41**	<0.95	**180**	**4.4**
	11/8/2012	**23**	< 1.0	<9.5 UJ	**48**	<0.95	**360**	**20**
	4/11/2013	**4.4**	< 1.0	<9.5	**160**	<0.95	**1,200**	**6.3**
	10/15/2013	**5.9**	< 1.0	< 10 UJ	**150**	<1.0	**1,000**	**12**
	4/16/2014	**4.7**	< 1.0	<9.5	**59**	<0.95	**740**	**6.3**
	10/23/2014	**7**	**0.23 J**	**4.8 JH**	**22 H**	< 0.26 H	**1,700 H**	**8.6 JH**
	4/22/2015	**3.6**	< 0.44	< 0.40	**8.7**	< 0.26	**1,900**	**16**
	10/20/2015	**7.1**	< 1.0	< 9.5	**34**	< 0.95	**2,500 D**	**19**
	4/13/2016	< 1.0	< 1.0	< 9.5	**38**	< 0.95	**310 D**	**4.9**
	10/28/2016	< 1.0	< 1.0	NA	**1.0**	NA	**140**	NA
	4/11/2017	< 1.0	< 1.0	NA	**7.9**	NA	**150**	NA
	10/5/2017	**2**	< 1.0	NA	< 0.97	NA	**540 D**	NA
	4/26/2018	< 1.0	< 1.0	NA	< 0.96	NA	**1,700 D**	NA
	10/2/2018	**2.6**	< 1.0	NA	**9.6 D**	NA	**524 D**	NA
	4/15/2019	**0.99**	< 1.0	NA	NA	NA	**4,600 D**	NA
	10/15/2019	**2.06**	<1.00	NA	NA	NA	**1950 D**	NA
	4/9/2020	**0.860**	<1.00	NA	NA	NA	**2040 D**	NA
	4/9/2020 Dup	**0.930**	<1.00	NA	NA	NA	**1560 D**	NA
	10/20/2020	**0.500**	<1.00	NA	NA	NA	**1,570 D**	NA
	4/12/2021	< 0.300	< 1.00	NA	NA	NA	**1,070 D**	NA
	10/4/2021	**0.680**	<1.00	NA	NA	NA	**1,030 D**	NA
	4/19/2022	< 0.50 U	< 0.50 U	NA	NA	NA	**1,300 D**	NA
	4/19/2023	< 0.50 U	< 0.50 U	NA	NA	NA	**1,900 D**	NA

Table 2-2
NIA Groundwater Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
East Sump	7/25/2007	**7.5**	**30**	< 9.5 U	**29**	<0.95 U	**910 D**	**8**
	10/24/2007	**6**	**16**	< 9.0 UJ	**13**	<0.96	**960**	**11**
	1/17/2008	**9.7 D**	**160 D**	< 9.5 U	**13**	<0.95 U	**650 D**	**8.1**
	4/15/2008	**12**	**710**	< 9.5 UJ	**19**	<0.95	**730**	**27**
	7/28/2008	**5.6**	**69**	< 9.6	**21**	<0.96	**600**	**5.6**
	10/24/2008	**7.9**	**57**	NA	**17**	<0.97	**1,200**	**14**
	1/30/2009	**2.3**	< 1	< 9.5	**13**	<0.95	**580**	**6.2**
	4/20/2009	**4.3**	79	< 9.6 J	**7.6**	<0.96	**590**	**3.6**
	10/21/2009	**2.4**	< 1.0	< 11 J	**3.4**	< 1.1	**500**	**15**
	4/22/2010	**1.9**	< 1.0	< 10 J	**4.4**	< 1.0	**330**	**4.4**
	10/21/2010	**14**	< 1.0	< 10	**6.7**	< 1.0	**760**	**18**
	10/10/2011	**9.7**	< 1.0	<9.5	**3.3 J**	<0.95	**310 J**	**5.1 J**
	4/19/2012	**1.9**	< 1.0	<9.5	**4.4**	<2.4	**280**	<1.9
	11/7/2012	<1.0	< 1.0	<9.5 UJ	**2.4**	<0.95	**220**	**2.4**
	4/10/2013	<1.0	< 1.0	<9.5	**2.0**	<0.95	**200**	**2.8**
	10/16/2013	<1.0	< 1.0	<9.5 UJ	**1.8**	<0.95	**260**	**2.8**
	4/14/2014	< 1.0	< 1.0	<9.5	**1.6**	<0.95	**190**	<1.9
	10/21/2014	< 0.06	< 0.11	NA	NA	NA	**200**	NA
	4/20/2015	< 0.42	**1.2 J**	NA	NA	NA	**150**	NA
	10/20/2015	< 1.0	< 1.0	NA	NA	NA	<0.95	NA
	4/13/2016	< 1.0	< 1.0	NA	NA	NA	**260 D**	NA
	10/27/2016	< 1.0	< 1.0	NA	NA	NA	**53**	NA
	4/10/2017	< 1.0	< 1.0	NA	NA	NA	**170**	NA
	10/4/2017	< 0.50	< 1.0	NA	NA	NA	**360 D**	NA
	4/23/2018	< 1.0	< 1.0	NA	NA	NA	**140**	NA
	10/2/2018	< 0.3	< 1.0	NA	NA	NA	**92 D**	NA
	4/12/2019	< 0.3	< 1.0	NA	< 0.644	NA	**112**	NA
	10/15/2019	<0.300	<1.00	NA	<0.473	NA	**266**	NA
	4/7/2020	<0.300	<1.00	NA	<0.475	NA	**80.5 D**	NA
	10/19/2020	**54.5**	<1.00	NA	<0.481	NA	**216 D**	NA
	10/19/2020 Dup	**55.1**	<1.00	NA	<0.483	NA	**278**	NA
	1/15/2021	**5.98**	<1.00	NA	NA	NA	NA	NA
	4/8/2021	**15.5**	<1.00	NA	<0.479	NA	**117 D**	NA
	7/16/21 ALS 8260	**2.0**		NA	NA	NA	NA	NA
	7/16/21 Spclty 802	**2.19**	**1.15**	NA	NA	NA	NA	NA
	10/1/2021 Spclty 82	<0.300	<1.00	NA	<0.473	NA	**104 H (lab)**	NA
	10/1/2021 DUP	<0.300	<1.00	NA	<0.474	NA	NA	NA
	4/14/2022 ALS	<0.50 U	<0.50 U	NA	<0.94	NA	**99**	NA
	4/14/2022 DUP	<0.50 U	<0.50 U	NA	<0.94	NA	**99**	NA
	10/18/2022	< 0.50 U	<0.50 U	NA	<0.66 U	NA	**290 D**	NA
	4/19/2023	< 0.50 U	< 0.50 U	NA	<0.98 U	NA	**95**	NA
West Sump	7/25/2007	**270 D**	**1,900 D**	**12**	**180 D**	<0.95 U	**1,600 D**	**9.5**
	7/25/2007 Dup	**270 D**	**1,500 D**	**11**	**160 D**	**2.5**	**1,600 D**	**14**
	10/24/2007	**270 J**	**1,300 J**	**32 J**	**190**	<0.96	**2,200**	**22 J**
	10/24/2007 Dup	**450 J**	**2,000 J**	**20 J**	**210**	<0.95	**2,100**	**16 J**
	1/17/2008	**410 D**	**8,300 D**	9.8	**45**	<0.96 U	**620 D**	**62 D**
	1/17/2008 Dup	**400 D**	**7,900 D**	< 9.7 U	**42**	<0.97 U	**600 D**	**55 D**
	4/15/2008	**79**	**820**	< 9.5 UJ	**160**	**1.1**	**1,200**	**8.7**
	4/15/2008 Dup	**83**	**780**	< 9.5 UJ	**160**	<0.95	**1,200**	**8.4**
	7/28/2008	**200**	**740**	< 9.5	**140**	<0.95	**1,300**	**18**
	7/28/2008 Dup	**200**	**740**	< 9.5	**140**	<0.95	**1,200**	**21**
	10/24/2008	**140**	**1,700**	**26 J-**	**110**	<0.95	**1,000**	**15**
	1/30/2009	**160**	**1,400**	26	**78**	<0.95	**880**	**2.5**
	1/30/2009 Dup	**150**	**1,300**	< 9.5	**110**	<0.95	**870**	**17**
	4/20/2009	**26**	**78**	< 9.6 J	**150**	<0.96	**1,100**	**5.7**
	4/20/2009 Dup	**27**	**78**	< 9.6 J	**130**	<0.96	**1,000**	**5.3**
	10/20/2009	**100**	**1,100**	< 9.5 J	**5.0 J**	<0.95	**570 J**	**31**
	10/21/2009 Dup	**100**	**1,100**	< 9.5 J	**59 J**	<0.95	**970 J**	**28**
	4/22/2010	**56**	**77**	< 9.0 J	**46**	<0.95	**490**	**5**
	4/22/2010 Dup	**59**	**85**	< 9.0 J	**45**	<0.99	**490**	**6.8**
	10/21/2010	**42**	**69**	< 9.8	**15**	< 0.98	**470**	**100**
	10/10/2011	**33**	**210**	<9.5	**45 J**	<0.95	**730 J**	**8.7 J**
	10/10/2011 Dup	**33**	**210**	<9.3	**23 J**	<0.93	**560 J**	**20 J**
	4/19/2012	**71**	**230**	<9.5	**27**	**< 2.4**	**320**	**4.2**
	4/19/2012 Dup	**71**	**230**	<9.5	**27**	**< 2.4**	**310**	**4.3**
	11/7/2012	**52**	**109**	<9.5 UJ	**49**	<0.95	**760**	**6.1**
	11/7/2012 Dup	**48**	**101**	<9.5 UJ	**46**	<0.95	**750**	**6.1**
	4/10/2013	**34**	**23**	**12**	**42**	<0.95	**410**	**5.0**
	4/10/2013 Dup	**34**	**22**	**9.8**	**42**	<0.95	**430**	**5.3**
	10/16/2013	**33**	**18**	<9.5	**45**	<0.95	**770**	**4.6**
	10/16/2013 Dup	**33**	**19**	<9.5	**42**	<0.95	**750**	**5.1**
	4/14/2014	**67**	**120**	<9.5 UJ	**47**	<0.95	**520**	**7.4**
	4/14/2014 Dup	**72**	**120**	<9.5 UJ	**46**	<0.95	**520**	**8.4**
	10/21/2014	**4.4**	**0.91**	NA	NA	NA	**830**	NA
	10/21/2014 Dup	**4.4**	**0.85**	NA	NA	NA	**980**	NA
	4/20/2015	**56**	**60**	NA	NA	NA	**550**	NA
	10/20/2015	**4.4**	< 1.0	NA	NA	NA	200	NA
	10/20/2015 Dup	4.5	< 1.0	NA	NA	NA	**200**	NA
	4/13/2016	**74**	**51**	NA	NA	NA	**180**	NA
	4/13/2016 Dup	**71**	**50**	NA	NA	NA	**190**	NA
	10/27/2016	**5.0**	**5.5**	NA	NA	NA	**1,100 D**	NA
	10/27/2016 Dup	**6.1**	**7.1**	NA	NA	NA	**1,100 D**	NA
	4/10/2017	**65 D**	**40 D**	NA	NA	NA	**100**	NA
	4/10/2017 Dup	**68 D**	**42 D**	NA	NA	NA	**100**	NA
	10/4/2017	**2.7**	**3.7**	NA	NA	NA	**790 D**	NA
	10/4/2017 Dup	**2.8**	**3.4**	NA	NA	NA	**770 D**	NA
	4/23/2018	**21**	**8.6**	NA	NA	NA	**300 D**	NA
	4/23/2018 Dup	**21**	**8.6**	NA	NA	NA	**300 D**	NA
	10/2/2018	**3.3**	**< 1.0**	NA	NA	NA	**844 D**	NA
	10/2/2018 Dup	**2.9**	**< 1.0**	NA	NA	NA	**595 D**	NA
	4/12/2019	**18.2**	**11.8**	NA	**37.8**	NA	**898 D**	NA
	4/12/2019 Dup	**18.6**	**12.4**	NA	**37.8**	NA	**962 D**	NA
	10/15/2019	**1.11**	<1.00	NA	**22.1**	NA	**996 D**	NA
	10/15/2019 Dup	**1.16**	<1.00	NA	**24.1**	NA	**1020 D**	NA
	4/7/2020	**9.57**	**11.8**	NA	**11.9**	NA	**532 D**	NA
	4/7/2020 Dup	**9.69**	**10.7**	NA	**12.9**	NA	**603 D**	NA
	10/19/2020	**0.970**	<1.00	NA	**13.1**	NA	**874 D**	NA
	1/15/2021	**15.2**	**2.45**	NA	**NA**	NA	**NA**	NA
	4/8/2021	**4.51**	**1.86**	NA	**8.82**	NA	**690 D**	NA
	10/1/2021	**0.500**	<1.00	NA	<0.474	NA	**119 H (lab)**	NA
	4/14/2022	**2.7**	<0.50 U	NA	**5.4**	NA	**400 D**	NA
	10/18/2022	**0.55**	<0.50 U	NA	**6.1**	NA	**750 D**	NA
	4/19/2023	**2.3**	**3.0**	NA	**7.0**	NA	**410 D**	NA

Notes:
< - Result is non-detected above the laboratory detection limit.
< - Detection limit above cleanup level.
Bold indicates detection.
Dup - Field Duplicate Sample.
NA - Not analyzed per Ecology approval.
J - Estimated concentration.
UJ - Not detected, estimate concentration.
Bold and shaded Detection above cleanup level.
EPA = U.S. Environmental Protection Agency; µg/L micrograms per liter; mg/L = milligrams per liter; NIA = North Impacted Area;

Table 2-3
NIA Interception Trench Sump Pump Operation Data (2022-2023)
Emerald Kalama Chemical, Kalama, WA

Current Reporting Year: Monthly Data	Total Groundwater Extracted			Days of Operation	Average Flow Rate[1]	
	East Sump (gallons)	West Sump (gallons)	Combined (gallons)		(gallons per day)	(gallons per minute)
April 2023	1,941,845	1,235,615	3,177,460	28	113,481	79
March 2023	1,994,994	1,338,167	3,333,161	35	95,233	66
February 2023	1,663,971	1,155,968	2,819,939	28	100,712	70
January 2023	1,686,931	1,155,080	2,842,011	28	101,500	70
December 2022	1,341,891	857,588	2,199,479	28	78,553	55
November 2022	1,491,881	936,929	2,428,810	35	69,395	48
October 2022	513,982	496,108	1,010,090	29	34,831	24
September 2022	1,319,767	768,432	2,088,199	34	61,418	43
August 2022	1,729,536	810,564	2,540,100	28	90,718	63
July 2022	2,245,998	1,032,102	3,278,100	28	117,075	81
June 2022	2,908,492	1,283,999	4,192,491	35	119,785	83
May 2022	2,233,267	1,219,992	3,453,259	29	119,078	83
Data by Year (1999 – 2023)						
May 2022 - April 2023 Total			33,363,099	365	91,406	63
May 2021 - April 2022 Total			29,004,774	364	79,683	55
May 2020 - April 2021 Total			25,686,164	335	76,675	53
May 2019 - April 2020 Total			25,672,040	364	70,528	49
May 2018 - April 2019 Total			26,892,240	365	73,677	51
May 2017 - April 2018 Total			34,527,000	365	94,595	66
May 2016 - April 2017 Total			27,211,420	357	76,222	53
May 2015 - April 2016 Total			22,279,780	364	61,208	43
May 2014 - April 2015 Total			28,283,351	364	77,702	54
May 2013 - April 2014 Total			26,146,043	364	71,830	50
May 2012 - April 2013 Total			32,377,430	367	88,222	61
May 2011 - April 2012 Total			29,560,750	364	81,211	56
May 2010 - April 2011 Total			27,198,659	364	74,722	52
May 2009 - April 2010 Total			23,801,041	365	66,114	46
May 2008 - April 2009 Total			24,827,910	365	68,022	47
May 2007 - April 2008 Total			24,318,988	366	66,493	46
May 2006 - April 2007 Total			30,981,555	365	85,000	59
May 2005 - April 2006 Total			28,741,209	365	78,986	55
May 2004 - April 2005 Total			22,890,809	365	62,791	44
May 2003 - April 2004 Total			25,980,637	366	71,036	49
May 2002 - April 2003 Total			22,689,839	363	62,700	44
May 2001 - April 2002 Total			18,336,898	365	50,465	35
May 2000 - April 2001 Total			16,158,522	365	44,230	31
May 1999 - April 2000 Total			27,663,437	366	75,565	53
		Averages:	26,441,400		75,143	52

Notes:

[1] Calculated based on weekly totalizer readings.

NIA = North Impacted Area

Table 2-4
NIA Discharge Data (2022 – 2023)
Emerald Kalama Chemical, Kalama, WA

East Sump

Chemical Name	Average Concentration (µg/L)*		May 2022 - October 2022 Contaminant Removal (lb)	November 2022 - April 2023 Contaminant Removal (lb)	East Sump Total Removal (lb)
	4/22 & 10/22 Avg.	10/22 & 4/23 Avg.			
Volatile Organic Compounds (EPA Method 8260)					
Benzene	0	0	0.00	0.00	0.00
Toluene	0	0	0.00	0.000	0.00
Semivolatile Organic Compounds (EPA Method 8270 mod.)					
Diphenyl Oxide	**195**	**193**	17.82	16.30	34.12

West Sump

Chemical Name	Average Concentration (µg/L)*		May 2022 - October 2022 Contaminant Removal (lb)	November 2022 - April 2023 Contaminant Removal (lb)	West Sump Total Removal (lb)
	4/22 & 10/22 Avg.	10/22 & 4/23 Avg.			
Volatile Organic Compounds (EPA Method 8260)					
Benzene	**1.6**	**1.4**	0.08	0.08	0.15
Toluene	**0**	**1.5**	0.00	0.08	0.08
Semivolatile Organic Compounds (EPA Method 8270 mod.)					
Diphenyl Oxide	**575**	**580**	26.93	32.33	59.26

East & West Combined NIA Total

Chemical Name	May 2022 - October 2022 Contaminant Removal (lb)	November 2022 - April 2023 Contaminant Removal (lb)	Combined NIA Total Removal (lb)
Volatile Organic Compounds (EPA Method 8260)			
Benzene	0.08	0.08	0.2
Toluene	0.00	0.08	0.1
Semivolatile Organic Compounds (EPA Method 8270 mod.)			
Diphenyl Oxide	44.75	48.63	93.4

Notes:
East Sump groundwater extracted = 21,072,555
West Sump groundwater extracted = 12,290,544
***Chemical concentrations are average for the period (May&Oct, Oct&April)**
Contaminant removal results are rounded.
EPA = U.S. Environmental Protection Agency; lb = pound; µg/L = micrograms per liter; NIA = North Impacted Area

Table 3-1
WIA Shallow Interception Trench Monitoring Program 2022 - 2023
Emerald Kalama Chemical, Kalama, WA

Well Location	Sampling Frequency	Field Parameters	Analytical Parameters	Gauging Frequency
KC-13, KC-24R, PZ-110, MW-238, MW-255, N&S Sumps	—	—	—	Annually
PZ-104, PZ-107	Annually	Temperature, pH, ORP, conductivity, turbidity, DO	Benzene, Toluene, Biphenyl, DEHP, DPO	
USRW-2	Annually	Temperature, pH, ORP, conductivity, turbidity, DO	DPO	

Notes:
DO = dissolved oxygen; ORP = oxidation reduction potential; DPO = Diphenyl Oxide; DEHP = Bis (2-ethylhexyl) phthalate.
Ecy 11-28-17 Approval of EKC recommendation: Remove Well KC-11 from sampling and gauging list (already sampled Oct 2017)

Table 3-2
WIA Upper Sand Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B / 8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
PZ-104	10/20/2009	**5.8**	< 1.0	<9.7 J	**550**	<0.97	**3,600**	**12**
	4/23/2010	**4.5**	< 1.0	<9.0 J	**180**	<0.95	**2,600**	**8.6**
	10/20/2010	**8.3**	< 1.0	< 10	**260**	< 1.0	**4,100**	**83**
	10/10/2011	**7.7**	< 1.0	<9.5	**150**	**<2.4**	**4,700**	**69**
	4/19/2012	**5.8**	< 1.0	<9.5	**29**	<0.95	**3,600**	**37**
	11/8/2012	**9.2**	< 1.0	<9.5 UJ	**36**	<0.95	**4,600**	**80**
	4/11/2013	**5.5**	< 1.0	<9.5	**47**	<0.95	**3,100**	**30**
	10/16/2013	**5.5**	< 1.0	<9.5 UJ	**4.9**	<0.95	**2,600**	**38**
	4/15/2014	**2.9**	< 1.0	<9.5	**13**	<0.95	**2,400**	**37**
	10/23/2014	**5.3**	< 0.11	< 0.40 H	**10 H**	< 0.26 H	**4,800 H**	**38 H**
	4/22/2015	**3**	< 0.44	< 0.40	**6.4**	**1.3 JB**	**3000**	**52**
	4/22/2015 Dup	**3**	< 0.44	< 0.39	**6.3**	**1.2 JB**	**3100**	**46**
	10/20/2015	**1.9**	< 1.0	< 9.5	**2.3**	< 0.95	**3,300 D**	**48**
	4/12/2016	< 1.0	< 1.0	< 9.5	**2.8**	**69**	**1,700 D**	**31**
	10/28/2016	**1.9**	< 1.0	NA	< 0.95	< 0.95	**3,700 D**	NA
	4/12/2017	< 0.50	< 1.0	NA	**2.2**	< 0.95	**1,600**	NA
	10/5/2017	**2.2**	< 1.0	NA	**4.7**	< 2.5	**2,800 D**	NA
	4/25/2018	< 1.0	< 1.0	NA	< 0.96	< 0.96	**1,600 D**	NA
	10/2/2018	**4.3**	**6.8**	NA	**50.2 D**	< 4.7 D	**3,620 D**	NA
	4/15/2019	**12.2**	< 1.0	NA	**381 D**	< 0.505	**8,350 D**	NA
	10/15/2019	**5.29**	<1.00	NA	**0.665**	<0.475	**2,740 D**	NA
	4/9/2020	**9.28**	<1.00	NA	**79.7 D**	**47.3 D**	**4,740 D**	NA
	5/12/2020	NA	NA	NA	**268 D**	<0.484	**12,100 D**	NA
	10/20/2020	**1.65**	<1.00	NA	**16.6**	<0.478	**3,140 D**	NA
	10/20/2020 Dup M	**1.66**	<1.00	NA	**22.4 D**	<0.479	**3,420 D**	NA
	4/12/2021	**5.67**	<1.00	NA	**86.1**	<0.478	**4,530 D**	NA
	10/4/2021	**0.970**	<1.00	NA	**81.5 D**	<47.9 D	**4,300 D**	NA
	10/4/2021 Dup	**0.760**	<1.00	NA	**3,430 D**	<47.8 D	**4,080 D****	NA
	4/21/2022	**1.7**	<0.50 U	NA	**54**	<1.9 U	**3,300 D**	NA
	4/21/2022 Dup 4	**1.6**	<0.50 U	NA	**44**	<1.9 U	**2,900 D**	NA
	4/18/2023	**2.3**	<0.50 U	NA	**34**	**2.5 B**	**2,900 D**	
	4/18/2023 Dup 4	**2.4**	<0.50 U	NA	**40**	**2.5 B**	**3,000 D**	NA
PZ-107	10/22/2009	**NA**	**NA**	**NA**	**NA**	NA	**NA**	NA
	4/23/2010	**5.3**	**590**	**1,300 J**	**1,500**	**<4.0**	**3,600**	**210**
	10/20/2010	**37**	**5,300**	**4,300**	**24,000**	**<200**	**65,000**	< 390
	10/11/2011 s	**100**	**5,300**	**38,000**	**110,000**	**3.4**	**300,000**	**220**
	4/19/2012 s	**18**	**130**	**7,400**	**1,700**	**600**	**4,300**	**140**
	11/7/2012 s	**19**	**227**	**900 J**	**4,400**	**30**	**12,000**	**41**
	4/11/2013 s	**160**	**2,000**	**8,000**	**140,000**	**1,200**	**330,000**	**270**
	10/16/2013 s	**13**	**200**	**450 J**	**1,200**	**6.4**	**4,400**	**40**
	4/15/2014 s	**5.5**	**57**	**640**	**1,000**	**<9.5**	**2,800**	**53**
	10/23/2014 s	**Not sampled**						
	4/23/2015 s	**6.6**	**82**	**2100**	**720**	**6.2 B**	**2,200**	**19**
	10/20/2015 s	**12**	**530 D**	**2,600 D**	**5,700 D**	**62 D**	**20,000 D**	< 48
	4/12/2016	**2.5**	**30**	**1,200 D**	**930 D**	<0.95	**2,300 D**	**36**
	10/28/2016	< 1.0	**6.8**	NA	**760 D**	< 0.96	**2,100 D**	NA
	4/12/2017	**0.62**	**15**	NA	**860 D**	< 9.5	**1,900 D**	NA
	10/5/2017	**1.2**	**32 D**	NA	**440 D**	2.7	**1,100 D**	NA
	4/25/2018	< 1.0	**1.7**	NA	**670 D**	< 9.6	**1,600 D**	NA
	10/3/2018	< 0.30	**3.9**	NA	**404 D**	< 4.7 D	**936 D**	NA
	4/15/2019	< 0.30	< 1.0	NA	**269 D**	<0.625	**622 D**	NA
	10/15/2019	<0.300	**1.45**	NA	**209**	<0.473	**1,080 D**	NA
	4/9/2020	<0.300	<1.00	NA	**22.1**	**1.08**	**176 D**	NA
	5/12/2020	NA	NA	NA	**159 D**	<0.487	**1,430 D**	NA
	10/20/2020	<0.300	<1.00	NA	**261 D**	<0.480	**649 D**	NA
	4/12/2021	<0.300	**3.67**	NA	**33.4**	<0.478	**85.8 D**	NA
	10/4/2021	<0.300	<1.00	NA	**60.9**	<0.345	**21.8**	NA
	4/21/2022	<0.50 U	<0.50 U	NA	**17**	<1.9 U	**64**	NA
	4/19/2023	<0.50 U	<0.50 U	NA	**150**	**2.7 B**	**480 D**	NA
MW-244	10/24/2007	**1.1**	< 1.0	< 9.8 UJ	< 0.98	< 0.98	**720**	**30**
	4/17/2008	**1.1**	< 1.0	< 9.7 UJ	< 0.97	< 0.97	**560**	**16**
	10/27/2008	**3**	< 1.0	**11 J**	< 0.95	< 0.95	**960**	**20**
	4/22/2009	**1**	< 1.0	< 9.6 J	< 0.96	< 0.96	**1,300**	**9.1**
	10/20/2009	**1.3**	< 1.0	< 9.8 J	< 0.98	< 0.98	**820**	**41**
	4/22/2010	< 1.0	< 1.0	< 9.0 J	< 0.98	< 0.98	**1,000**	**38**
	10/19/2010	< 1.0	< 1.0	< 9.6	< 0.96	< 0.96	**340**	**5.7**
	10/11/2011	< 1.0	< 1.0	<9.5	<0.95	<0.95	**68**	<1.9
	4/18/2012	< 1.0	**2,400**	<9.5	<0.95	**<2.4**	**550**	**4.8**
	11/8/2012	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**590**	**7.8**
	11/8/2012 Dup	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**600**	**8.4**
	4/11/2013	< 1.0	< 1.0	<9.5	<0.95	<0.95	**530**	**14**
	4/11/2013 Dup	< 1.0	< 1.0	<9.5	<0.95	<0.95	**610**	**14**
	10/17/2013	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**410**	**8.2**
	4/15/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**600**	**9.4**
	10/22/2014	**0.12 J**	< 0.11	NA	NA	< 0.28	**570**	NA
	4/21/2015	< 0.42	< 0.44	NA	NA	**1.2 JB**	**450**	NA
	10/20/2015	NA	NA	NA	NA	NA	**780 D**	NA
	4/13/2016	NA	NA	NA	NA	NA	**190**	NA
	10/27/2016	NA	NA	NA	NA	NA	**470 D**	NA
	4/11/2017	NA	NA	NA	NA	NA	**68**	NA
	10/3/2017	NA	NA	NA	NA	NA	**330 D**	NA
	4/24/2018	NA	NA	NA	NA	NA	**340 D**	NA
	10/1/2018	NA	NA	NA	NA	NA	**207**	NA
	4/15/2019	NA	NA	NA	NA	NA	**269 D**	NA
	10/15/2019	NA	NA	NA	NA	NA	**79.7 D**	NA
	4/9/2020	NA	NA	NA	NA	NA	**156 D**	NA
	Cease sampling Oct 2020 Sampling Round Per Ecy 10/21/20 Approval							

Table 3-2
WIA Upper Sand Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B / 8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
KC-11	10/20/2009 *	NS	NS	NS	NS	NS	NS	NS
	4/23/2010 *	NS	NS	NS	NS	NS	NS	NS
	10/11/2011	< 1.0	**2.8**	**26**	**28**	**<9.9**	**160**	<9.9
	4/19/2012	**1.4**	< 1.0	<9.5	<0.95	**<2.4**	**4.6**	<1.9
	11/7/2012 *	NS	NS	NS	NS	NS	NS	NS
	4/10/2013	<1.0	<1.0	<9.5	<0.95	<0.95	**38**	<1.9
	10/16/2013	**1.0**	<1.0	<10 UJ	<1.0	<1.0	**18**	<2.0
	4/15/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**4.3**	<1.9
	10/22/2014 *	NS	NS	NS	NS	NS	NS	NS
	4/22/2015	< 0.42	< 0.44	NA	NA	**1.3 JB**	**4.9**	NA
	10/20/2015 *	NS	NS	NS	NS	NS	NS	NS
	4/12/2016	NA	NA	NA	NA	NA	**2.6**	NA
	10/27/2016	NA	NA	NA	NA	NA	**3.2**	NA
	4/10/2017	NA	NA	NA	NA	NA	**31**	NA
	10/4/2017	NA	NA	NA	NA	NA	NS	NA
	Cease Monitoring & Gauging KC-11 Per Ecy Approval 11-28-17							
KC-13	10/20/2009 *	NS	NS	NS	NS	NS	NS	NS
	4/23/2010 *	NS	NS	NS	NS	NS	NS	NS
	10/11/2011 *	NS	NS	NS	NS	NS	NS	NS
	4/19/2012 *	NS	NS	NS	NS	NS	NS	NS
	11/7/2012 *	NS	NS	NS	NS	NS	NS	NS
	4/10/2013 *	NS	NS	NS	NS	NS	NS	NS
	10/16/2013 *	NS	NS	NS	NS	NS	NS	NS
	4/15/2014 *	NS	NS	NS	NS	NS	NS	NS
	10/22/2014 *	NS	NS	NS	NS	NS	NS	NS
	4/22/2015	< 0.42	< 0.44	NA	NA	**1.7 JB**	**1.7 J**	NA
	10/20/2015 *	NS	NS	NS	NS	NS	NS	NS
	4/12/2016 *	NS	NS	NS	NS	NS	NS	NS
	Cease Monitoring KC-13, Continue Gauging Per Ecy 11/29/16 Ltr.							
USRW-2	10/25/2007	**2.8**	< 1.0	< 9.9 UJ	< 0.99	< 0.99	**1,500**	**39**
	10/25/2007 Dup	**2.7**	< 1.0	< 9.9 UJ	< 0.99	< 0.99	**1,400**	**40**
	4/17/2008	< 1.0	< 1.0	< 9.7 UJ	< 0.97	< 0.97	< 0.97	< 2
	4/17/2008 Dup	< 1.0	< 1.0	< 9.7 UJ	< 0.97	< 0.97	< 0.97	< 2
	10/28/2008	**1.2**	< 1.0	< 9.5 J	< 0.95	< 0.95	**1,500**	**22**
	10/28/2008 Dup	**1.1**	< 1.0	< 9.5 J	< 0.95	< 0.95	**1,600**	**23**
	4/22/2009	< 1.0	< 1.0	< 9.6 J	< 0.96	< 0.96	**1,000**	**10**
	4/22/2009 Dup	< 1.0	< 1.0	< 9.6 J	< 0.96	< 0.96	**1,100**	**8.4**
	10/20/2009	**1.2**	< 1.0	< 11 J	< 1.1	< 1.1	**800**	**41**
	10/20/2009 Dup	**1.2**	< 1.0	< 10 J	< 1.0	< 1.0	**970**	**43**
	4/22/2010	< 1.0	< 1.0	< 10 J	< 1.0	< 1.0	**850**	**20**
	4/22/2010 Dup	< 1.0	< 1.0	< 9.0 J	< 0.99	< 0.99	**780**	**20**
	10/19/2010	< 1.0	< 1.0	< 9.8	**5**	< 0.98	**880**	**43**
	10/11/2011	< 1.0	< 1.0	<9.5	<0.95	<0.95	**310**	**5.5**
	10/11/2011 Dup	< 1.0	< 1.0	<9.5	<0.95	<0.95	**490**	**6.7**
	4/19/2012	< 1.0	< 1.0	<9.5	<0.95	**<2.4**	**400**	**9.6**
	4/19/2012 Dup	< 1.0	< 1.0	<9.5	<0.95	**<2.4**	**400**	**9.3**
	11/7/2012	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**500**	**11**
	11/7/2012 Dup	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**410**	**9.4**
	4/11/2013	< 1.0	< 1.0	<9.5	<0.95	<0.95	**430**	**7.5**
	10/17/2013	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**380**	**6.3**
	10/17/2013 Dup	< 1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**380**	**8.1**
	4/15/2014	< 1.0	< 1.0	<9.5	<0.95	<0.95	**330**	**6.1**
	4/15/2014 Dup	< 1.0	< 1.0	<9.5	<0.95	<0.95	**340**	**6.4**
	10/23/2014	< 0.060	< 0.11	NA	NA	< 0.27 H	**370 H**	NA
	10/23/2014 Dup	< 0.060	< 0.11	NA	NA	< 0.26 H	**360 H**	NA
	4/22/2015	< 0.42	< 0.44	NA	NA	**1.2 JB**	**270**	NA
	10/20/2015	NA	NA	NA	NA	NA	**430 D**	NA
	4/13/2016	NA	NA	NA	NA	NA	**340 D**	NA
	10/27/2016	NA	NA	NA	NA	NA	**290 D**	NA
	4/11/2017	NA	NA	NA	NA	NA	< 1.0	NA
	10/3/2017	NA	NA	NA	NA	NA	**390 D**	NA
	4/25/2018	NA	NA	NA	NA	NA	**140**	NA
	10/1/2018	NA	NA	NA	NA	NA	**204**	NA
	4/15/2019	NA	NA	NA	NA	NA	< 1.0	NA
	10/15/2019	NA	NA	NA	NA	NA	**178 D**	NA
	4/9/2020	NA	NA	NA	NA	NA	**1.43**	NA
	10/20/2020	NA	NA	NA	NA	NA	**280**	NA
	4/12/2021	NA	NA	NA	NA	NA	<0.478	NA
	10/6/2021	NA	NA	NA	NA	NA	<0.480	NA
	4/19/2022	NA	NA	NA	NA	NA	< 1.0 U	NA
	4/18/2023	NA	NA	NA	NA	NA	<1.0 U	NA

Table 3-2
WIA Upper Sand Analytical Data (10/2007 – 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B / 8260)		SVOCs (µg/L) (EPA Method 8270C SIM)				
		Benzene	Toluene	Benzoic Acid	Biphenyl	Bis (2-ethylhexyl) phthalate	Diphenyl Oxide	Phenol
	Cleanup Level	**1.2**	**2,000**	**24,590**	**230**	**1.8**	**410**	**2,560**
North Sump	7/25/2007	< 1 U	< 1 U	< 9.5 U	< 0.95 U	< 0.95 U	**550 D**	**38**
	10/23/2007	< 1.0	< 1.0	< 9.0 UJ	< 0.95	< 0.95	**600**	**13**
	1/17/2008	< 1 U	< 1 U	< 11 U	< 1.1 U	< 1.1 U	**330 D**	**8.4**
	4/15/2008	< 1.0	< 1.0	< 9.5 UJ	< 0.95	< 0.95	**490**	**5.2**
	7/28/2008	< 1.0	< 1.0	< 9.5	< 0.95	< 0.95	**950**	**19**
	10/24/2008	**140**	**1,500**	**27 J**	**120**	< 0.95	**1,100**	**16**
	11/3/2008	< 1.0	< 1.0	< 10 J	< 1	< 1	**140**	**38**
	1/30/2009	< 1.0	< 1.0	< 9.8	< 0.98	< 0.98	**710**	**24**
	4/22/2009	< 1.0	< 1.0	< 11 J	< 1.1	**3.7**	**570**	**15**
	10/21/2009 *	NS	NS	NS	NS	NS	NS	NS
	4/21/2010	< 1.0	< 1.0	< 9.0 J	< 0.97	< 0.97	**290**	**15**
	10/19/2010	< 1.0	< 1.0	< 9.6	< 0.96	< 0.96	**390**	**9.3**
	10/11/2011	<1.0	< 1.0	<9.7	<0.97	<0.97	**470**	**8.5**
	4/19/2012	<1.0	< 1.0	<9.5	<0.95	**<2.4**	**320**	**6.2**
	11/7/2012	<1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**380**	**11**
	4/10/2013	<1.0	<1.0	<9.5	<0.95	<0.95	**310**	**5.2**
	10/16/2013	<1.0	<1.0	<9.5 UJ	<0.95	<0.95	**460**	**7.7**
	4/14/2014	< 1.0	< 1.0	<9.7	<0.97	<0.97	**340**	**8.7**
	10/21/2014	< 0.060	< 0.11	NA	NA	< 0.30	**210**	NA
	4/20/2015	< 0.42	< 0.44	NA	NA	**1.1 JB**	**370**	NA
	10/19/2015	NA	NA	NA	NA	NA	**180**	NA
	4/12/2016	NA	NA	NA	NA	NA	**140**	NA
	10/24/2016	NA	NA	NA	NA	NA	**99**	NA
	4/10/2017	NA	NA	NA	NA	NA	**130**	NA
	10/4/2017	NA	NA	NA	NA	NA	**190**	NA
	4/23/2018	NA	NA	NA	NA	NA	**190**	NA
	10/2/2018	NA	NA	NA	NA	NA	**268**	NA
	10/18/2022	<0.50 U	< 0.50 U	NA	<0.66 U	**2.0 B**	**110 D**	NA
		Ceased Sump Pumping & Sampling, Maintain Functionality - Ecy Approval 11-14-18						
South Sump	7/25/2007	**2.2**	**1.9**	< 9.6 U	<0.96 U	<0.96 U	**73 D**	**28**
	10/23/2007	< 1.0	**2.5**	< 9.0 UJ	<0.97	<0.97	**1.5 J**	< 2.0
	1/17/2008	< 1 U	< 1 U	< 9.5 U	<0.95 U	<0.95 U	< 0.95	< 1.9 U
	4/15/2008	< 1.0	**1.7**	< 9.6 UJ	<0.96	<0.96	**140**	**12**
	7/28/2008	**10**	**3**	< 9.6	<0.96	<0.96	**370**	**5.5**
	1/30/2009	< 1.0	**700**	< 9.9	<0.99	<0.99	**380**	**7.9**
	4/22/2009	< 1.0	**4.8**	< 9.6 J	<0.96	<0.96	**620**	**6.4**
	10/21/2009 *	NS	NS	NS	NS	NS	NS	NS
	4/21/2010	< 1.0	< 1.0	< 9.0 J	< 0.97	<0.97	**130 J**	**13 J**
	10/19/2010	< 1.0	< 1.0	< 9.6	<0.96	<0.96	**38**	**9.7**
	10/11/2011	<1.0	<1.0	<9.5	<0.95	<0.95	**550**	**11**
	4/19/2012	<1.0	**3.4**	<9.7	<0.97	<0.97	**110**	**2.8**
	11/7/2012	<1.0	< 1.0	<9.5 UJ	<0.95	<0.95	**130**	**2.2**
	4/10/2013	<1.0	<1.0	**11**	<0.95	<0.95	**76**	**6.7 J**
	10/16/2013	<1.0	<1.0	<9.5 UJ	<0.95	<0.95	**230**	**5.2**
	4/14/2014	<1.0	<1.0	<9.5	<0.95	<0.95	**130**	**3.3**
	10/21/2014	< 0.060	< 0.11	NA	NA	< 0.26	**200**	NA
	4/20/2015	< 0.42	< 0.44	NA	NA	**1.1 JB**	**160**	NA
	10/19/2015	NA	NA	NA	NA	NA	**320**	NA
	4/12/2016	NA	NA	NA	NA	NA	**1.6**	NA
	10/24/2016	NA	NA	NA	NA	NA	< 0.95	NA
	4/10/2017	NA	NA	NA	NA	NA	< 0.96	NA
	10/4/2017	NA	NA	NA	NA	NA	**65**	NA
	4/23/2018	NA	NA	NA	NA	NA	**71**	NA
	10/2/2018	NA	NA	NA	NA	NA	**63**	NA
	10/18/2022	< 0.50 U	< 0.50 U	NA	<0.66 U	**2.0 B**	**6.2**	NA
	10/18/2022 Dup	< 0.50 U	< 0.50 U	NA	<0.66 U	**2.2 B**	**5.1**	NA
		Ceased Sump Pumping & Sampling, Maintain Functionality - Ecy Approval 11-14-18						

Notes:
< - Constituent Non-detect
Bold indicates detection.
Dup - Field Duplicate Sample.
NA - Not analyzed, Ecy Apprvl.
J - Estimated concentration.
H - Sample prep or analyzed beyond specified holding time
Bold and shaded Detection above cleanup level.
* NS - Not sampled due to lack of water.
EPA = U.S. Environmental Protection Agency; µg/L = micrograms per liter; SVOC = semivolatile organic compound; WIA = West Impacted Area

Table 4-1
WIA Intermediate Sand Aquifer Groundwater Monitoring Program 2022 - 2023
Emerald Kalama Chemical, Kalama, WA

Well Location	Sampling Frequency	Field Parameters	Analytical Parameters	Gauging Frequency
KC-6, PZ-117, PZ-118, Columbia River	—	—	—	Quarterly (Per EKC Temporary Request)
ISRW-1, ISRW-2B, ISRW-3, ISRW-4, ISRW-5, ISRW-6, ISRW-7, ISRW-8, ISRW-9, ISRW-10	Quarterly (Per EKC Temporary Request)	—	Benzene, Toluene (8260)	
KC-14, MW-239, MW-243, MW-250	Semi-Annual	Temperature, pH, ORP, conductivity, turbidity, DO	Benzene, Toluene (8260)	

Notes:
DO = dissolved oxygen; ORP = oxidation reduction potential; WIA = West Impacted Area

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date		VOCs (µg/L) (EPA Method 8021B/8260)			
			Benzene		Toluene	
	Cleanup Level		1.2		2,000	
ISRW-1	7/25/2007		290	D	35,000	D
	7/25/2007	Dup	310	D	34,000	D
	10/23/2007		380		61,000	
	10/23/2007	Dup	370		59,000	
	1/17/2008		390	D	65,000	D
	1/17/2008	Dup	390	D	69,000	D
	4/15/2008		350		55,000	
	4/15/2008	Dup	360		54,000	
	7/28/2008		550		56,000	
	7/28/2008	Dup	570		63,000	
	10/23/2008		250		27,000	
	10/23/2008	Dup	240		29,000	
	1/30/2009		360		35,000	
	1/30/2009	Dup	340		35,000	
	4/20/2009		100		26,000	J
	4/20/2009	Dup	110		45,000	J
	10/21/2009		400		58,000	
	10/21/2009	Dup	410		58,000	
	4/21/2010		430		47,000	
	4/21/2010	Dup	440		49,000	
	10/19/2010		190		23,000	
	10/11/2011		250		49,000	
	10/11/2011	Dup	260		49,000	
	4/19/2012		200		36,000	
	4/19/2012	Dup	200		35,000	
	11/6/2012		153		40,600	
	11/6/2012	Dup	170		45,700	
	4/9/2013		230		66,000	
	4/9/2013	Dup	230		66,000	
	10/16/2013		160		49,000	
	10/16/2013	Dup	150		47,000	
	4/14/2014		240		55,000	
	4/14/2014	Dup	240		55,000	
	10/21/2014		< 600		68,000	
	4/20/2015		170		46,000	
	10/19/2015		110	D	33,000	D
	4/11/2016		200	D	61,000	D
	10/24/2016		120	D	48,000	D
	4/10/2017		240	D	63,000	D
	10/4/2017		160	D	48,000	D
	4/23/2018		200	D	72,000	D
	8/6/2018	Smr1/4	107		35,800	D
	10/2/2018		99	D	43,100	D
	1/16/2019		87		51,800	D
	4/12/2019		166		92,500	
	7/30/2019		45.0		12,300	D
	10/15/2019		30.3		11,100	D
	1/7/2020		91.2		45,800	D
	4/7/2020 VOA#1(4/15)		37.3		4,140	D
	4/7/2020 VOA#3(4/24)		NA		21,100	H
	7/28/2020		89.8		19,700	D
	10/19/2020		39.0		16,100	D
	10/19/2020	Dup ISRW	36.0		11,400	D
	1/15/2021		68.6		51,400	D
	1/15/2021	Dup ISRW	86.6		50,600	D
	4/8/2021		23.8	D	13,600	D

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)					
		Benzene			Toluene		
	Cleanup Level	1.2			2,000		
ISRW-1 Cont'd	7/16/2021(ALS 8260)	34			26,000		
	7/16/2021(Spclty 8021)	34.2		D	21,900		D
	10/1/2021(Spclty 8260)	<	300	DQ	1,720		D
	10/1/2021 Dup Spclty	6.8		D	1,870		D
	1/18/2022 (ALS)	<	50	U,D	30,000		D
	1/18/2022 Dup ALS (11)	<	50	U,D	32,000		D
	4/14/2022	<	25	U,D	11,000		D
	7/6/2022	<	50	U,D	23,000		D
	10/18/2022	<	5	U,D	1,900		D
	1/11/2023	<	25	U,D	8,500		D
	4/18/2023	<	50	U,D	28,000		D
ISRW-2B	7/25/2007	14		D	8,500		D
	10/23/2007	7.6			3,000		
	1/17/2008	45		D	22,000		D
	4/15/2008	60			20,000		
	7/28/2008	150			36,000		
	10/23/2008	130			31,000		
	1/30/2009	77			33,000		
	4/20/2009	230			150,000		
	10/21/2009	330			260,000		
	4/21/2010	470			720,000		
	10/11/2011	95			83,000		
	4/19/2012	300			23,000		
	11/6/2012	71			53,900		
	4/9/2013	130			61,000		
	10/16/2013	97			68,000		
	4/14/2014	94			72,000		
	10/21/2014	<	600		75,000		
	4/20/2015	94		J	72,000		
	10/19/2015	47		D	18,000		D
	4/11/2016	160		D	110,000		D
	10/24/2016	<	20		11,000		D
	4/10/2017	110		D	92,000		D
	10/4/2017	130		D	74,000		D
	4/23/2018	54		D	9,800		D
	8/6/2018 Smr1/4	58			23,600		D
	10/2/2018	59		D	43,200		D
	1/16/2019	96			77,200		D
	4/12/2019	75			52,900		
	7/30/2019	42.6			16,600		D
	10/15/2019	62.8			18,500		D
	1/7/2020	56.1			32,500		D
	4/7/2020 VOA#1(4/15)	100			5,760		D
	4/7/2020 VOA#3(4/24)	NA			50,700		H
	7/28/2020	53.3			18,400		D
	10/19/2020	33.1			8,090		D
	1/15/2021	45.9			54,200		D
	4/8/2021	57.6			20,200		D
	7/16/2021	68.4		D	32,500		D
	10/1/2021 Spclty	96.0		D	17,000		D
	1/18/2022 ALS	69		D	37,000		D
	4/14/2022 ALS	27		D	8,600		D
	7/6/2022	65		D	27,000		D
	10/18/2022	27		D	5,700		D
	1/11/2023	<	25	U,D	9,900		D
	4/18/2023	62		D	43,000		D

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)			
		Benzene		Toluene	
	Cleanup Level	1.2		2,000	
ISRW-3	7/25/2007	150	D	110,000	D
	10/23/2007	110		82,000	
	1/17/2008	210	D	130,000	D
	4/15/2008	150		100,000	
	7/28/2008	150		110,000	
	10/23/2008	< 500		140,000	
	1/30/2009	98		97,000	
	4/20/2009	13		14,000	
	10/21/2009	9.4		25,000	J
	4/21/2010	17,000		980,000	
	10/19/2010	13		34,000	
	10/11/2011	20		47,000	
	4/19/2012	70		65,000	
	11/6/2012	25		45,000	
	4/9/2013	50		58,000	
	10/16/2013	16		22,000	
	4/14/2014	23		33,000	
	10/21/2014	< 600		47,000	
	4/20/2015	56	J	51,000	
	10/19/2015	55	D	71,000	D
	4/11/2016	120	D	150,000	D
	10/24/2016	290	D	200,000	D
	4/10/2017	< 50	U	74,000	D
	10/4/2017	140	D	100,000	D
	4/23/2018	< 50	U	19,000	D
	8/6/2018 Smr1/4	54		23,700	D
	10/2/2018	54	D	30,800	D
	1/16/2019	129		93,000	D
	4/12/2019	337		172,000	
	7/30/2019	97.4		63,400	D
	10/15/2019	80.4		51,900	D
	1/7/2020	204	D	142,000	D
	4/7/2020 VOA#1(4/15)	117		17,200	D
	4/7/2020 VOA#3(4/24)	NA		81,400	H
	7/28/2020	157		44,300	D
	10/19/2020	92.4		56,400	D
	1/15/2021	206	D	204,000	D
	4/8/2021	92.5	D	61,400	D
	4/8/2021 Dup ISRW	106	D	72,500	D
	7/16/2021	243	D	133,000	D
	10/1/2021	58.0	D	17,800	D
	1/18/2022 (ALS)	150	D	100,000	D
	4/14/2022 ALS	120	D	73,000	D
	7/6/2022	<50	U,D	45,000	D
	10/18/2022	42	D	13,000	D
	1/11/2023	74	D	22,000	D
	4/18/2023	< 130	U,D	90,000	D
ISRW-4	7/25/2007	35	D	20,000	D
	10/23/2007	350		65,000	
	1/17/2008	130	D	34,000	D
	4/15/2008	430		77,000	
	7/28/2008	48		24,000	
	10/23/2008	130		55,000	
	1/30/2009	120		59,000	
	4/20/2009	28		10,000	
	10/21/2009	3.1		4,700	
	4/21/2010	3.7		7,300	

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)			
		Benzene		Toluene	
	Cleanup Level	1.2		2,000	
ISRW-4 Cont'd	10/19/2010	7.8		3,200	
	10/11/2011	20		14,000	
	4/19/2012	< 1.0		650	
	11/6/2012	< 0.5		29	
	4/9/2013	0.57		200	
	10/16/2013	< 1.0		59	
	4/14/2014	< 1.0		35	
	10/21/2014	< 600		32,000	
	4/20/2015	15		6,400	
	10/19/2015	8.8	D	29,000	D
	4/11/2016	2.1		1,000	D
	10/24/2016	14		3,100	D
	4/10/2017	< 0.50	U	< 1.0	U
	10/4/2017	< 50	U	9,000	D
	4/23/2018	< 25	U	18,000	D
	8/6/2018 Smr1/4	6		526	D
	10/2/2018	34	D	6,280	D
	1/16/2019	167	D	34,600	D
	4/12/2019	140		27,800	
	7/30/2019	62.2	D	1,440	D
	10/15/2019	41.2		261	
	1/7/2020	94.5	D	10,000	D
	4/7/2020 VOA#1(4/15)	30.6		2,200	D
	4/7/2020 VOA#3(4/24)	NA		5,640	H
	7/28/2020	6.03		1,250	D
	10/19/2020	96.9		25,100	D
	1/15/2021	0.918		40	
	4/8/2021	6.76	D	296	D
	7/16/2021	25.8	D	6,080	D
	10/1/2021	7.30		78.8	
	1/18/2022 (ALS)	10	D	3,800	D
	4/14/2022 ALS	11	D	690	D
	7/6/2022	0.56		8.9	
	10/18/2022	40	D	1,300	D
	1/11/2023	27	D	11,000	D
	4/18/2023	28	D	5,400	D
ISRW-5	7/25/2007	110	D	37,000	D
	10/23/2007	110		45,000	
	1/17/2008	170	D	62,000	D
	4/15/2008	140		68,000	
	7/28/2008	360		110,000	
	10/23/2008	130		47,000	
	1/30/2009	100		33,000	
	4/22/2009	79		52,000	
	10/21/2009	40		20,000	
	4/21/2010	7.5		2,400	
	10/19/2010	26		7,900	
	10/11/2011	36		15,000	
	4/19/2012	30		12,000	
	11/6/2012	402		48,500	
	4/9/2013	94		46,000	
	10/16/2013	160		92,000	
	4/14/2014	37		16,000	
	10/21/2014	< 600		19,000	
	4/20/2015	76	J	25,000	
	10/19/2015	84	D	17,000	D
	4/11/2016	< 100		31,000	D
	10/24/2016	120	D	130,000	D

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)					
		Benzene			Toluene		
	Cleanup Level	1.2			2,000		
ISRW-5 Cont'd	4/10/2017	50	D		46,000	D	
	10/4/2017	80	D		53,000	D	
	4/23/2018	190	D		110,000	D	
	8/6/2018 Smr1/4	88			59,700	D	
	10/2/2018	72	D		106,000	D	
	1/16/2019	79			60,300	D	
	4/12/2019	106			90,200		
	7/30/2019	72.5			56,000	D	
	10/15/2019	20.9			15,900	D	
	1/7/2020	58.6			71,900	D	
	4/7/2020 VOA#1(4/15)	42.2			11,000	D	
	4/7/2020 VOA#3(4/24)	NA			93,800	H	
	5/12/20 VOA#1	66.9			74,700	D	
	5/12/20 VOA #3	68.4			74,300	D	
	7/28/2020	110			45,400	D	
	10/19/2020	47.2			28,900	D	
	1/15/2021	256	D		158,000	D	
	4/8/2021	25.4	D		46,400	D	
	7/16/21 ALS 8260	31			38,000		
	7/16/21 Spclty 8021	27.6	D		36,300	D	
	10/1/2021 Spclty 8260	<30.0	D		21,300	D	
	1/18/2022 ALS	<100	U,D		78,000	D	
	4/14/2022 ALS	<100	U,D		34,000	D	
	7/6/2022	110	D		92,000	D	
	10/18/2022	10	D		900	D	
	1/11/2023	< 50	U,D		62,000	D	
	4/18/2023	< 100	U,D		44,000	D	
ISRW-6	7/25/2007	150	D		59,000	D	
	10/23/2007	120			47,000		
	1/17/2008	150	D		58,000	D	
	4/15/2008	190			69,000		
	7/28/2008	140			53,000		
	10/23/2008	< 200			62,000		
	1/30/2009	140			61,000		
	4/20/2009	15			16,000		
	10/21/2009	1.4			270		
	4/21/2010	56			22,000		
	10/19/2010	49			42,000		
	10/11/2011	4.3			1,000		
	4/19/2012	18			14,000		
	11/7/2012	2.0			1,420		
	4/9/2013	8.6			6,900		
	10/16/2013	1.1			1,200		
	4/14/2014	6.1			8,100		
	10/21/2014	1.3	J		890		
	4/20/2015	0.73	J		790		
	10/19/2015	1.7			270	D	
	4/11/2016	3.7	D		2,300	D	
	10/24/2016	140	D		57,000	D	
	4/12/2017	< 0.50	U		< 1.0	U	
	10/4/2017	< 50	U		10,000	D	
	4/23/2018	1.8			1,400	D	
	5/16/2018	1.1			1,400	D	
	8/6/2018 Smr1/4	0.6			377	D	
	10/2/2018	2.7			2,220	D	
	1/16/2019	34	D		10,100	D	
	4/12/2019	32.6			5,940		

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)			
		Benzene		Toluene	
	Cleanup Level	1.2		2,000	
ISRW-6 Cont'd	7/30/2019	**45.4**		**2,470**	D
	10/15/2019	**33.2**		**1,860**	D
	1/7/2020	**7.90**	D	**341**	D
	4/7/2020 VOA#1(4/15)	**1.35**		**120**	D
	4/7/2020 VOA#3(4/24)	**NA**		**630**	H
	7/28/2020	**0.750**		**1,340**	D
	10/19/2020	**0.710**		**365**	D
	1/15/2021	< 3.00	D	**3,120**	D
	4/8/2021	**3.94**	D	**2,990**	D
	7/16/2021	**57.5**	D	**16,900**	D
	10/1/2021	**54.0**	D	**7,520**	D
	1/18/2022	**46**	D	**18,000**	D
	4/14/2022	**140**	D	**31,000**	D
	7/6/2022	**51**	D	**19,000**	D
	10/18/2022	**35**	D	**1,400**	D
	1/11/2023	**14**	D	**1,600**	D
	4/18/2023	**30**	D	**4,700**	D
ISRW-7	7/25/2007	**1,100**		**24,000**	D
	10/23/2007	**350**		**9,400**	
	1/17/2008	**540**	D	**19,000**	D
	4/15/2008	**200**		**11,000**	
	7/28/2008	**520**		**32,000**	
	10/23/2008	**280**		**14,000**	
	1/30/2009	**120**		**9,100**	
	4/20/2009	**83**		**5,900**	
	10/21/2009	**3,400**		**45,000**	
	4/21/2010	**2,700**		**30,000**	
	10/19/2010	**17,000**		**18,000**	
	10/11/2011	**4,000**		**27,000**	
	4/19/2012	**1,100**		**18,000**	
	11/6/2012	**1,220**		**18,700**	
	4/9/2013	**180**		**9,900**	
	10/16/2013	**380**		**6,600**	
	4/14/2014	**900**		**14,000**	
	10/21/2014	**530**		**1,800**	
	4/20/2015	**12**		**2,100**	
	10/19/2015	**170**	D	**1,700**	D
	4/11/2016	**54**	D	**4,300**	D
	10/24/2016	**92**	D	**1,600**	D
	4/10/2017	**190**	D	**10,000**	D
	10/4/2017	**180**	D	**2,800**	D
	4/23/2018	**72**	D	**330**	D
	5/16/2018	**270**	D	**1,700**	D
	8/6/2018 Smr1/4	**8**		**46**	
	10/2/2018	**1.1**		< 1.0	
	1/16/2019	**0.6**		< 1.00	
	4/12/2019	< 0.300		< 1.00	
	7/30/2019	**0.500**		**3.24**	
	10/15/2019	< 0.300		**19.7**	
	1/7/2020	**7.27**		**730**	D
	4/7/2020 VOA#1(4/15)	**4.51**		**124**	D
	4/7/2020 VOA#3(4/24)	**NA**		**372**	H
	7/28/2020	**0.32**		**123**	D
	10/19/2020	< 0.300		**28.7**	

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)			
		Benzene		Toluene	
	Cleanup Level	1.2		2,000	
ISRW-7 Cont'd	1/15/2021	< 0.300		**0.515**	
	4/8/2021	< 0.300		< 0.500	
	7/16/2021	< 0.300		**1.31**	
	10/1/2021	< 0.300		< 1.00	
	1/18/2022 ALS	< 0.50		**0.66**	
	4/14/2022 ALS	< 0.50		< 0.50	
	7/6/2022	< 0.50		**0.90**	
	10/18/2022	< 0.50	U	< 0.50	U
	1/11/2023	< 0.50	U	< 0.50	U
	4/18/2023	< 0.50	U	< 0.50	U
ISRW-8	4/20/2009	**90**		**66,000**	
	10/21/2009	**45**		**50,000**	
	4/21/2010	**71**		**57,000**	
	10/19/2010	**31**		**72,000**	
	10/11/2011	**52**		**54,000**	
	4/19/2012	**53**		**40,000**	
	11/6/2012	**69**		**51,200**	
	4/9/2013	**58**		**33,000**	
	10/16/2013	**64**		**39,000**	
	4/14/2014	**61**		**40,000**	
	10/21/2014	**< 600**		**36,000**	
	4/20/2015	**84**	**J**	**51,000**	
	10/19/2015	**58**	**D**	**39,000**	**D**
	4/11/2016	**< 100**		**79,000**	**D**
	10/24/2016	**140**	**D**	**74,000**	**D**
	4/10/2017	**17**	**D**	**20,000**	**D**
	10/4/2017	**140**	**D**	**84,000**	**D**
	4/23/2018	< 100	U	**44,000**	**D**
	8/6/2018 Smr1/4	**127**		**49,500**	**D**
	10/2/2018	**170**		**61,800**	**D**
	1/16/2019	**148**		**67,400**	**D**
	4/12/2019	**164**		**107,000**	
	7/30/2019	**102**		**49,100**	**D**
	10/15/2019	**130**		**34,800**	
	1/7/2020	**107**		**69,700**	**D**
	4/7/2020 VOA#1(4/15)	**115**		**7,240**	**D**
	4/7/2020 VOA#3(4/24)	**NA**		**62,700**	**H**
	7/28/2020	**111**		**33,200**	**D**
	10/19/2020	**115**		**31,700**	**D**
	1/15/2021	**81.6**		**43,400**	**D**
	4/8/2021	**64.0**	**D**	**45,800**	**D**
	7/16/2021 ALS 8260	**70**		**52,000**	
	7/16/21 Spclty 8021	**71.8**	**D**	**44,000**	**D**
	10/1/2021	**60.0**	**D**	**17,000**	**D**
	1/18/2022 ALS	**77**	**D**	**45,000**	**D**
	4/14/2022 ALS	**56**	**D**	**39,000**	**D**
	7/6/2022	**68**	**D**	**42,000**	**D**
	10/18/2022	**25**	**D**	**850**	**D**
	1/11/2023	**90**	**D**	**68,000**	**D**
	4/18/2023	**76**	**D**	**57,000**	**D**

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)					
		Benzene			Toluene		
	Cleanup Level	1.2			2,000		
ISRW-9	4/20/2009	120			62,000		
	10/21/2009	71			36,000		
	4/21/2010	81			42,000		
	10/19/2010	71			55,000		
	10/11/2011	4.1			920		
	4/19/2012	22			16,000		
	11/6/2012	40			20,100		
	4/9/2013	47			35,000		
	10/16/2013	83			73,000		
	4/14/2014	39			35,000		
	10/21/2014	< 600			30,000		
	4/20/2015	79		J	64,000		
	10/19/2015	55		D	44,000		D
	4/11/2016	< 100			53,000		D
	10/24/2016	77		D	95,000		D
	4/10/2017	19		D	19,000		D
	10/4/2017	< 50		U	22,000		D
	4/23/2018	< 100		U	83,000		D
	8/6/2018 Smr1/4	27			11,500		D
	10/2/2018	36			12,600		D
	1/16/2019	28			25,300		D
	4/12/2019	81.3			77,900		
	7/30/2019	20.3			8,570		D
	10/15/2019	58.5			45,800		D
	1/7/2020	64.4			71,700		D
	4/7/2020 VOA#1(4/15)	45.7			3,440		D
	4/7/2020 VOA#3(4/24)	NA			33,300		H
	7/28/2020	31.2			18,600		D
	10/19/2020	26.3			14,200		D
	1/15/2021	42.0			48,800		D
	4/8/2021	60.8		D	40,900		D
	7/16/2021	9.98		D	7,430		D
	10/1/2021 Spclty	< 15.0		D	4,360		D
	1/18/2022 ALS	< 25		U,D	17,000		D
	4/14/2022 ALS	36		D	8,700		D
	7/6/2022	26		D	23,000		D
	10/18/2022	18		D	1000		D
	1/11/2023	< 25		U,D	25,000		D
	4/18/2023	33		D	25,000		D
ISRW-10	4/20/2009	180			38,000		
	10/21/2009	3.8			1,400		
	4/21/2010	2			380		
	10/19/2010	< 1.0			63		
	10/11/2011	16			1,100		
	4/19/2012	85			15,000		
	11/6/2012	< 1.0			2.5		
	4/9/2013	34			3,300		
	10/16/2013	96			8,300		
	4/14/2014	< 1.0			7.7		
	10/21/2014	3.9			140		
	4/20/2015	< 0.42			13		
	10/19/2015 -1	52		D	3,800		D
	4/11/2016 -1	49		D	4,700		D
	10/24/2016	190		D	29,000		D
	4/10/2017	29			4,300		D
	10/4/2017	110		D	43,000		D

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)			
		Benzene		Toluene	
	Cleanup Level	**1.2**		**2,000**	
ISRW-10 Cont'd	4/23/2018	**220**	**D**	**30,000**	**D**
	8/6/2018	**36**		**2,900**	**D**
	10/2/2018	**151**		**18,800**	**D**
	1/16/2019	**204**	**D**	**78,300**	**D**
	4/12/2019	**385**		**113,000**	
	7/30/2019	**160**	**D**	**43,900**	**D**
	10/15/2019	**82.9**		**22,600**	**D**
	1/7/2020	**243**	**D**	**80,200**	**D**
	4/7/2020 VOA#1(4/15)	**72.5**		**4,300**	**D**
	4/7/2020 VOA#3(4/24)	**NA**		**29,300**	**H**
	7/28/2020	**319**		**34,900**	**D**
	10/19/2020	**135**	**D**	**328,000**	**D**
	1/15/2021	**145**		**50,200**	**D**
	4/8/2021	**53.8**	**D**	**20,600**	**D**
	7/16/2021 ALS 8260	**150**		**74,000**	
	7/16/2021 Spclty 8021	**148**	**D**	**61,600**	**D**
	10/1/2021	**127**	**D**	**35,900**	**D**
	1/18/2022 ALS	**110**	**D**	**47,000**	**D**
	4/14/2022 ALS	**63**	**D**	**45,000**	**D**
	7/6/2022	**81**	**D**	**33,000**	**D**
	10/18/2022	**35**	**D**	**860**	**D**
	1/11/2023	**59**	**D**	**35,000**	**D**
	4/18/2023	**45**	**D**	**32,000**	**D**
KC-14	10/24/2007	**2.9**		**940**	
	4/16/2008	< 1.0		**180**	
	10/27/2008	**3.1**		**1,100**	
	4/22/2009	< 1.0		**99**	
	10/20/2009	**1.3**		**1,300**	
	4/23/2010	0.92		**690**	
	10/19/2010	**14**		**270,000**	
	10/10/2011	< 1.0		**420**	
	4/18/2012	**1.4**	**J**	**140**	J
	11/7/2012	< 1.0		< 1.0	
	4/10/2013	< 0.5		**200**	
	10/17/2013	**4.2**		**88**	
	4/16/2014	< 1.0		**30**	
	10/22/2014	< 0.060		< 0.11	
	4/22/2015	< 0.42		< 0.44	
	4/22/2015 Dup	< 0.42		< 0.44	
	10/20/2015	< 1.0		**66**	D
	4/12/2016	< 1.0		**20**	
	10/24/2016	< 1.0		**1.9**	
	4/12/2017	**2.5**		**160**	D
	10/4/2017	< 0.50		< 1.0	
	4/25/2018	< 1.0		**20**	
	10/1/2018	NS		NS	
	4/15/2019	**0.420**		**7.15**	
	10/15/2019	< 0.300		**1.14**	
	4/9/2020	< 0.300		**9.52**	
	10/21/2020	< 0.300		< 1.00	
	4/13/2021	< 0.300		< 1.00	
	10/6/2021	< 0.300		< 1.00	
	4/19/2022	**2.8**		**15**	
	10/18/2022	< 0.50	U	< 0.50	U
	4/18/2023	< 0.50	U	< 0.50	U

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)					
		Benzene			Toluene		
	Cleanup Level	1.2			2,000		
MW-239	10/24/2007	**660**			**120,000**		
	4/16/2008	**1200**			**190,000**		
	10/27/2008	**580**			**100,000**		
	4/22/2009	< 1.0			< 1.0		
	10/20/2009	< 1.0			**1.4**		
	4/23/2010	**9.3**			**3,500**		
	10/19/2010	**7.7**			**260**		
	10/11/2011	**310**			**55,000**		
	4/18/2012	< 1.0			< 1.0		
	11/7/2012	**413**			**35,300**		
	4/10/2013	**71**			**390**		
	10/17/2013	**180**			**15,000**		
	4/16/2014	< 1.0			< 1.0		
	10/23/2014	**5.2**			**0.62**		
	4/23/2015	**80**	**J**		**8,400**		
	10/20/2015	**280**	**D**		**8,200**	**D**	
	10/20/2015 Dup	**290**	**D**		**8,500**	**D**	
	4/12/2016	**90**	**D**		**810**	D	
	4/12/2016 Dup	**87**	**D**		**1,000**	D	
	10/24/2016	**340**	**D**		**43,000**	**D**	
	10/24/2016 Dup	**360**	**D**		**43,000**	**D**	
	4/11/2017	< 0.50	U		< 1.0	U	
	4/11/2017 Dup MW	< 0.50	U		< 1.0	U	
	10/3/2017	**580**	**D**		**140,000**	**D**	
	4/25/2018	**130**	**D**		**3,100**	**D**	
	4/25/2018 Dup MW9	**140**	**D**		**3,200**	**D**	
	10/3/2018	**320**	**D**		**32,700**	**D**	
	10/3/2018 Dup 97	**370**	**D**		**40,200**	**D**	
	4/15/2019	**454**	**D**		**39,700**	**D**	
	4/15/2019 Dup 97	**450**	**D**		**39,100**	**D**	
	10/15/2019	**178**			**15,700**	**D**	
	10/15/2019 Dup 97	**175**			**15,400**	**D**	
	4/9/2020	**160**			**11,200**	**D**	
	4/9/2020 Dup 97	**< 0.300**			**24.4**		
	10/21/2020	**341**	**D**		**17,300**	**D**	
	10/21/2020 Dup 97	**407**	**D**		**17,600**	**D**	
	4/13/2021	**426**	**D**		**32,300**	**D**	
	10/6/2021	**< 60.0**	**DQ**		**1,470**	**D**	
	10/6/2021 Dup97	**54.0**	**D**		**1,900**	**D**	
	4/19/2022	**91**	**D**		**2,200**	**D**	
	4/19/2022 Dup97	**87**	**D**		**2,100**	**D**	
	10/18/2022	**22**	**D**		**2,000**	**D**	
	10/18/2022 Dup97	**23**	**D**		**1,900**	**D**	
	4/18/2023	**5.7**			**82**	**D**	
	4/18/2023 Dup97	**5.3**			**59**		
MW-243	10/24/2007	< 1.0			< 1.0		
	4/17/2008	< 1.0			< 1.0		
	10/27/2008	< 1.0			< 1.0		
	4/22/2009	< 1.0			< 1.0		
	10/20/2009	< 1.0			< 1.0		
	4/22/2010	< 1.0			< 1.0		
	10/19/2010	< 1.0			< 1.0		
	10/11/2011	< 1.0			< 1.0		
	4/18/2012	< 1.0			< 1.0		
	11/7/2012	< 1.0			< 1.0		
	4/10/2013	< 1.0			< 1.0		
	10/17/2013	< 1.0			< 1.0		
	4/15/2014	< 1.0			< 1.0		

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)	
		Benzene	Toluene
	Cleanup Level	1.2	2,000
MW-243 Cont'd	10/22/2014	< 0.06	< 0.11
	4/21/2015	< 0.42	< 0.44
	10/20/2015	< 1.0	< 1.0
	4/13/2016	< 1.0	< 1.0
	10/24/2016	< 1.0	< 1.0
	4/12/2017	< 0.50	< 1.0
	10/4/2017	< 0.50	< 1.0
	4/24/2018	< 1.0	< 1.0
	10/1/2018	< 0.30	< 1.0
	4/15/2019	< 0.30	< 1.00
	10/15/2019	< 0.300	< 1.00
	4/9/2020	< 0.300	< 1.00
	10/21/2020	< 0.300	< 1.00
	4/13/2021	< 0.300	7.98
	10/6/2021	< 0.300 U	< 1.00 U
	4/19/2022	< 0.50 U	< 0.50 U
	10/18/2022	< 0.50 U	< 0.50 U
	4/18/2023	< 0.50 U	< 0.50 U
MW-249	10/24/2007	< 1.0	< 1.0
	4/16/2008	< 1.0	< 1.0
	10/27/2008	< 1.0	< 1.0
	4/22/2009	< 1.0	< 1.0
	10/20/2009	< 1.0	< 1.0
	4/23/2010	< 1.0	< 1.0
	10/20/2010	< 1.0	< 1.0
	10/10/2011	< 1.0	< 1.0
	4/18/2012	< 1.0	< 1.0
	11/7/2012	< 1.0	< 1.0
	4/10/2013	< 1.0	< 1.0
	10/17/2013	< 1.0	< 1.0
	4/15/2014	< 1.0	< 1.0
	10/22/2014	< 0.060	< 1.0
	4/23/2015	< 0.42	< 1.0
	10/20/2015	< 1.0	< 1.0
	4/12/2016	< 1.0	< 1.0
	MW-249 Monitoring Ceased Per 112916 Ecy Ltr.		
MW-250	10/25/2007	< 1.0	< 1.0
	4/17/2008	< 1.0	< 1.0
	4/17/2008 Dup	< 1.0	< 1.0
	10/27/2008	< 1.0	**3**
	10/27/2008 Dup	< 1.0	**3**
	4/23/2009	< 1.0	< 1.0
	4/23/2009 Dup	< 1.0	< 1.0
	10/20/2009 Dup	< 1.0	< 1.0
	10/20/2009	< 1.0	< 1.0
	4/23/2010 Dup	< 1.0	< 1.0
	4/23/2010	< 1.0	< 1.0
	10/19/2010	< 1.0	< 1.0
	10/11/2011	< 1.0	< 1.0
	10/11/2011 Dup	< 1.0	< 1.0
	4/18/2012	< 1.0	< 1.0
	11/7/2012	< 1.0	< 1.0
	4/10/2013	< 1.0	< 1.0
	4/10/2013 Dup	< 1.0	< 1.0
	10/17/2013	< 1.0	< 1.0
	10/17/2013 Dup	< 1.0	< 1.0
	4/15/2014	< 1.0	< 1.0
	4/15/2014 Dup	< 1.0	< 1.0

Table 4-2
WIA Intrmdiate Sand Aquifer
Analytical Data (10/2007 - 4/2023)
Emerald Kalama Chemical, Kalama, WA

Well	Date	VOCs (µg/L) (EPA Method 8021B/8260)	
		Benzene	Toluene
	Cleanup Level	1.2	2,000
MW-250 Cont'd	10/22/2014	< 0.060	< 0.1
	10/22/2014 Dup	< 0.060	< 0.1
	4/23/2015	< 0.42	< 0.4
	4/23/2015 Dup	< 0.42	< 0.4
	10/20/2015	< 1.0	< 1.0
	4/12/2016	**< 73 D**	< 1.0
	10/24/2016	< 1.0	< 1.0
	4/12/2017	< 0.50	< 1.0
	10/4/2017	< 0.50	< 1.0
	4/25/2018	< 1.0	< 1.0
	10/3/2018	< 0.30	**13.8**
	4/15/2019	< 0.30	**3.47**
	10/16/2019	< 0.30	< 1.0
	4/9/2020	< 0.300	**13.8**
	10/21/2020	< 0.300	< 1.00
	4/13/2021	< 0.300	< 1.00
	10/6/2021	< 0.300	< 1.00
	4/19/2022	< 0.50	< 0.50
	10/18/2022	< 0.50 U	< 0.50 U
	4/18/2023	< 0.50 U	< 0.50 U

Notes:
(1) - ISRW pump wells sampled by peristaltic pump 10/2015 & 4/2016
< - Result is non-detected above the laboratory reporting limit.
< - Detection limit above cleanup level.
Bold indicates detection.
Dup - Field Duplicate Sample.
D - Laboratory analtyical dilution
J - Estimated concentration.
Bold and sha Detection above cleanup level.
EPA = U.S. Environmental Protection Agency; µg/L micrograms per liter;
VOC = volatile organic compound; WIA = West Impacted Area

Table 4-3
WIA ISRW Groundwater Extraction Pump Volume Data (2022 - 2023)
Emerald Kalama Chemical, Kalama, WA

Date	Groundwater Extracted (gallons)										
	ISRW-1	ISRW-2	ISRW-3	ISRW-4	ISRW-5	ISRW-6	ISRW-7	ISRW-8	ISRW-9	ISRW-10	Total
April 2023	16,300	6,550	6,160	2,250	9,600	2,800	0	9,070	4,050	7,080	**63,860**
March 2023	11,900	3,670	6,900	2,180	8,230	2,200	0	8,040	3,810	8,460	**55,390**
February 2023	7,200	3,800	6,430	1,990	6,460	1,700	0	5,620	3,920	5,450	**42,570**
January 2023	11,030	6,060	5,230	2,350	11,510	4,700	0	10,630	8,060	8,880	**68,450**
December 2022	7,718	7,790	3,250	640	11,360	4,814	0	5,120	6,400	7,270	**54,362**
November 2022	7,582	7,100	7,780	980	9,480	3,586	0	8,410	5,650	9,030	**59,598**
October 2022	4,259	3,130	4,320	400	6,480	1,255	0	5,290	3,900	4,790	**33,824**
September 2022	8,341	5,710	5,710	1,310	7,940	1,945	0	7,960	5,590	7,540	**52,046**
August 2022	8,600	5,770	1,410	0	9,790	3,200	0	6,780	5,380	7,860	**48,790**
July 2022	13,700	6,050	17,800	1,810	18,110	8,900	0	12,540	6,140	10,060	**95,110**
June 2022	40,800	23,900	46,920	9,260	31,810	33,600	0	58,380	16,940	28,970	**290,580**
May 2022	24,331	9,210	17,210	1,620	24,960	7,532	0	19,030	2,920	16,230	**123,043**
Total	**161,761**	**88,740**	**129,120**	**24,790**	**155,730**	**76,232**	**0**	**156,870**	**72,760**	**121,620**	**987,623**

Table 4-4
WIA ISRW Discharge Analytical/Mass Removal Data (2022 - 2023)
Emerald Kalama Chemical, Kalama, WA

Well	May 2022 - October 2022					November 2022 - April 2023					May 2022 - April 2023	
	Groundwater Extracted (gallons)	Avg Benz (Apr, Jul, Oct) (ug/L)	Benz Remvd (lb)	Avg Toluene (Apr, Jul, Oct) (ug/L)	Toluene Remvd (lb)	Groundwater Extracted (gallons)	Avg Benz (Oct, Jan, Apr) (ug/L)	Benz Remvd (lb)	Avg Toluene (Oct, Jan, Apr) (ug/L)	Toluene Remvd (lb)	Benz Remvd (lb)	Toluene Remvd (lb)
ISRW-1	100,031	13	0.01	11,970	10.0	61,730	13	0.0	12,800	10.7	0.0	21
ISRW-2B	53,770	40	0.02	13,767	6.2	34,970	34	0.0	19,530	8.8	0.0	15
ISRW-3	93,370	62	0.05	43,670	34.0	35,750	60	0.0	41,670	32.4	0.1	66
ISRW-4	14,400	17	0.00	665	0.1	10,390	32	0.0	5,900	0.7	0.0	1
ISRW-5	99,090	57	0.05	42,300	34.9	56,640	28	0.0	35,630	29.4	0.1	64
ISRW-6	56,432	75	0.04	17,130	8.1	19,800	26	0.0	2,570	1.2	0.0	9
ISRW-7	0	0.0	0.00	0	0.0	0	0	0.0	0	0.0	0.0	0
ISRW-8	109,980	50	0.05	27,300	25.0	46,890	64	0.1	41,970	38.5	0.1	64
ISRW-9	40,870	27	0.01	10,900	3.7	31,890	21	0.0	17,000	5.8	0.0	10
ISRW-10	75,450	60	0.04	26,300	16.5	46,170	46	0.0	22,630	14.2	0.1	31
Total	**643,393**		**0.25**		**139**	**344,230**		**0.2**		**142**	**0.5**	**280**

Notes:
Averages include duplicate samples.
Average concentration values are rounded.
ISRW = intermediate sand recovery well; lb = pounds; ug/L = micrograms per liter

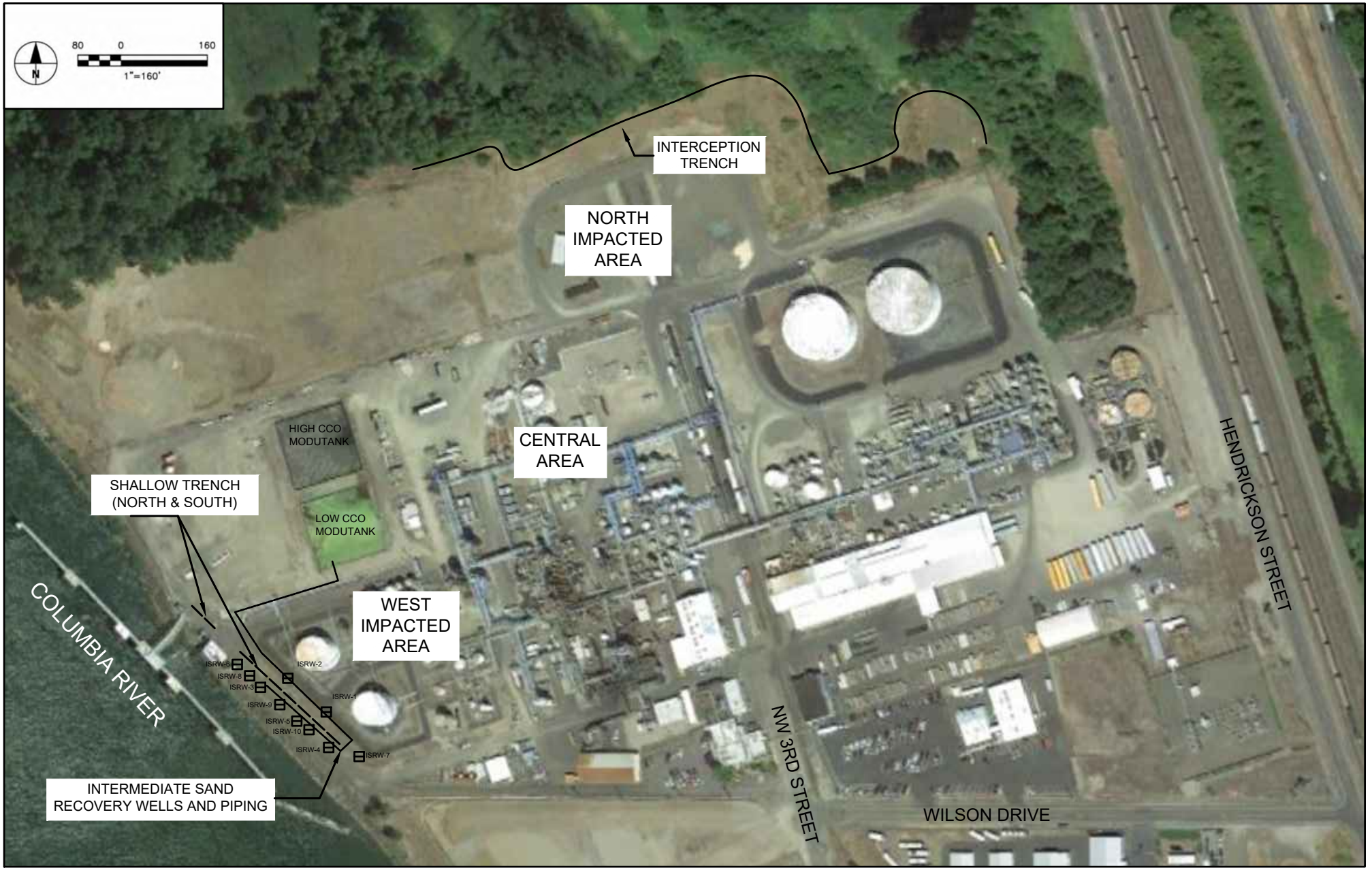
Table 4-5
WIA ISRW Discharge Annual Mass Removal Data (Does NOT Include All Years 1997-2010)
This Table is for Year to Year Comparison / Trends & is Not a Complete Data Set of All System Ops Years
Emerald Kalama Chemical, Kalama, WA

Year (April - April)	Extracted Water (gallons)	Annual Benzene & Toluene Removal By ISRW Well (lbs)																				Totals	
		ISRW-1		ISRW-2		ISRW-3		ISRW-4		ISRW-5		ISRW-6		ISRW-7		ISRW-8		ISRW-9		ISRW-10			
		Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol	Benz	Tol
2022-2023	987,623	0	21	0	15	0.1	66	0	1	0.1	64	0	9	0	0	0.1	64	0	10	0.1	31	**0.4**	**281**
2021-2022	1,001,625	0	24	0	15	0.1	51	0	0	0	32	0	3	0	0	0.1	32	0	8	0.2	53	**0.4**	**218**
2020-2021	1,737,727	0.1	41	0.1	31	0.1	61	0	2	0.1	102	0	0	0	1	0.2	81	0	34	0.2	145	**1**	**498**
2019-2020	1,087,500	0.1	34	0.1	30	0.1	34	0	1	0	26	0	1	0	0	0.2	78	0.1	75	0	10	**1**	**289**
2018-2019	1,658,473	0.2	76	0.1	45	0.1	54	0	10	0.1	109	0	3	0.1	0	0.4	184	0	49	0	11	**1**	**541**
2017-2018	2,213,000	1	157	0	76	0	164	0	6	0	173	0	10	1	20	0	128	0	84	0	18	**2**	**836**
2016-2017	3,004,478	0	119	0	97	0	256	0	1	0	154	0	25	1	59	0	107	0	155	0	9	**3**	**982**
2015-2016	3,534,000	0	87	0	174	0	135	0	17	0	12	0	2	11	216	0	150	0	137	0	1	**12**	**931**
2014-2015	4,388,000	0	99	1	279	0	56	0	3	0	5	0	1	3	21	2	520	1	266	0	0	**8**	**1,250**
2013-2014	4,418,508	1	137	0	69	0	21	0	5	0	15	0	9	10	157	1	338	0	288	0	1	**12**	**1,040**
2012-2013	7,786,000	2	443	0	188	0	71	0	0	0	25	0	13	16	324	1	723	0	136	0	1	**19**	**1,924**
2011-2012	9,825,000	3	515	1	187	0	85	0	34	0	20	0	44	45	399	1	1,071	0	91	0	11	**50**	**2,457**
2008-2009	6,307,000	NA	373	NA	231	NA	122	NA	103	NA	181	NA	159	NA	601	NA	225	NA	131	NA	48	**NA**	**2,174**
2004-2005	5,579,000	NA	930	NA	44	NA	373	NA	78	NA	680	NA	190	NA	541	NA	NA	NA	NA	NA	NA	**NA**	**2,836**
2001-2002	5,642,000	NA	797	NA	63	NA	967	NA	78	NA	646	NA	634	NA	531	NA	NA	NA	NA	NA	NA	**NA**	**3,716**
1997-1998	2,733,000	NA	874	NA	407	NA	953	NA	983	NA	355	NA	177	NA	257	NA	NA	NA	NA	NA	NA	**NA**	**4,006**
TOTAL		**7**	**4,531**	**2**	**1,815**	**1**	**3,203**	**0**	**1,308**	**0**	**2,266**	**0**	**1,264**	**87**	**3,126**	**5**	**3,262**	**2**	**1,288**	**0**	**90**	**105**	**22,153**

NOTES: ISRW-7 shut down October 2019 due to consisten BDL / <CUL Data. 600K gal of water/year 2017-18 & 2018-19.
1997 - 1998 first full year of system operation as Interim Corrective Measure / 2007 CD/CAP began current system ops.

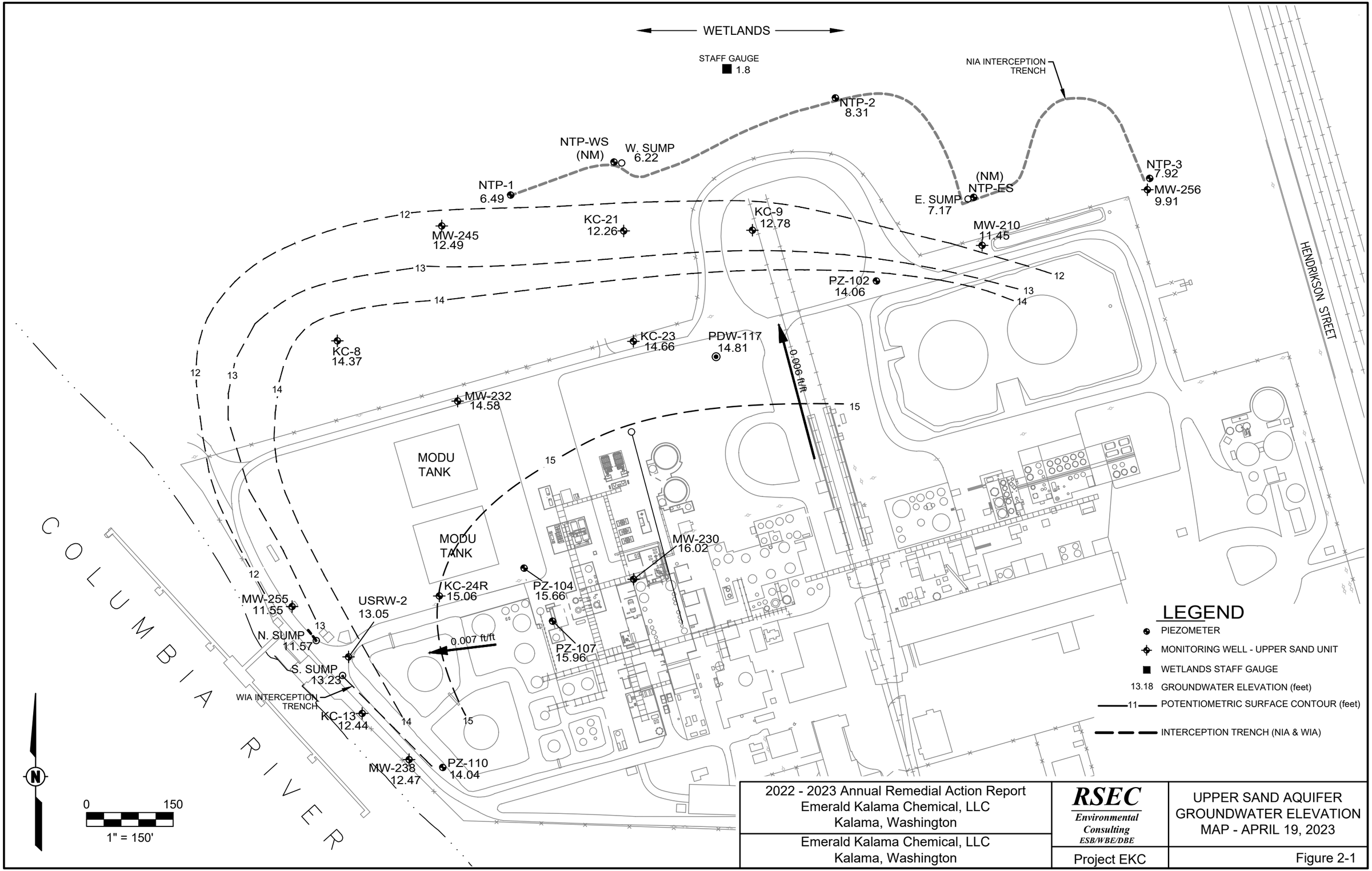
Total Toluene Removed Since 1997 ICM Start-up		**52,826**
Total Benzene Since 2011 (Consistent Data Not Available Pre-2	**108**	

Figures



Kalama Facility Site Layout

Figure 1-1



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Kalama, Washington

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UPPER SAND AQUIFER GROUNDWATER ELEVATION MAP - APRIL 19, 2023

Project EKC

Figure 2-1

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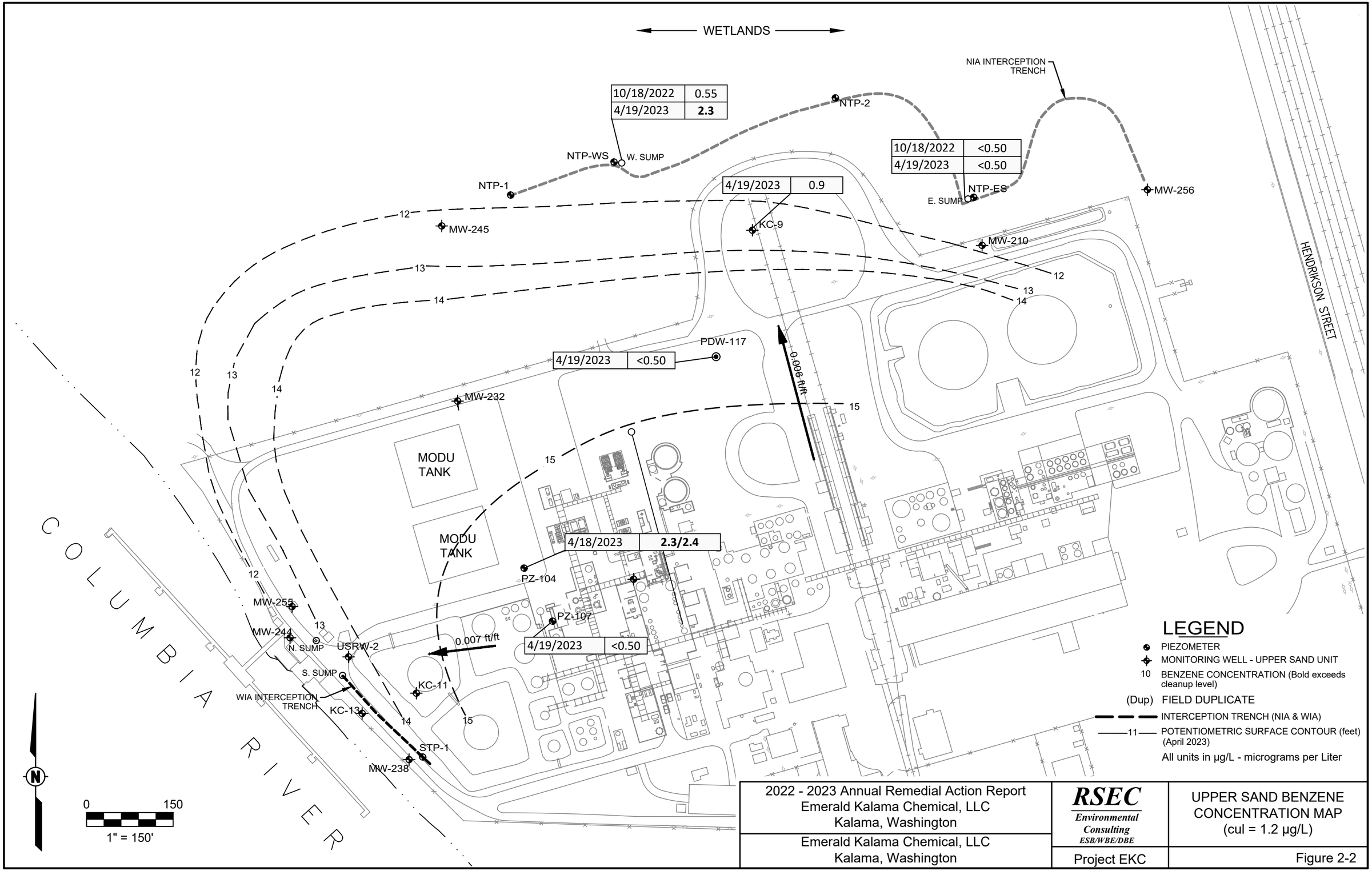

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UPPER SAND BENZENE CONCENTRATION MAP
(cul = 1.2 µg/L)

Project EKC

Figure 2-2

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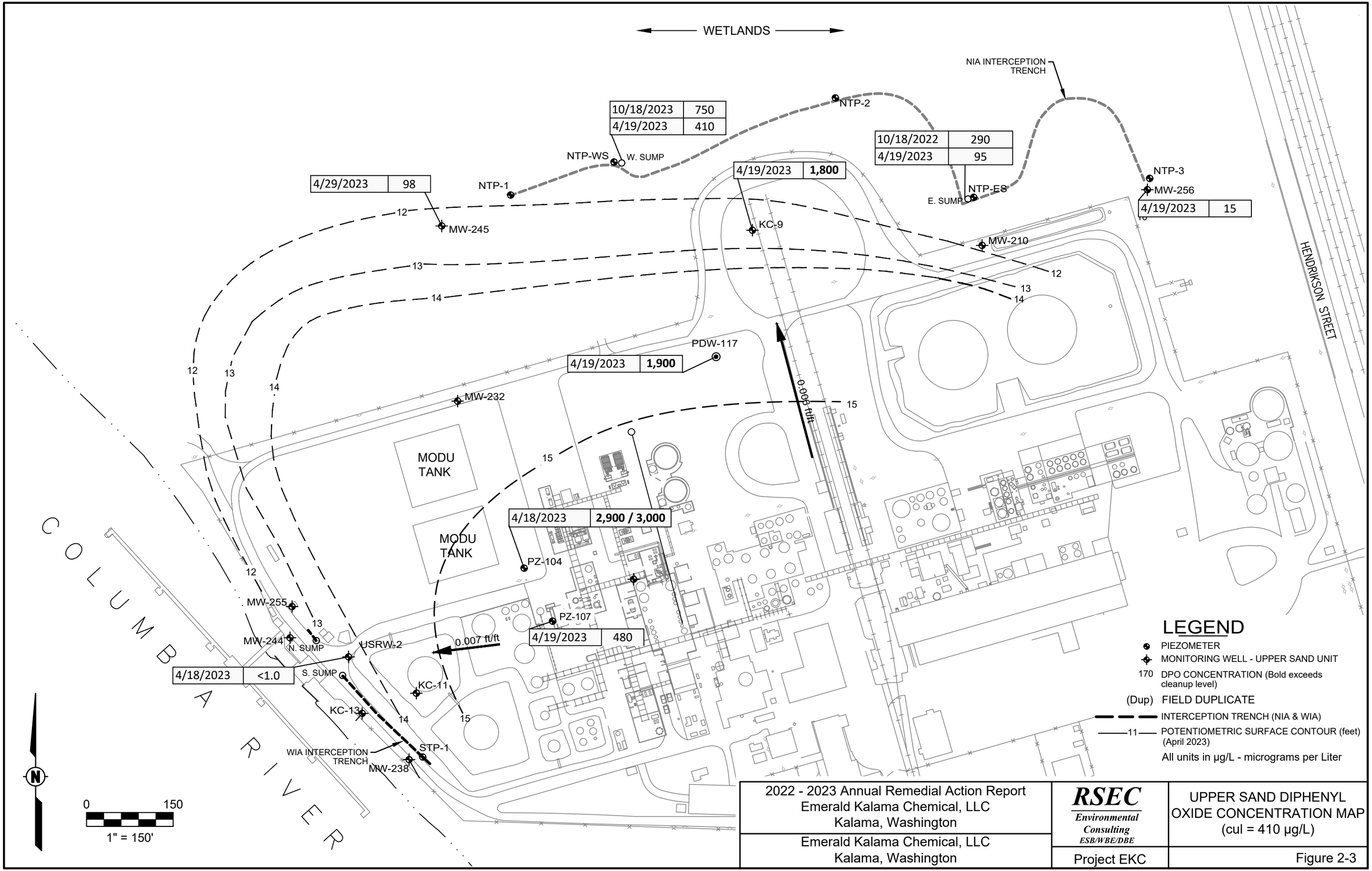

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UPPER SAND DIPHENYL OXIDE CONCENTRATION MAP
(cul = 410 µg/L)

Project EKC

Figure 2-3

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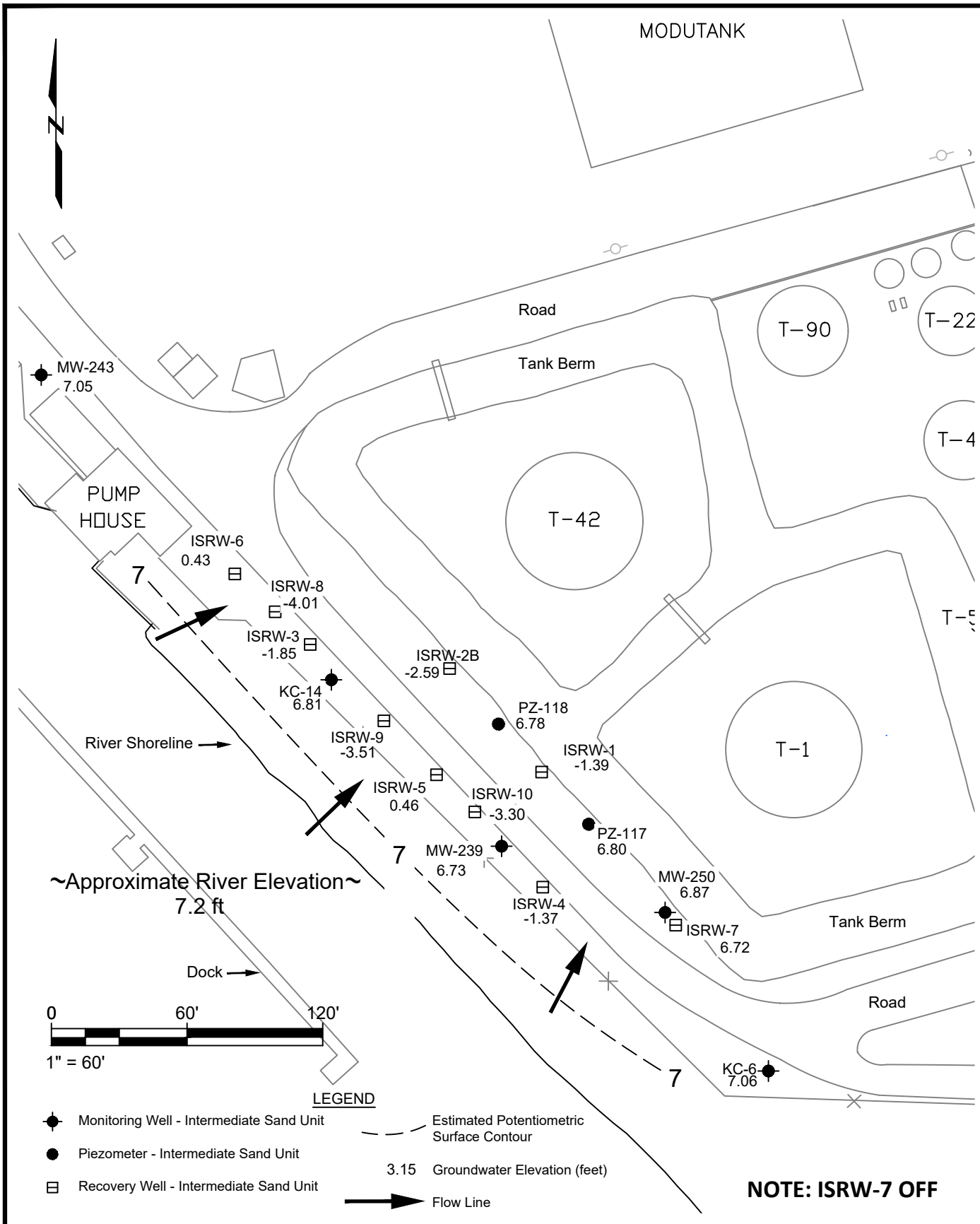

2022 - 2023 Annual Remedial Action Report Emerald Kalama Chemical, LCC Kalama, Washington	RSEC Environmental Consulting ESB/WBE/DBE	WIA Intermediate Sand Aquifer Potentiometric Surface Map July 6, 2022
Emerald Kalama Chemical, LCC Kalama, Washington	Project EKC	Figure 4-1

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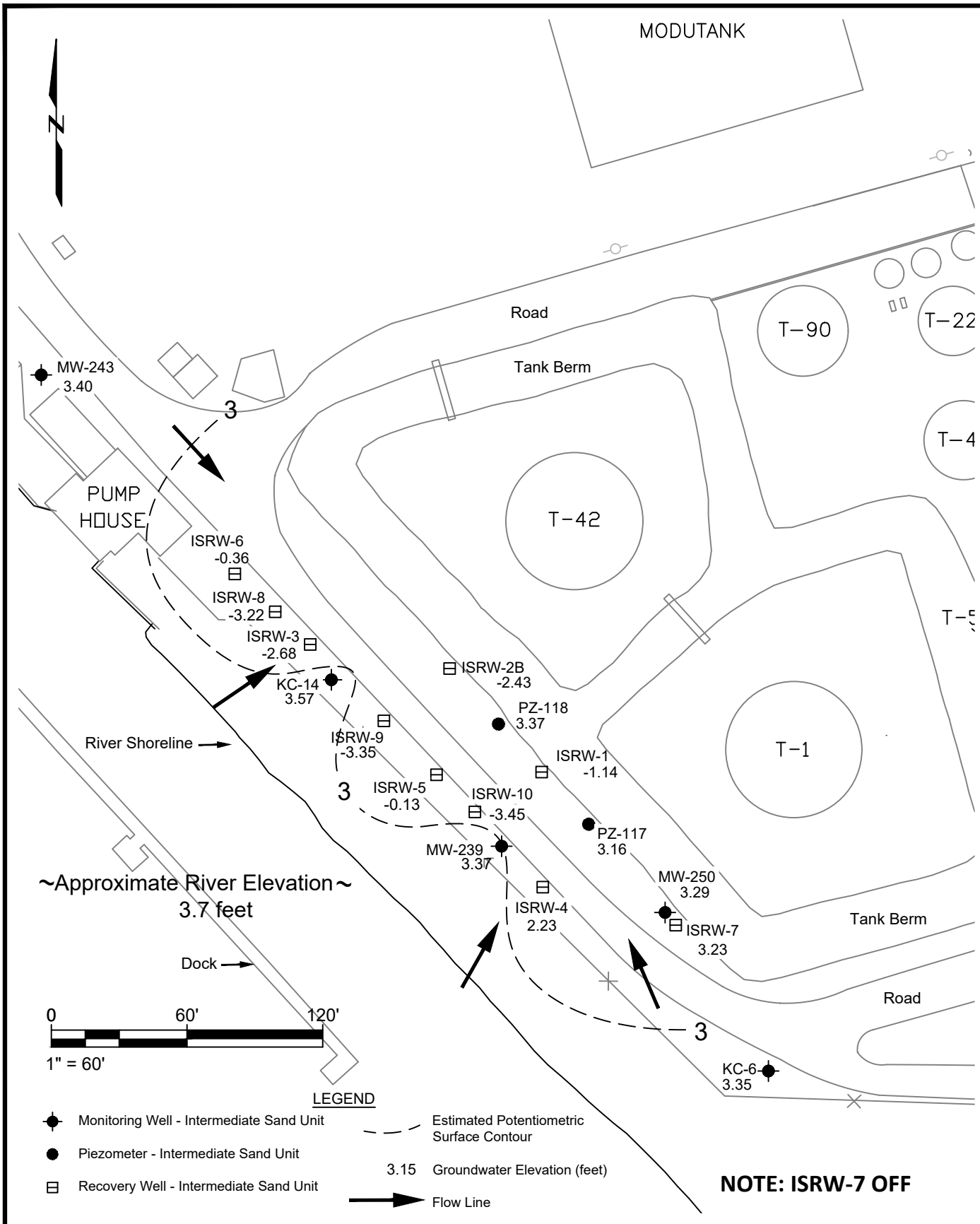

2022 - 2023 Annual Remedial Action Report Emerald Kalama Chemical, LCC Kalama, Washington	RSEC Environmental Consulting ESB/WBE/DBE	WIA Intermediate Sand Aquifer Potentiometric Surface Map October 18, 2022
Emerald Kalama Chemical, LCC Kalama, Washington	Project EKC	Figure 4-2

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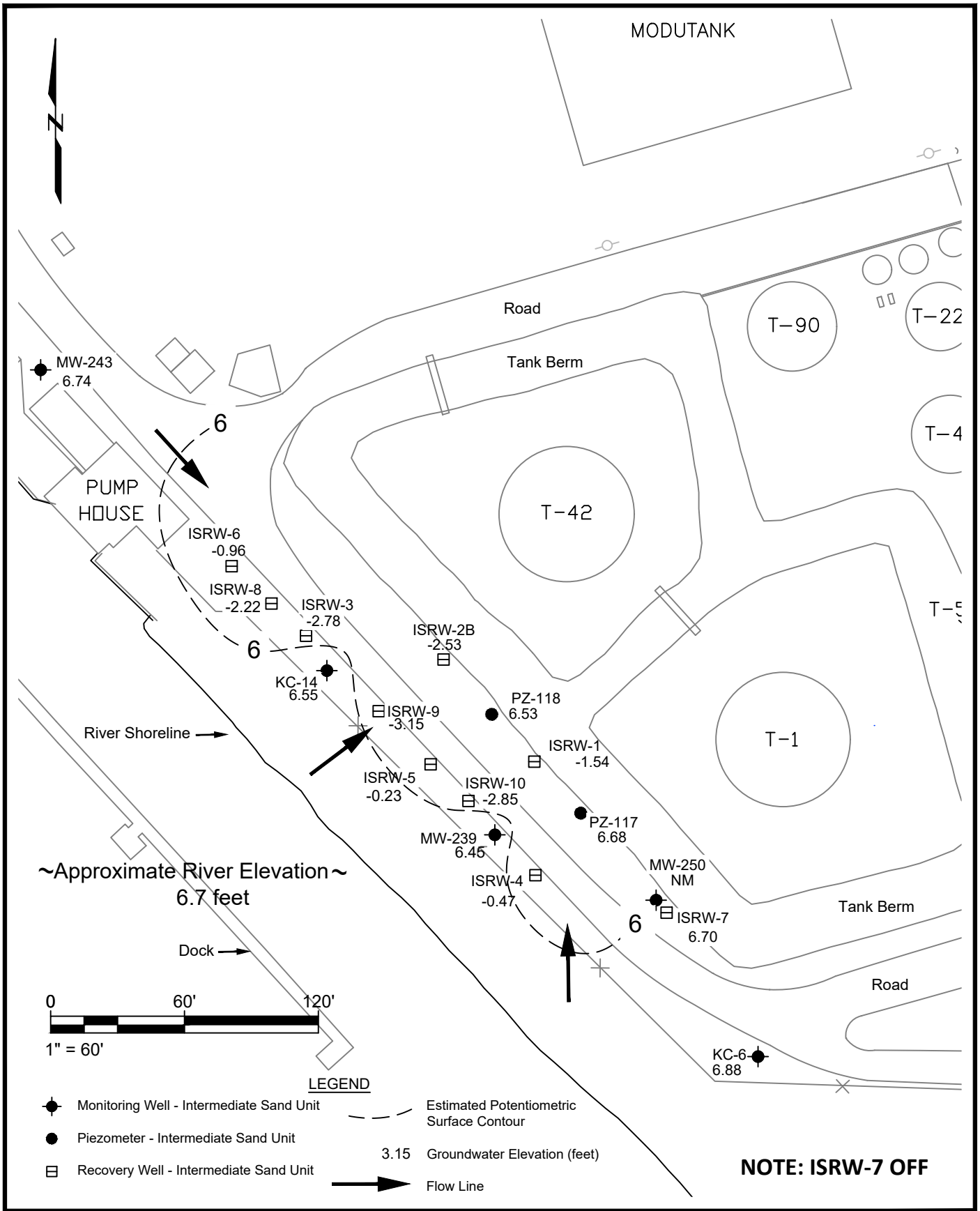

2022 - 2023 Annual Remedial Action Report Emerald Kalama Chemical, LCC Kalama, Washington	RSEC Environmental Consulting ESB/WBE/DBE	WIA Intermediate Sand Aquifer January 11, 2023
Emerald Kalama Chemical, LCC Kalama, Washington	Project EKC	Figure 4-3

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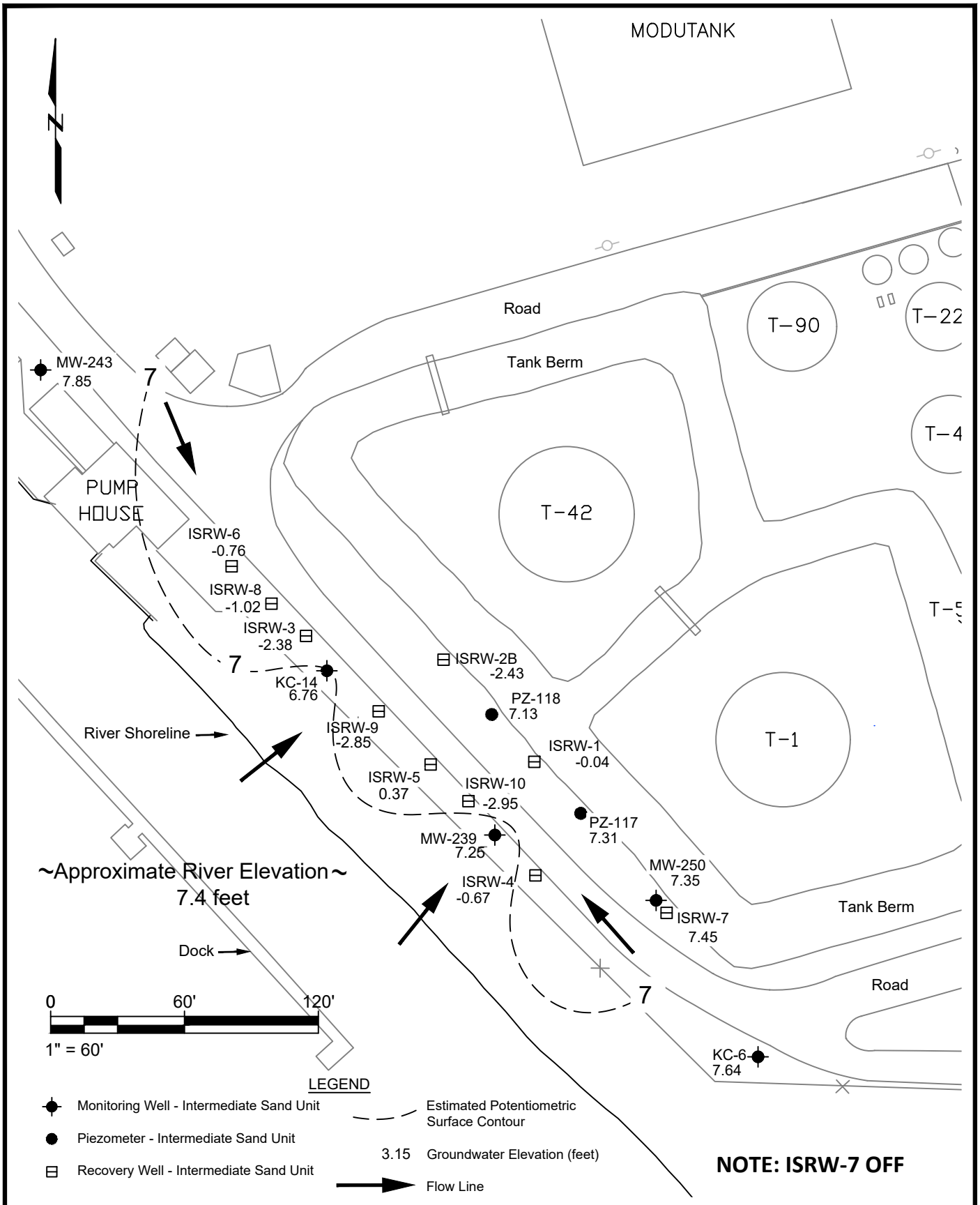

2022 - 2023 Annual Remedial Action Report Emerald Kalama Chemical, LCC Kalama, Washington	RSEC Environmental Consulting ESB/WBE/DBE	WIA Intermediate Sand Aquifer April 11, 2023
Emerald Kalama Chemical, LCC Kalama, Washington	Project EKC	Figure 4-4

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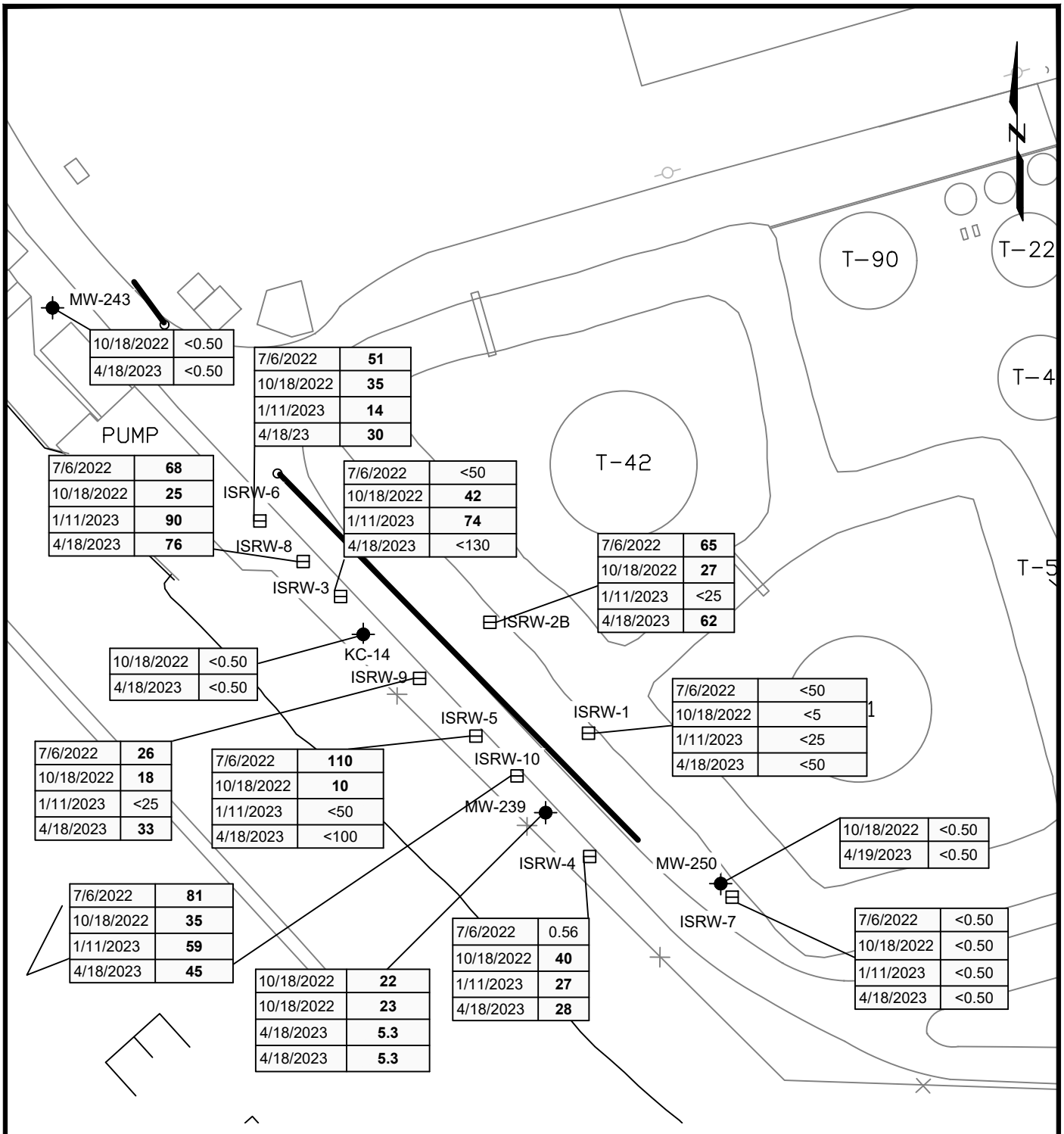

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WIA Intermediate Sand Aquifer
Benzene Concentrations
(cul = 1.2 µg/L)

Project EKC

Figure 4-5

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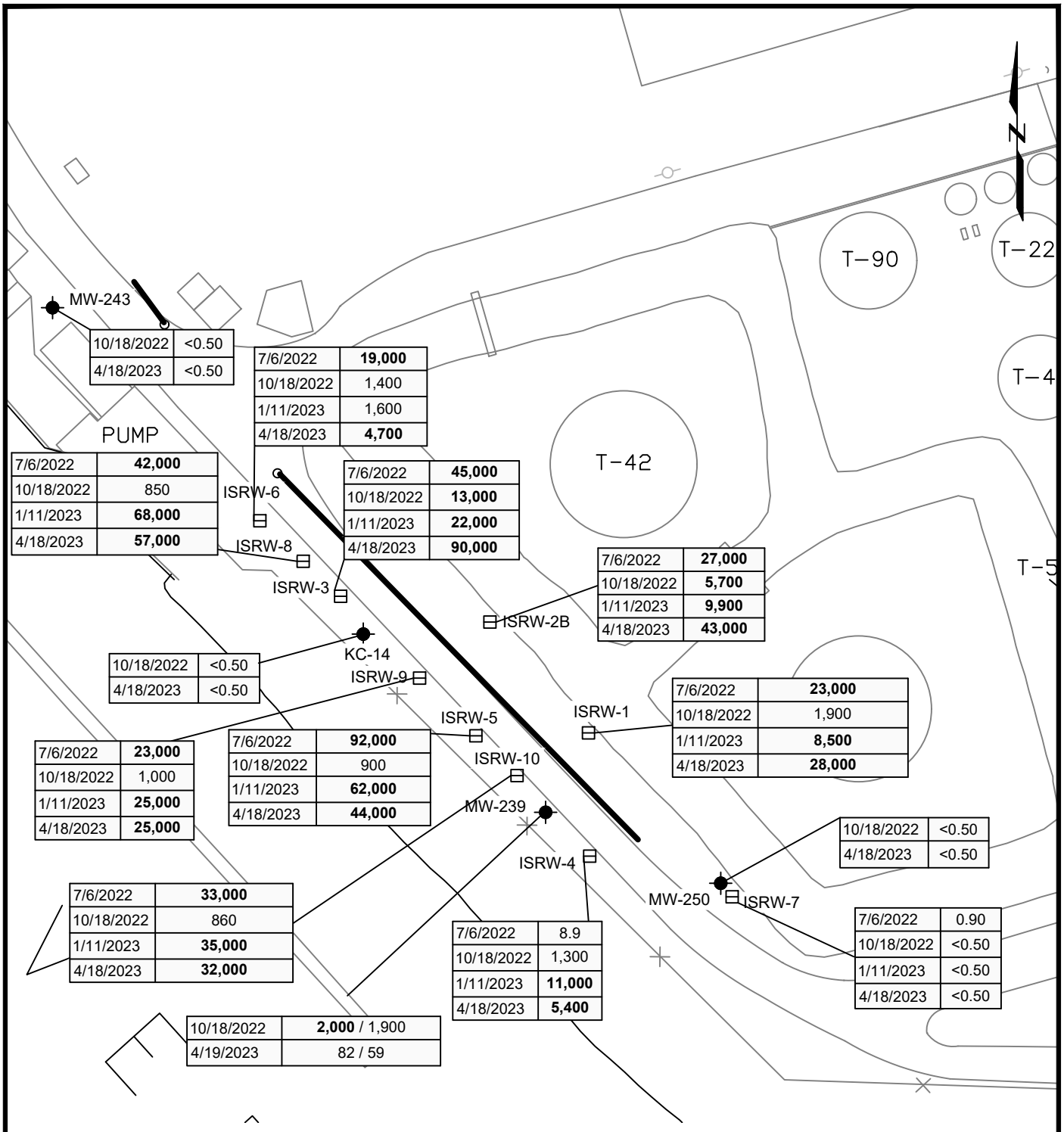

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WIA Intermediate Sand Aquifer
Toluene Concentrations
(cul = 2,000 µg/L)

Project EKC

Figure 4-6

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Appendix A

Ground Water Elevation Data Tables

Table B NIA Upper Sand Gauging Data

Well	MP Elevation	4/19/2023			4/19&21/2022			10/4/2021			4/12/2021			10/19/2020			4/7/2020			10/15/2019		
		Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation
KC-8	24.57	1300	10.2	14.37	1220 / 21	9.87	14.70	1740	13.29	11.28	1445	11.05	13.52	1251	12.78	11.79	1210	11.06	13.51	1155	13.4	11.17
KC-9 (2)	21.07	1200	8.29	12.78	1400 / 19	8.05	13.02	1245	10.73	10.34	1215	8.9	12.17	1332	10.26	10.81	1242	8.95	12.12	1105	10.8	10.27
KC-21	24.61	1305	12.35	12.26	1135 / 21	12.5	12.11	nm	nm	#VALUE!	1340	13.35	11.26	1256	14.72	9.89	1215	13.41	11.20	1140	15.11	9.50
KC-23	23.87	1110	9.21	14.66	1536 / 19	9	14.87	1640	11.87	12.00	1330	9.62	14.25	1335	11.42	12.45	1330	9.72	14.15	1130	11.9	11.97
MW-210	26.44	1250	14.99	11.45	1533 / 19	14.86	11.58	1234	16.75	9.69	1055	15.26	11.18	1324	16.49	9.95	1040	15.40	11.04	1122	17.77	8.67
MW-232	24.59	1100	10.01	14.58	1540 / 19	9.8	14.79	nm	nm	#VALUE!	1500	10.44	14.15	1350	12.54	12.05	1350	10.73	13.86	1215	13.04	11.55
MW-245	25.81	1430	13.32	12.49	1150 / 21	13.18	12.63	1705	15.74	10.07	1400	14.02	11.79	1249	15.48	10.33	1125	14.09	11.72	1010	15.8	10.01
MW-256	19.09	1255	9.18	9.91	1040 / 21	9.06	10.03	1200	10.36	8.73	1105	9.39	9.70	1322	10.02	9.07	1020	9.46	9.63	930	10.5	8.59
PZ-102	25.76	1245	11.7	14.06	1530 / 19	11.5	14.26	1237	14.17	11.59	1050	12.04	13.72	1326	13.69	12.07	1325	12.10	13.66	1120	14.12	11.64
NTP-1	23.99	1445	17.5	6.49	1230 / 21	16.72	7.27	1715	18.7	5.29	1338	18.5	5.49	1248	18.7	5.29	1220	18.14	5.85	1150	18.73	5.26
NTP-2	16.91	1455	8.6	8.31	1142 / 21	8.3	8.61	1750	10.9	6.01	1205	9.25	7.66	#######	10.9	6.01	1105	9.77	7.14	1141	NM	NM
NTP-3	15.61	1310	7.69	7.92	1100 / 21	7.61	8.00	1215	8.8	6.81	1140	7.6	8.01	1320	8.9	6.71	NM	NM	NM	945	8.8	6.81
East Sump	13.47	1340	6.3	7.17	1115 / 21	6.12	7.35	1220	8.45	5.02	1200	6.3	7.17	1315	8.4	5.07	1045	8.05	5.42	1115	8.4	5.07
West Sump	13.62	1410	7.4	6.22	1138 / 21	6.55	7.07	1740	8.42	5.20	1335	8.4	5.22	1245	8.6	5.02	1050	8.07	5.55	1146	8.75	4.87
Staff Gauge	8.17	1450	1.8	1.8	1145 / 21	2.7	2.70			dry	1350	~2	1.30	1250	dry	dry	1100	1.3	1.30	1143	dry	dry

Notes:

Wetlands staff gauge used to measure surface water elevation

NM - Not Measured - due to either wetland flooding or other obstruction.

NTP-ES&WS, MW-201 & -205 Removed from gauging per Ecy 10/21/20 apprvl.

New MP elevation starting April 20, 2015 data due to RR infrastructure changes

Gauging modified to Annual in April, Ecy Oct 2022

Table B CIA Upper Sand Gauging Data

Well	MP Elevation	4/19/2023			4/19&21/2022			10/4/2021			4/12/2021			10/19/2020			4/7/2020			10/15/2019		
		Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation
KC-9 (2)	21.07	1200	8.29	12.78	1400 / 19	8.05	13.02	1245	10.73	10.34	1215	8.9	12.17	1332	10.26	10.81	1242	8.95	12.12	1330	10.8	10.27
MW-210	26.44	1250	14.99	11.45	1533 / 19	14.86	11.58	1234	16.75	9.69	1055	15.26	11.18	1324	16.49	9.95	1040	15.40	11.04	1122	17.77	8.67
MW-230	26.16	1430	10.14	16.02	1300 / 21	10.04	16.12	1503(10/1)	13.16	13.00	1610	10.2	15.96	1342	12.86	13.30	1340	10.42	15.74	1238	13.18	12.98
MW-231 (2,3)	22.15				850 / 21	6.39	15.76	0830(10/6)	9.48	12.67	0930	6.76	15.39			22.15	4/9 - 1445	6.91	15.24	1900	9.49	12.66
PDW-117	25.85	1120	11.04	14.81	1445 / 19	10.82	15.03	1440	13.83	12.02	1000	11.38	14.47	1337	13.38	12.47	1035	11.49	14.36	1100	13.90	11.95
PZ-104	24.83	1425	9.17	15.66	1430 / 21	9.09	15.74	1457(10/1)	12.08	12.75	1510	9.32	15.51	1349	11.75	13.08	1350	9.53	15.30	1230	12.14	12.69
PZ-107	25.5	1420	9.54	15.96	1340 / 21	9.5	16.00	1500(10/1)	12.6	12.90	1810	9.68	15.82	1346	12.25	13.25	1345	9.90	15.60	1235	12.64	12.86

Notes: 1 - Facility RR extension temporarily blocked well
2 - New MP elevation starting April 20, 2015 data due to RR infrastructure changes
3 - Cease gauging MW-231 Oct 2022 / CIA Gauging Annual in April starting Oct 2022

Table B WIA Upper Sand Gauging Data

Well	MP Elevation	4/18/2023			4/19&21/2022			10/1/2021			4/13/2021			10/19/2020			4/7/2020			10/15/2019		
		Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation	Time	Depth to Water	Ground-water Elevation
KC-13	23.34	1400	10.9	12.44	0 / 21	10.84	12.5	1445	14.39	8.95	1448	11.29	12.05	918	13.14	10.2	1420	11.20	12.14	1315	14.4	8.94
KC-24R	24.76	1410	9.7	15.06	1450 / 21	9.63	15.13	1454	12.55	12.21	1445	10	14.76	936	12.16	12.6	1415	10.14	14.62	1245	12.57	12.19
MW-238	25.10	1355	12.63	12.47	0 / 21	12.60	12.5	1440	14.08	11.02	1452	13.42	11.68	920	14.19	10.91	1430	13.28	11.82	1318	15.01	10.09
MW-255	21.96	1350	10.41	11.55	1542 / 19	10.39	11.57	1451	12.75	9.21	1515	11.03	10.93	935	12.27	9.69	1400	10.98	10.98	1303	12.83	9.13
PZ-110	25.76	1358	11.72	14.04	0 / 21	11.89	13.87	1442	14.6	11.16	1500	12.29	13.47	925	14.23	11.53	1432	12.59	13.17	1320	14.59	11.17
USRW-2	22.85	1330	9.8	13.05	1310 / 19	9.75	13.1	1447	12.78	10.07	1720	10.38	12.47	932	12.22	10.63	1410	10.26	12.59	1416	12.88	9.97
STP-1	23.15													939	12.55	10.6	1430	10.58	12.57	1418	12.9	10.25
N. SUMP	23.29	1340	11.72	11.57	1545 / 19	11.5	11.79	1449	13.85	9.44	1442	12.18	11.11	934	13.42	9.87	1403	12.00	11.29		nm	
S. SUMP	23.34	1345	10.11	13.23	1543 / 19	10.9	12.44	1446	13.6	9.74	1440	10.68	12.66	930	12.92	10.42	1408	10.55	12.79		nm	

NOTES:
KC-12, KC-15, KCP-6, PZ-106 REMOVED FROM GAUGING PER ECY 112916 LTR
MW-244 & STP-1 Removed from gauging per Ecy 10/21/20 Apprvl
Gauging modified to Annual in April per Ecy Oct 2022 Apprvl

Table B WIA Intermediate Sand Gauging Data

Well	Updated MP Elevation 7-2019 (#4,5,7,8 stkup lowered 7-15-19)	4/ 11 /2023			1/11/2023			10/18/2022			7/6/2022			4/19/2022			1/18/2022		
		Time	DTW	GW Elev (7-15-19 MP)	Time	DTW	GW Elev (7-15-19 MP)	Time	DTW	GW Elev (7-15-19 MP)	Time	DTW	GW Elev (7-15-19 MP)	Time	DTW	GW Elev (7-15-19 MP)	Time	DTW	GW Elev (7-15-19 MP)
River	0 - MSL	1015		7.4	1000		6.7	1245		3.7	1115		7.2	930		6.30	1334		7.7
KC-6	25.02	1020	17.38	7.64	1020	18.14	6.88	1304	21.67	3.35	1100	17.96	7.06	937	17.87	7.15	1426	16.93	8.09
KC-14	23.29	1135	16.33	6.96	1010	16.73	6.55	1253	19.72	3.57	1120	16.48	6.81	952	16.77	6.52	1342	15.83	7.46
MW-239	25.35	1025	18.10	7.25	1018	18.90	6.45	1300	21.98	3.37	1113	18.62	6.73	956	18.95	6.40	1413	17.55	7.80
MW-243	25.9	1027	18.05	7.85	1003	19.16	6.74	1210	22.50	3.40	1125	18.85	7.05	945	19.32	6.58	1338	18.48	7.42
MW-250	26.12	1023	18.77	7.35				1308	22.83	3.29	1105	19.25	6.87	935	19.23	6.89	1416	18.34	7.78
PZ-117	25.92	1040	18.61	7.31	1015	19.24	6.68	1301	22.76	3.16	1110	19.12	6.80	940	19.12	6.80	1408	18.66	7.26
PZ-118	25.18	1041	18.05	7.13	1013	18.65	6.53	1256	21.81	3.37	1117	18.40	6.78	942	18.60	6.58	1405	17.68	7.50
ISRW-1	25.26	1043	25.30	-0.04	1027	26.8	-1.54	1313	26.4	-1.14	1240	26.65	-1.39	1035	27.30	-2.04	1400	26.1	-0.84
ISRW-2b	24.47	1029	26.90	-2.43	1035	27.0	-2.53	1303	26.9	-2.43	1142	27.06	-2.59	1038	27.10	-2.63	1350	26.6	-2.13
ISRW-3	23.82	1035	26.20	-2.38	1037	26.6	-2.78	1319	26.5	-2.68	1134	25.67	-1.85	1009	27.10	-3.28	1320	26.7	-2.88
ISRW-4	24.33	1037	25.00	-0.67	1025	24.8	-0.47	1310	22.1	2.23	1248	25.70	-1.37	1024	25.70	-1.37	1409	25.4	-1.07
ISRW-5	24.07	1045	23.70	0.37	1031	24.3	-0.23	1315	24.2	-0.13	1255	23.61	0.46	1015	24.50	-0.43	1355	24.0	0.07
ISRW-6	23.54	1055	24.30	-0.76	1045	24.5	-0.96	1322	23.9	-0.36	1130	23.11	0.43	1000	25.60	-2.06	1325	24.5	-0.96
ISRW-7	24.83	1022	17.38	7.45	1022	18.13	6.70	1306	21.6	3.23	1245	18.11	6.72	1030	18.30	6.53	1423	16.9	7.93
ISRW-8	23.88	1031	24.90	-1.02	1040	26.1	-2.22	1321	27.1	-3.22	1300	27.89	-4.01	1004	28.00	-4.12	1315	28.1	-4.22
ISRW-9	23.55	1033	26.40	-2.85	1033	26.7	-3.15	1317	26.9	-3.35	1138	27.06	-3.51	1012	27.30	-3.75	1345	27.2	-3.65
ISRW-10	24.35	1047	27.30	-2.95	1029	27.2	-2.85	1312	27.8	-3.45	1250	27.65	-3.30	1020	27.70	-3.35	1358	27.4	-3.05

Notes:

Wells MW-236, MW-249, and KC-17 removed from elevation gauging program per 11/29/16 Ecology approval Letter

River staff gauge used to estimate elevation of Columbia River, High/Low Tide based on NOAA Tide Table

NM - Not measured.

KCP-3 Elevation re-surveyed 4/10/17, corrrected to 27.57

ISRW 1 - 10 are pumping wells, water levels set by control floats & pump cycles

NOTE MW-249, KC17, MW-236 GAUGING CEASED 112916 ECY LTR

Appendix B

Laboratory Reports: Oct.-2022 and April-2023 (transmitted via e-file)

July 2022 ISRW Sampling

Laboratory Data Report

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: RSEC Inc
Project: LKC-0722
Sample Matrix: Water

Service Request: K2207545
Date Received: 07/06/2022

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Eleven water samples were received for analysis at ALS Environmental on 07/06/2022. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Volatiles by GC/MS:

Method 8260C:Samples ISRW-1, ISRW-2b, ISRW-3, ISRW-5, ISRW-6, ISRW-8, ISRW-9, and ISRW-10 required dilution due to the presence of elevated levels of a target analyte. The reporting limits are adjusted to reflect the dilution.

Approved by  Date 07/14/2022

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ISRW-1			Lab ID: K2207545-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	23000			1000	ug/L	8260C

CLIENT ID: ISRW-2b			Lab ID: K2207545-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	65			25	ug/L	8260C
Toluene	27000			500	ug/L	8260C

CLIENT ID: ISRW-3			Lab ID: K2207545-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	45000			1000	ug/L	8260C

CLIENT ID: ISRW-4			Lab ID: K2207545-004			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	0.56			0.50	ug/L	8260C
Toluene	8.9			0.50	ug/L	8260C

CLIENT ID: ISRW-5			Lab ID: K2207545-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	110			100	ug/L	8260C
Toluene	92000			2500	ug/L	8260C

CLIENT ID: ISRW-6			Lab ID: K2207545-006			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	51			13	ug/L	8260C
Toluene	19000			250	ug/L	8260C

CLIENT ID: ISRW-7			Lab ID: K2207545-007			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	0.90			0.50	ug/L	8260C

CLIENT ID: ISRW-8			Lab ID: K2207545-008			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	68			50	ug/L	8260C
Toluene	42000			1000	ug/L	8260C

CLIENT ID: ISRW-9			Lab ID: K2207545-009			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	26			25	ug/L	8260C
Toluene	23000			500	ug/L	8260C

CLIENT ID: ISRW-10			Lab ID: K2207545-010			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	81			50	ug/L	8260C
Toluene	33000			1300	ug/L	8260C

CHAIN OF CUSTODY

SR# K2207545

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE 1 OF 1 COC# 1

PROJECT NAME	LKC-0722
PROJECT NUMBER	LKC-0722
PROJECT MANAGER	Rich Trucx
COMPANY NAME	RSEC
ADDRESS	958 Hood View Ct.
CITY/STATE/ZIP	Hood River, OR. 97031
E-MAIL ADDRESS	rich@rsecinc.com
PHONE #	541-490-4223 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☒	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐ 8021☐ BTEX☐	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, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases CO_2☐ RSK 175☐ Methane☐ Ethane☐ Ethene☐	REMARKS
ISRW-1	7/6/22	1000		GW	3		X														
ISRW-2b		1015																			
ISRW-3		1030																			
ISRW-4		1045																			
ISRW-5		1100																			
ISRW-6		1115																			
ISRW-7		1130																			
ISRW-8		1145																			
ISRW-9		1200																			
ISRW-10		1215																			

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. # LKC-0722

Bill To: rich@rsecinc.com

TURNAROUND REQUIREMENTS

☐ 24 hr. ☐ 48 hr. ☐ 5 day ☒ Standard (15 working days) ☐ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

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

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

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

*Benzene + Toluen only all Smpls.

~~TPH for Diesel~~

Container Supply Number

124755

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 7/6 2:10p	Date/Time: 7/6/22 1410	Date/Time:	Date/Time:
Printed Name: R. Trucx	Printed Name: M. Mellegers	Printed Name:	Printed Name:
Firm: RSEC	Firm: RSEC	Firm:	Firm:

PM 12

Cooler Receipt and Preservation Form

Client RSEC Service Request K22 07545

Received: 7/6/22 Opened: 7/6/22 By: Unloaded: 7/6/22 By:

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

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
14.6	7.6	IR02					

4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column above:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N
15. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? NA Y N Under filled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, Resolutions: _____

Volatile Organic Compounds by GC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 10:00
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-1	**Units:**	ug/L
Lab Code:	K2207545-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	50	100	07/07/22 19:01	
Toluene	**23000**	1000	2000	07/07/22 16:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	68 - 117	07/07/22 19:01	
Dibromofluoromethane	119	73 - 122	07/07/22 19:01	
Toluene-d8	112	65 - 144	07/07/22 19:01	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 10:15
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-2b	**Units:**	ug/L
Lab Code:	K2207545-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**65**	25	50	07/07/22 19:23	
Toluene	**27000**	500	1000	07/07/22 17:06	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	07/07/22 19:23	
Dibromofluoromethane	117	73 - 122	07/07/22 19:23	
Toluene-d8	110	65 - 144	07/07/22 19:23	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 10:30
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-3	**Units:**	ug/L
Lab Code:	K2207545-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	50	100	07/07/22 19:46	
Toluene	**45000**	1000	2000	07/07/22 17:29	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	93	68 - 117	07/07/22 19:46	
Dibromofluoromethane	117	73 - 122	07/07/22 19:46	
Toluene-d8	112	65 - 144	07/07/22 19:46	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 10:45
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-4	**Units:**	ug/L
Lab Code:	K2207545-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**0.56**	0.50	1	07/13/22 12:32	
Toluene	**8.9**	0.50	1	07/13/22 12:32	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	86	68 - 117	07/13/22 12:32	
Dibromofluoromethane	96	73 - 122	07/13/22 12:32	
Toluene-d8	98	65 - 144	07/13/22 12:32	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 11:00
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-5	**Units:**	ug/L
Lab Code:	K2207545-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**110**	100	200	07/07/22 20:09	
Toluene	**92000**	2500	5000	07/07/22 17:52	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	68 - 117	07/07/22 20:09	
Dibromofluoromethane	117	73 - 122	07/07/22 20:09	
Toluene-d8	111	65 - 144	07/07/22 20:09	

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 11:15
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-6	**Units:**	ug/L
Lab Code:	K2207545-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**51**	13	25	07/07/22 20:32	
Toluene	**19000**	250	500	07/07/22 18:15	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	07/07/22 20:32	
Dibromofluoromethane	116	73 - 122	07/07/22 20:32	
Toluene-d8	113	65 - 144	07/07/22 20:32	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 11:30
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-7	**Units:**	ug/L
Lab Code:	K2207545-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	07/08/22 18:34	
Toluene	**0.90**	0.50	1	07/08/22 18:34	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	95	68 - 117	07/08/22 18:34	
Dibromofluoromethane	118	73 - 122	07/08/22 18:34	
Toluene-d8	114	65 - 144	07/08/22 18:34	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 11:45
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-8	**Units:**	ug/L
Lab Code:	K2207545-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**68**	50	100	07/07/22 20:55	
Toluene	**42000**	1000	2000	07/07/22 18:38	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	94	68 - 117	07/07/22 20:55	
Dibromofluoromethane	118	73 - 122	07/07/22 20:55	
Toluene-d8	113	65 - 144	07/07/22 20:55	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 12:00
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-9	**Units:**	ug/L
Lab Code:	K2207545-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**26**	25	50	07/08/22 19:43	
Toluene	**23000**	500	1000	07/08/22 18:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	92	68 - 117	07/08/22 19:43	
Dibromofluoromethane	118	73 - 122	07/08/22 19:43	
Toluene-d8	113	65 - 144	07/08/22 19:43	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 12:15
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	ISRW-10	**Units:**	ug/L
Lab Code:	K2207545-010	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**81**	50	100	07/08/22 20:06	
Toluene	**33000**	1300	2500	07/08/22 19:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	07/08/22 20:06	
Dibromofluoromethane	116	73 - 122	07/08/22 20:06	
Toluene-d8	112	65 - 144	07/08/22 20:06	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	07/06/22 10:00
Sample Matrix:	Water	**Date Received:**	07/06/22 14:10
Sample Name:	Trip Blanks	**Units:**	ug/L
Lab Code:	K2207545-011	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	07/08/22 17:48	
Toluene	ND U	0.50	1	07/08/22 17:48	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	68 - 117	07/08/22 17:48	
Dibromofluoromethane	122	73 - 122	07/08/22 17:48	
Toluene-d8	112	65 - 144	07/08/22 17:48	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: RSEC Inc **Service Request:** K2207545
Project: LKC-0722/LKC-0722
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Extraction Method: None

Sample Name	Lab Code	4-Bromofluorobenzene 68-117	Dibromofluoromethane 73-122	Toluene-d8 65-144
ISRW-1	K2207545-001	96	119	112
ISRW-2b	K2207545-002	95	117	110
ISRW-3	K2207545-003	93	117	112
ISRW-4	K2207545-004	86	96	98
ISRW-5	K2207545-005	96	117	111
ISRW-6	K2207545-006	95	116	113
ISRW-7	K2207545-007	95	118	114
ISRW-8	K2207545-008	94	118	113
ISRW-9	K2207545-009	92	118	113
ISRW-10	K2207545-010	91	116	112
Trip Blanks	K2207545-011	96	122	112
Method Blank	KQ2211192-05	100	121	113
Method Blank	KQ2211218-05	96	121	112
Method Blank	KQ2211379-05	90	99	90
Lab Control Sample	KQ2211192-03	106	112	116
Duplicate Lab Control Sample	KQ2211192-04	109	111	116
Lab Control Sample	KQ2211218-03	102	114	116
Duplicate Lab Control Sample	KQ2211218-04	102	114	117
Lab Control Sample	KQ2211379-03	107	98	92
Duplicate Lab Control Sample	KQ2211379-04	107	96	93

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2211192-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	07/07/22 12:09	
Toluene	ND U	0.50	1	07/07/22 12:09	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	07/07/22 12:09	
Dibromofluoromethane	121	73 - 122	07/07/22 12:09	
Toluene-d8	113	65 - 144	07/07/22 12:09	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2211218-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	07/08/22 13:54	
Toluene	ND U	0.50	1	07/08/22 13:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	96	68 - 117	07/08/22 13:54	
Dibromofluoromethane	121	73 - 122	07/08/22 13:54	
Toluene-d8	112	65 - 144	07/08/22 13:54	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2211379-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	07/13/22 12:07	
Toluene	ND U	0.50	1	07/13/22 12:07	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	07/13/22 12:07	
Dibromofluoromethane	99	73 - 122	07/13/22 12:07	
Toluene-d8	90	65 - 144	07/13/22 12:07	

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Analyzed:**	07/07/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	769791

	Lab Control Sample KQ2211192-03			Duplicate Lab Control Sample KQ2211192-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	10.3	10.0	103	10.4	10.0	104	69-124	<1	30
Toluene	10.3	10.0	103	10.4	10.0	104	69-124	1	30

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Analyzed:**	07/08/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	769960

	Lab Control Sample KQ2211218-03			Duplicate Lab Control Sample KQ2211218-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	10.4	10.0	104	10.5	10.0	105	69-124	1	30
Toluene	10.6	10.0	106	10.7	10.0	107	69-124	1	30

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2207545
Project:	LKC-0722/LKC-0722	**Date Analyzed:**	07/13/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	770357

	Lab Control Sample KQ2211379-03			Duplicate Lab Control Sample KQ2211379-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.11	10.0	91	9.47	10.0	95	69-124	4	30
Toluene	8.40	10.0	84	8.66	10.0	87	69-124	3	30

October 2022 Semi-Annual Sampling

Laboratory Data Report

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: RSEC Inc
Project: Emerald Kalama
Sample Matrix: Water

Service Request: K2212191
Date Received: 10/18/2022

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Twenty one water samples were received for analysis at ALS Environmental on 10/18/2022. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Semivolatiles by GC/MS:

Method 8270D:The Method Blank KQ2218621-01
contained low levels of Bis(2-ethylhexyl) Phthalate slightly above the Method Reporting Limit (MRL). This analyte is flagged B for the associated field samples.
Method 8270D, 12/01/2022:The upper control criterion was exceeded for Bis(2-ethylhexyl) Phthalate in Laboratory Control Sample (LCS) KQ2218621-02 and Duplicate Laboratory Control Sample (DLCS) KQ2218621-03. The error associated with elevated recovery indicated a potential high bias. The sample data was not significantly affected. No further corrective action was appropriate.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.

Approved by  Date 12/20/2022

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: MW-239			Lab ID: K2212191-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	22			5.0	ug/L	8260C
Toluene	2000			50	ug/L	8260C

CLIENT ID: MW-97			Lab ID: K2212191-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	23			5.0	ug/L	8260C
Toluene	1900			50	ug/L	8260C

CLIENT ID: N1A-WS			Lab ID: K2212191-009			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	0.55			0.50	ug/L	8260C
Biphenyl	6.1			0.66	ug/L	8270D
Diphenyl Ether	750			50	ug/L	8270D

CLIENT ID: ISRW-2b			Lab ID: K2212191-012			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	27			13	ug/L	8260C
Toluene	5700			250	ug/L	8260C

CLIENT ID: ISRW-3			Lab ID: K2212191-013			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	42			13	ug/L	8260C
Toluene	13000			250	ug/L	8260C

CLIENT ID: ISRW-4			Lab ID: K2212191-014			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	40			2.5	ug/L	8260C
Toluene	1300			25	ug/L	8260C

CLIENT ID: ISRW-5			Lab ID: K2212191-015			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	10			2.5	ug/L	8260C
Toluene	900			25	ug/L	8260C

CLIENT ID: ISRW-6			Lab ID: K2212191-016			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	35			2.5	ug/L	8260C
Toluene	1400			25	ug/L	8260C

CLIENT ID: ISRW-8			Lab ID: K2212191-018			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	25			2.5	ug/L	8260C
Toluene	850			25	ug/L	8260C

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ISRW-9			Lab ID: K2212191-019			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	18			2.5	ug/L	8260C
Toluene	1000			25	ug/L	8260C

CLIENT ID: ISRW-10			Lab ID: K2212191-020			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	35			2.5	ug/L	8260C
Toluene	860			25	ug/L	8260C

CLIENT ID: W1A-NS			Lab ID: K2212191-006			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Bis(2-ethylhexyl) Phthalate	2.0	B		1.9	ug/L	8270D
Diphenyl Ether	110			10	ug/L	8270D

CLIENT ID: W1A-SS			Lab ID: K2212191-007			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Bis(2-ethylhexyl) Phthalate	2.0	B		1.9	ug/L	8270D
Diphenyl Ether	6.2			1.0	ug/L	8270D

CLIENT ID: W1A-PUD			Lab ID: K2212191-010			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Bis(2-ethylhexyl) Phthalate	2.2	B		1.9	ug/L	8270D
Diphenyl Ether	5.1			1.0	ug/L	8270D

CLIENT ID: N1A-ES			Lab ID: K2212191-008			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Diphenyl Ether	290			25	ug/L	8270D

CLIENT ID: ISRW-1			Lab ID: K2212191-011			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	1900			50	ug/L	8260C

CHAIN OF CUSTODY

SR# K2212191

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE ____ OF ____ COC# ____

PROJECT NAME: Emerald Kalama
PROJECT NUMBER: LKC-1022
PROJECT MANAGER: Rich Truax
COMPANY NAME: RSEC
ADDRESS: 958 Hood View Ct.
CITY/STATE/ZIP: Hood River, OR. 97031
E-MAIL ADDRESS: rich@rsecinc.com
PHONE #: 541-490-4223 FAX #:
SAMPLER'S SIGNATURE: [signature]

Analysis columns: 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☐; Alkalinity☐ CO3☐ HCO3☐ 506☐; Dioxins/Furans 1613☐ 8290☐; Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO2☐

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics (8270)	Volatile Organics (8260)	REMARKS
KC-14	10/18/22	1130		GW	3		X	B+T only
MW-243	↓	1145		↓	↓		↓	↓
MW-239	↓	1200		↓	↓		↓	↓
MW-250	↓	1215		↓	↓		↓	↓
MW-97	↓	1230		↓	↓		↓	↓
WIA-NS	↓	1245		↓	5	X	↓	See Comment
WIA-SS	↓	1300		↓	↓	X	↓	↓
NIA-ES	↓	1315		↓	↓	X	↓	↓
NIA-WS	↓	1330		↓	↓	X	↓	↓
WIA-PUD	↓	1345		↓	↓	X	↓	↓

REPORT REQUIREMENTS

X 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. # LKC-1022
Bill To: rich@rsecinc.com

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:
8260 - Benzene + Toluene. Benzene <1.0 ug/L where possible (probably MW-243, -250, KC-14, All WIA + NIA)
8270 - All samples Diphenyl-oxide (DPO) + biphenyl.
WIA samples add bis(2-ethylhexyl) phthalate

Container Supply Number 126649

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature: [signature]	Date/Time:	Signature: [signature]	Date/Time: 10/18/22 1600	Signature	Date/Time	Signature	Date/Time
Printed Name: R. Truax	Firm: RSEC	Printed Name: Michelyn Mitolo	Firm: ALS	Printed Name	Firm	Printed Name	Firm

CHAIN OF CUSTODY

SR# K2212191

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE ____ OF ____ COC# ____

PROJECT NAME: Emerald Kalama
PROJECT NUMBER: LKC-1022
PROJECT MANAGER: Rich Trilax
COMPANY NAME: RSEC
ADDRESS: 958 Hood View Ct.
CITY/STATE/ZIP: Hood River OR. 97031
E-MAIL ADDRESS: richt@rseginc.com
PHONE # 541-490-4223 FAX #
SAMPLER'S SIGNATURE: R.T.C

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ SIM PAH☐	Volatile Organics 624☐ 8260X 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, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases CO_2☐ RSK 175☐ Methane☐ Ethane☐ Ethene☐	REMARKS
ISRW-1	10/18/12	0900		GW	3		X														
ISRW-2b		0915																			SEE Comment
ISRW-3		0930																			
ISRW-4		0945																			
ISRW-5		1000																			
ISRW-6		1015																			
ISRW-7		1030																			
ISRW-8		1045																			
ISRW-9		1100																			
ISRW-10		1115																			

REPORT REQUIREMENTS

- X 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. # LKC-1022
Bill To: Richt@rseginc.com

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:

*8260 Benzene + Toluene only.
(Benzene @ <1ug/L if possible, but I know toluene levels will interfere).

Container Supply Number

126649

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature: 10/18/12 1600	Signature:	Signature:
Date/Time:	Date/Time:	Date/Time:	Date/Time:
Printed Name: R. Trilax	Printed Name: Kathelyn Matola	Printed Name:	Printed Name:
Firm: RSEC	Firm: ALS	Firm:	Firm:

PM 12

Cooler Receipt and Preservation Form

Client Emerald Kalama Service Request K22 12191

Received: 10/18/22 Opened: 10/18/22 By: Unloaded: 10/18/22 By:

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

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
2.0	2.0	IR2	12606419				
11.4	12.1	IR2					

4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column above:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N
15. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? NA Y N Under filled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, Resolutions: Received 2 Trip blanks that were not listed on COC

Volatile Organic Compounds by GC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 11:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	KC-14	**Units:**	ug/L
Lab Code:	K2212191-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 13:56	
Toluene	ND U	0.50	1	10/20/22 13:56	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	68 - 117	10/20/22 13:56	
Dibromofluoromethane	108	73 - 122	10/20/22 13:56	
Toluene-d8	105	65 - 144	10/20/22 13:56	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 11:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	MW-243	**Units:**	ug/L
Lab Code:	K2212191-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 14:20	
Toluene	ND U	0.50	1	10/20/22 14:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/20/22 14:20	
Dibromofluoromethane	109	73 - 122	10/20/22 14:20	
Toluene-d8	106	65 - 144	10/20/22 14:20	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 12:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	MW-239	**Units:**	ug/L
Lab Code:	K2212191-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**22**	5.0	10	10/21/22 19:28	
Toluene	**2000**	50	100	10/21/22 17:34	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	93	68 - 117	10/21/22 19:28	
Dibromofluoromethane	118	73 - 122	10/21/22 19:28	
Toluene-d8	111	65 - 144	10/21/22 19:28	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 12:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	MW-250	**Units:**	ug/L
Lab Code:	K2212191-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 14:44	
Toluene	ND U	0.50	1	10/20/22 14:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/20/22 14:44	
Dibromofluoromethane	109	73 - 122	10/20/22 14:44	
Toluene-d8	106	65 - 144	10/20/22 14:44	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 12:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	MW-97	**Units:**	ug/L
Lab Code:	K2212191-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**23**	5.0	10	10/21/22 19:51	
Toluene	**1900**	50	100	10/21/22 17:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	10/21/22 19:51	
Dibromofluoromethane	121	73 - 122	10/21/22 19:51	
Toluene-d8	112	65 - 144	10/21/22 19:51	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 12:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-NS	**Units:**	ug/L
Lab Code:	K2212191-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 15:09	
Toluene	ND U	0.50	1	10/20/22 15:09	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/20/22 15:09	
Dibromofluoromethane	108	73 - 122	10/20/22 15:09	
Toluene-d8	104	65 - 144	10/20/22 15:09	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-SS	**Units:**	ug/L
Lab Code:	K2212191-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 15:33	
Toluene	ND U	0.50	1	10/20/22 15:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/20/22 15:33	
Dibromofluoromethane	108	73 - 122	10/20/22 15:33	
Toluene-d8	103	65 - 144	10/20/22 15:33	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	N1A-ES	**Units:**	ug/L
Lab Code:	K2212191-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 15:57	
Toluene	ND U	0.50	1	10/20/22 15:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	101	68 - 117	10/20/22 15:57	
Dibromofluoromethane	109	73 - 122	10/20/22 15:57	
Toluene-d8	107	65 - 144	10/20/22 15:57	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	N1A-WS	**Units:**	ug/L
Lab Code:	K2212191-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**0.55**	0.50	1	10/20/22 16:21	
Toluene	ND U	0.50	1	10/20/22 16:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/20/22 16:21	
Dibromofluoromethane	109	73 - 122	10/20/22 16:21	
Toluene-d8	107	65 - 144	10/20/22 16:21	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-PUD	**Units:**	ug/L
Lab Code:	K2212191-010	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 16:45	
Toluene	ND U	0.50	1	10/20/22 16:45	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	68 - 117	10/20/22 16:45	
Dibromofluoromethane	110	73 - 122	10/20/22 16:45	
Toluene-d8	105	65 - 144	10/20/22 16:45	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 09:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-1	**Units:**	ug/L
Lab Code:	K2212191-011	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	5.0	10	10/21/22 20:14	
Toluene	**1900**	50	100	10/21/22 18:20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	10/21/22 20:14	
Dibromofluoromethane	121	73 - 122	10/21/22 20:14	
Toluene-d8	111	65 - 144	10/21/22 20:14	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 09:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-2b	**Units:**	ug/L
Lab Code:	K2212191-012	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**27**	13	25	10/21/22 20:37	
Toluene	**5700**	250	500	10/21/22 18:42	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	10/21/22 20:37	
Dibromofluoromethane	118	73 - 122	10/21/22 20:37	
Toluene-d8	112	65 - 144	10/21/22 20:37	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 09:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-3	**Units:**	ug/L
Lab Code:	K2212191-013	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**42**	13	25	10/21/22 21:00	
Toluene	**13000**	250	500	10/21/22 19:05	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	10/21/22 21:00	
Dibromofluoromethane	118	73 - 122	10/21/22 21:00	
Toluene-d8	112	65 - 144	10/21/22 21:00	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 09:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-4	**Units:**	ug/L
Lab Code:	K2212191-014	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**40**	2.5	5	10/24/22 16:29	
Toluene	**1300**	25	50	10/24/22 14:05	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	68 - 117	10/24/22 16:29	
Dibromofluoromethane	109	73 - 122	10/24/22 16:29	
Toluene-d8	106	65 - 144	10/24/22 16:29	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 10:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-5	**Units:**	ug/L
Lab Code:	K2212191-015	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**10**	2.5	5	10/25/22 14:41	
Toluene	**900**	25	50	10/24/22 16:53	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/22 16:53	
Dibromofluoromethane	112	73 - 122	10/24/22 16:53	
Toluene-d8	106	65 - 144	10/24/22 16:53	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 10:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-6	**Units:**	ug/L
Lab Code:	K2212191-016	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**35**	2.5	5	10/24/22 17:17	
Toluene	**1400**	25	50	10/24/22 14:53	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/24/22 17:17	
Dibromofluoromethane	111	73 - 122	10/24/22 17:17	
Toluene-d8	106	65 - 144	10/24/22 17:17	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 10:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-7	**Units:**	ug/L
Lab Code:	K2212191-017	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 17:10	
Toluene	ND U	0.50	1	10/20/22 17:10	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	98	68 - 117	10/20/22 17:10	
Dibromofluoromethane	112	73 - 122	10/20/22 17:10	
Toluene-d8	108	65 - 144	10/20/22 17:10	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 10:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-8	**Units:**	ug/L
Lab Code:	K2212191-018	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**25**	2.5	5	10/25/22 15:05	
Toluene	**850**	25	50	10/24/22 17:42	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/24/22 17:42	
Dibromofluoromethane	110	73 - 122	10/24/22 17:42	
Toluene-d8	107	65 - 144	10/24/22 17:42	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 11:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-9	**Units:**	ug/L
Lab Code:	K2212191-019	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**18**	2.5	5	10/25/22 15:29	
Toluene	**1000**	25	50	10/24/22 18:06	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/22 18:06	
Dibromofluoromethane	113	73 - 122	10/24/22 18:06	
Toluene-d8	108	65 - 144	10/24/22 18:06	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 11:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	ISRW-10	**Units:**	ug/L
Lab Code:	K2212191-020	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**35**	2.5	5	10/25/22 15:54	
Toluene	**860**	25	50	10/24/22 18:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/24/22 18:30	
Dibromofluoromethane	107	73 - 122	10/24/22 18:30	
Toluene-d8	105	65 - 144	10/24/22 18:30	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	Trip Blank	**Units:**	ug/L
Lab Code:	K2212191-021	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/24/22 13:16	
Toluene	ND U	0.50	1	10/24/22 13:16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	10/24/22 13:16	
Dibromofluoromethane	110	73 - 122	10/24/22 13:16	
Toluene-d8	106	65 - 144	10/24/22 13:16	

Semivolatile Organic Compounds by GC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 12:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-NS	**Units:**	ug/L
Lab Code:	K2212191-006	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND	U	0.66	1	12/01/22 19:03	10/25/22	
Bis(2-ethylhexyl) Phthalate	**2.0**	**B**	1.9	1	12/01/22 19:03	10/25/22	*
Diphenyl Ether	**110**		10	10	12/02/22 13:04	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	68	48 - 114	12/01/22 19:03	
Phenol-d6	75	38 - 107	12/01/22 19:03	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:00
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-SS	**Units:**	ug/L
Lab Code:	K2212191-007	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND	U	0.66	1	12/01/22 19:27	10/25/22	
Bis(2-ethylhexyl) Phthalate	**2.0**	**B**	1.9	1	12/01/22 19:27	10/25/22	*
Diphenyl Ether	**6.2**		1.0	1	12/01/22 19:27	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	69	48 - 114	12/01/22 19:27	
Phenol-d6	72	38 - 107	12/01/22 19:27	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:15
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	N1A-ES	**Units:**	ug/L
Lab Code:	K2212191-008	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND U	0.66	1	12/01/22 19:52	10/25/22	
Diphenyl Ether	**290**	25	25	12/02/22 13:29	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	68	48 - 114	12/01/22 19:52	
Phenol-d6	72	38 - 107	12/01/22 19:52	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:30
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	N1A-WS	**Units:**	ug/L
Lab Code:	K2212191-009	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	**6.1**	0.66	1	12/01/22 20:16	10/25/22	
Diphenyl Ether	**750**	50	50	12/02/22 13:53	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	68	48 - 114	12/01/22 20:16	
Phenol-d6	73	38 - 107	12/01/22 20:16	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	10/18/22 13:45
Sample Matrix:	Water	**Date Received:**	10/18/22 16:00
Sample Name:	W1A-PUD	**Units:**	ug/L
Lab Code:	K2212191-010	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND	U	0.66	1	12/01/22 20:40	10/25/22	
Bis(2-ethylhexyl) Phthalate	**2.2**	**B**	1.9	1	12/01/22 20:40	10/25/22	*
Diphenyl Ether	**5.1**		1.0	1	12/01/22 20:40	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	72	48 - 114	12/01/22 20:40	
Phenol-d6	74	38 - 107	12/01/22 20:40	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: RSEC Inc **Service Request:** K2212191
Project: Emerald Kalama/LKC-1022
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Extraction Method: None

Sample Name	Lab Code	4-Bromofluorobenzene 68-117	Dibromofluoromethane 73-122	Toluene-d8 65-144
KC-14	K2212191-001	98	108	105
MW-243	K2212191-002	99	109	106
MW-239	K2212191-003	93	118	111
MW-250	K2212191-004	100	109	106
MW-97	K2212191-005	91	121	112
W1A-NS	K2212191-006	100	108	104
W1A-SS	K2212191-007	100	108	103
N1A-ES	K2212191-008	101	109	107
N1A-WS	K2212191-009	100	109	107
W1A-PUD	K2212191-010	102	110	105
ISRW-1	K2212191-011	90	121	111
ISRW-2b	K2212191-012	90	118	112
ISRW-3	K2212191-013	88	118	112
ISRW-4	K2212191-014	97	109	106
ISRW-5	K2212191-015	99	112	106
ISRW-6	K2212191-016	100	111	106
ISRW-7	K2212191-017	98	112	108
ISRW-8	K2212191-018	100	110	107
ISRW-9	K2212191-019	99	113	108
ISRW-10	K2212191-020	100	107	105
Trip Blank	K2212191-021	100	110	106
Method Blank	KQ2218429-05	97	111	107
Method Blank	KQ2218463-05	93	118	108
Method Blank	KQ2218605-05	99	109	106
Method Blank	KQ2218762-05	91	94	88
Lab Control Sample	KQ2218429-03	106	109	108
Duplicate Lab Control Sample	KQ2218429-04	105	107	108
Lab Control Sample	KQ2218463-03	102	110	115
Duplicate Lab Control Sample	KQ2218463-04	103	107	112
Lab Control Sample	KQ2218605-03	104	111	108
Duplicate Lab Control Sample	KQ2218605-04	106	108	108
Lab Control Sample	KQ2218762-03	105	95	93
Duplicate Lab Control Sample	KQ2218762-04	105	94	93

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2218429-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/20/22 12:44	
Toluene	ND U	0.50	1	10/20/22 12:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	97	68 - 117	10/20/22 12:44	
Dibromofluoromethane	111	73 - 122	10/20/22 12:44	
Toluene-d8	107	65 - 144	10/20/22 12:44	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2218463-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/21/22 12:54	
Toluene	ND U	0.50	1	10/21/22 12:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	93	68 - 117	10/21/22 12:54	
Dibromofluoromethane	118	73 - 122	10/21/22 12:54	
Toluene-d8	108	65 - 144	10/21/22 12:54	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2218605-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/24/22 12:52	
Toluene	ND U	0.50	1	10/24/22 12:52	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	10/24/22 12:52	
Dibromofluoromethane	109	73 - 122	10/24/22 12:52	
Toluene-d8	106	65 - 144	10/24/22 12:52	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2218762-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	10/25/22 13:27	
Toluene	ND U	0.50	1	10/25/22 13:27	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	10/25/22 13:27	
Dibromofluoromethane	94	73 - 122	10/25/22 13:27	
Toluene-d8	88	65 - 144	10/25/22 13:27	

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Analyzed:**	10/20/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	782057

	Lab Control Sample KQ2218429-03			Duplicate Lab Control Sample KQ2218429-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	8.00	10.0	80	7.92	10.0	79	69-124	1	30
Toluene	8.00	10.0	80	8.04	10.0	80	69-124	<1	30

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Analyzed:**	10/21/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	782251

	Lab Control Sample KQ2218463-03			Duplicate Lab Control Sample KQ2218463-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.88	10.0	99	9.62	10.0	96	69-124	3	30
Toluene	9.79	10.0	98	9.63	10.0	96	69-124	2	30

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Analyzed:**	10/24/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	782407

	Lab Control Sample KQ2218605-03			Duplicate Lab Control Sample KQ2218605-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.06	10.0	91	8.60	10.0	86	69-124	5	30
Toluene	9.09	10.0	91	8.60	10.0	86	69-124	6	30

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Analyzed:**	10/25/22
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	782596

	Lab Control Sample KQ2218762-03			Duplicate Lab Control Sample KQ2218762-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.00	10.0	90	8.58	10.0	86	69-124	5	30
Toluene	8.37	10.0	84	7.95	10.0	80	69-124	5	30

Client: RSEC Inc **Service Request:** K2212191
Project: Emerald Kalama/LKC-1022
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Extraction Method: EPA 3520C

Sample Name	Lab Code	2-Fluorobiphenyl 48-114	Phenol-d6 38-107
W1A-NS	K2212191-006	68	75
W1A-SS	K2212191-007	69	72
N1A-ES	K2212191-008	68	72
N1A-WS	K2212191-009	68	73
W1A-PUD	K2212191-010	72	74
Method Blank	KQ2218621-01	73	67
Lab Control Sample	KQ2218621-02	74	68
Duplicate Lab Control Sample	KQ2218621-03	75	68

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2218621-01	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND U	0.66	1	12/01/22 17:50	10/25/22	
Bis(2-ethylhexyl) Phthalate	**2.1**	1.9	1	12/01/22 17:50	10/25/22	
Diphenyl Ether	ND U	1.0	1	12/01/22 17:50	10/25/22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	73	48 - 114	12/01/22 17:50	
Phenol-d6	67	38 - 107	12/01/22 17:50	

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QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2212191
Project:	Emerald Kalama/LKC-1022	**Date Analyzed:**	12/01/22
Sample Matrix:	Water	**Date Extracted:**	10/25/22

Duplicate Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS SIM

Analysis Method:	8270D	**Units:**	ug/L
Prep Method:	EPA 3520C	**Basis:**	NA
		Analysis Lot:	787137

	Lab Control Sample KQ2218621-02			Duplicate Lab Control Sample KQ2218621-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Biphenyl	4.07	5.00	81	4.10	5.00	82	70-130	<1	30
Bis(2-ethylhexyl) Phthalate	6.95	5.00	139 *	7.03	5.00	141 *	64-122	1	30
Diphenyl Ether	5.62	5.00	112	5.70	5.00	114	70-130	1	30

January 2023 ISRW Sampling

Laboratory Data Report

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: RSEC Inc
Project: EKC- Kalama
Sample Matrix: Water

Service Request: K2300439
Date Received: 01/11/2023

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Eleven water samples were received for analysis at ALS Environmental on 01/11/2023. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Volatiles by GC/MS:

Method 8260C, 01/12/2023:Many samples required dilution due to the presence of elevated levels of target analyte. The reporting limits are adjusted to reflect the dilution.

Approved by _____ Date 01/20/2023

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ISRW-3			Lab ID: K2300439-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	74			25	ug/L	8260C
Toluene	22000			500	ug/L	8260C

CLIENT ID: ISRW-4			Lab ID: K2300439-004			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	27			13	ug/L	8260C
Toluene	11000			500	ug/L	8260C

CLIENT ID: ISRW-6			Lab ID: K2300439-006			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	14			10	ug/L	8260C
Toluene	1600			100	ug/L	8260C

CLIENT ID: ISRW-8			Lab ID: K2300439-008			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	90			50	ug/L	8260C
Toluene	68000			1000	ug/L	8260C

CLIENT ID: ISRW-10			Lab ID: K2300439-010			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	59			25	ug/L	8260C
Toluene	35000			1000	ug/L	8260C

CLIENT ID: ISRW-1			Lab ID: K2300439-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	8500			500	ug/L	8260C

CLIENT ID: ISRW-2b			Lab ID: K2300439-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	9900			500	ug/L	8260C

CLIENT ID: ISRW-5			Lab ID: K2300439-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	62000			2500	ug/L	8260C

CLIENT ID: ISRW-9			Lab ID: K2300439-009			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	25000			1000	ug/L	8260C

ALS Environmental

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

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001

SR# 12300439

COC Set 2 of 2

COC#

Project Name	EKC-Kelang
Project Number:	1-23
Project Manager	Rich Truex
Company	RSEC
Address	958 Hood View Ct.
Phone #	541-490-4223
email	richa@rsei.nc.com
Sampler Signature	
Sampler Printed Name	Rich Truex

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS	14D	8260C / VOC FP	1	2	3	4	5	Remarks
1. LAB Trip Blank		1/11			2	X							8260 Benz + Tol. only
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													

Report Requirements

- [X] 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.# EKC-0123

Bill To: richa@rsei.nc.com

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	Signature	Signature	Signature	Signature
Printed Name: Rich Truex	Printed Name: Diane Phu	Printed Name	Printed Name	Printed Name	Printed Name
Firm: RSEC	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time	Date/Time: 1/11/23 1330	Date/Time	Date/Time	Date/Time	Date/Time

PM 12

Cooler Receipt and Preservation Form

Client RSFC Service Request K23 00439

Received: 1/11/23 Opened: 1/11/23 By: Unloaded: 1/11/23 By:

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

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
2.7		180	128313				

4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column above:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # above and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N
15. Were samples received within the method specified time limit? If not, notate the error below and notify the PM NA Y N
16. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? NA Y N Underfilled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, Resolutions: _____

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 09:00
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-1	**Units:**	ug/L
Lab Code:	K2300439-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	25	50	01/12/23 20:18	
Toluene	**8500**	500	1000	01/12/23 19:29	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	01/12/23 20:18	
Dibromofluoromethane	89	73 - 122	01/12/23 20:18	
Toluene-d8	88	65 - 144	01/12/23 20:18	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 09:15
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-2b	**Units:**	ug/L
Lab Code:	K2300439-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	25	50	01/12/23 20:42	
Toluene	**9900**	500	1000	01/12/23 19:53	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	01/12/23 20:42	
Dibromofluoromethane	89	73 - 122	01/12/23 20:42	
Toluene-d8	88	65 - 144	01/12/23 20:42	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 09:30
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-3	**Units:**	ug/L
Lab Code:	K2300439-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**74**	25	50	01/13/23 20:13	
Toluene	**22000**	500	1000	01/13/23 19:01	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	103	68 - 117	01/13/23 20:13	
Dibromofluoromethane	112	73 - 122	01/13/23 20:13	
Toluene-d8	114	65 - 144	01/13/23 20:13	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 09:45
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-4	**Units:**	ug/L
Lab Code:	K2300439-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**27**	13	25	01/13/23 20:37	
Toluene	**11000**	500	1000	01/13/23 19:26	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	101	68 - 117	01/13/23 20:37	
Dibromofluoromethane	110	73 - 122	01/13/23 20:37	
Toluene-d8	114	65 - 144	01/13/23 20:37	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 10:00
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-5	**Units:**	ug/L
Lab Code:	K2300439-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	50	100	01/13/23 21:01	
Toluene	**62000**	2500	5000	01/13/23 19:49	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	101	68 - 117	01/13/23 21:01	
Dibromofluoromethane	111	73 - 122	01/13/23 21:01	
Toluene-d8	112	65 - 144	01/13/23 21:01	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 10:15
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-6	**Units:**	ug/L
Lab Code:	K2300439-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**14**	10	20	01/16/23 23:18	
Toluene	**1600**	100	200	01/16/23 21:42	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	68 - 117	01/16/23 23:18	
Dibromofluoromethane	114	73 - 122	01/16/23 23:18	
Toluene-d8	113	65 - 144	01/16/23 23:18	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 10:30
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-7	**Units:**	ug/L
Lab Code:	K2300439-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	01/12/23 19:04	
Toluene	ND U	0.50	1	01/12/23 19:04	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	01/12/23 19:04	
Dibromofluoromethane	94	73 - 122	01/12/23 19:04	
Toluene-d8	100	65 - 144	01/12/23 19:04	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 10:45
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-8	**Units:**	ug/L
Lab Code:	K2300439-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**90**	50	100	01/16/23 23:42	
Toluene	**68000**	1000	2000	01/16/23 22:06	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	68 - 117	01/16/23 23:42	
Dibromofluoromethane	117	73 - 122	01/16/23 23:42	
Toluene-d8	115	65 - 144	01/16/23 23:42	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 11:00
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-9	**Units:**	ug/L
Lab Code:	K2300439-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	25	50	01/17/23 00:06	
Toluene	**25000**	1000	2000	01/16/23 22:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	99	68 - 117	01/17/23 00:06	
Dibromofluoromethane	114	73 - 122	01/17/23 00:06	
Toluene-d8	112	65 - 144	01/17/23 00:06	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23 11:15
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	ISRW-10	**Units:**	ug/L
Lab Code:	K2300439-010	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**59**	25	50	01/17/23 00:30	
Toluene	**35000**	1000	2000	01/16/23 22:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	68 - 117	01/17/23 00:30	
Dibromofluoromethane	117	73 - 122	01/17/23 00:30	
Toluene-d8	110	65 - 144	01/17/23 00:30	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	01/11/23
Sample Matrix:	Water	**Date Received:**	01/11/23 13:36
Sample Name:	Lab Trip Blank	**Units:**	ug/L
Lab Code:	K2300439-011	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	01/13/23 15:01	
Toluene	ND U	0.50	1	01/13/23 15:01	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	104	68 - 117	01/13/23 15:01	
Dibromofluoromethane	117	73 - 122	01/13/23 15:01	
Toluene-d8	116	65 - 144	01/13/23 15:01	

QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: RSEC Inc **Service Request:** K2300439
Project: EKC- Kalama/1-23
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Extraction Method: None

Sample Name	Lab Code	4-Bromofluorobenzene 68-117	Dibromofluoromethane 73-122	Toluene-d8 65-144
ISRW-1	K2300439-001	85	89	88
ISRW-2b	K2300439-002	85	89	88
ISRW-3	K2300439-003	103	112	114
ISRW-4	K2300439-004	101	110	114
ISRW-5	K2300439-005	101	111	112
ISRW-6	K2300439-006	102	114	113
ISRW-7	K2300439-007	85	94	100
ISRW-8	K2300439-008	100	117	115
ISRW-9	K2300439-009	99	114	112
ISRW-10	K2300439-010	102	117	110
Lab Trip Blank	K2300439-011	104	117	116
Method Blank	KQ2300652-05	89	92	91
Method Blank	KQ2300753-05	104	114	111
Method Blank	KQ2300932-05	104	117	116
Lab Control Sample	KQ2300652-03	106	92	95
Duplicate Lab Control Sample	KQ2300652-04	105	90	93
Lab Control Sample	KQ2300753-03	110	114	113
Duplicate Lab Control Sample	KQ2300753-04	109	110	112
Lab Control Sample	KQ2300932-03	111	112	115
Duplicate Lab Control Sample	KQ2300932-04	114	115	115

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2300652-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	01/12/23 12:57	
Toluene	ND U	0.50	1	01/12/23 12:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	01/12/23 12:57	
Dibromofluoromethane	92	73 - 122	01/12/23 12:57	
Toluene-d8	91	65 - 144	01/12/23 12:57	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2300753-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	01/13/23 14:13	
Toluene	ND U	0.50	1	01/13/23 14:13	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	104	68 - 117	01/13/23 14:13	
Dibromofluoromethane	114	73 - 122	01/13/23 14:13	
Toluene-d8	111	65 - 144	01/13/23 14:13	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2300932-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	01/16/23 18:05	
Toluene	ND U	0.50	1	01/16/23 18:05	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	104	68 - 117	01/16/23 18:05	
Dibromofluoromethane	117	73 - 122	01/16/23 18:05	
Toluene-d8	116	65 - 144	01/16/23 18:05	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Analyzed:**	01/12/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	791428

	Lab Control Sample KQ2300652-03			Duplicate Lab Control Sample KQ2300652-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.47	10.0	95	9.34	10.0	93	69-124	1	30
Toluene	8.92	10.0	89	8.76	10.0	88	69-124	2	30

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Analyzed:**	01/13/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	791491

	Lab Control Sample KQ2300753-03			Duplicate Lab Control Sample KQ2300753-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.31	10.0	93	9.60	10.0	96	69-124	3	30
Toluene	9.67	10.0	97	9.71	10.0	97	69-124	<1	30

Client:	RSEC Inc	**Service Request:**	K2300439
Project:	EKC- Kalama/1-23	**Date Analyzed:**	01/16/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	791610

	Lab Control Sample KQ2300932-03			Duplicate Lab Control Sample KQ2300932-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	8.61	10.0	86	9.52	10.0	95	69-124	10	30
Toluene	8.90	10.0	89	9.69	10.0	97	69-124	8	30

April 2023 Semi-Annual Sampling

Laboratory Data Report

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

Client: RSEC Inc
Project: Emerald Kalama Chemical
Sample Matrix: Water

Service Request: K2304530
Date Received: 04/19/2023

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Twenty six water samples were received for analysis at ALS Environmental on 04/19/2023. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Semivolatiles by GC/MS:

Method 8270D, 05/31/2023:The upper control criterion was exceeded for Bis(2-ethylhexyl) Phthalate in Laboratory Control Sample (LCS) KQ2307427-02. The error associated with elevated recovery indicated a potential high bias. No further corrective action was taken.
Method 8270D, 05/31/2023:The Method Blank KQ2307427-01
contained low levels of Bis(2-ethylhexyl) Phthalate above the Method Reporting Limit (MRL). In accordance with ALS QA/QC policy, all sample results less than twenty times the level found in the Method Blank were flagged B.

Volatiles by GC/MS:

Method 8260C:Multiple samples required dilution due to the presence of elevated levels of target analyte. The reporting limits are adjusted to reflect the dilution.

Approved by  Date 06/02/2023

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ISRW-2b	Lab ID: K2304530-002					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	62			50	ug/L	8260C
Toluene	43000			1300	ug/L	8260C

CLIENT ID: ISRW-4	Lab ID: K2304530-004					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	28			25	ug/L	8260C
Toluene	5400			250	ug/L	8260C

CLIENT ID: ISRW-6	Lab ID: K2304530-006					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	30			13	ug/L	8260C
Toluene	4700			250	ug/L	8260C

CLIENT ID: ISRW-8	Lab ID: K2304530-008					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	76			50	ug/L	8260C
Toluene	57000			1300	ug/L	8260C

CLIENT ID: ISRW-9	Lab ID: K2304530-009					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	33			25	ug/L	8260C
Toluene	25000			1000	ug/L	8260C

CLIENT ID: ISRW-10	Lab ID: K2304530-010					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	45			25	ug/L	8260C
Toluene	32000			1000	ug/L	8260C

CLIENT ID: MW-239	Lab ID: K2304530-013					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	5.7			0.50	ug/L	8260C
Toluene	82			2.5	ug/L	8260C

CLIENT ID: MW-97	Lab ID: K2304530-014					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	5.3			0.50	ug/L	8260C
Toluene	59			0.50	ug/L	8260C

CLIENT ID: KC-9	Lab ID: K2304530-020					
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Benzene	0.91			0.50	ug/L	8260C
Diphenyl Ether	1800			25	ug/L	8270D

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: NIA W-SUMP — **Lab ID: K2304530-023**

Analyte	Results	Flag	MDL	MRL	Units	Method
Benzene	2.3			0.50	ug/L	8260C
Biphenyl	7.0			0.96	ug/L	8270D
Diphenyl Ether	410			5.0	ug/L	8270D
Toluene	3.0			0.50	ug/L	8260C

CLIENT ID: PZ-104 — **Lab ID: K2304530-024**

Analyte	Results	Flag	MDL	MRL	Units	Method
Benzene	2.3			0.50	ug/L	8260C
Biphenyl	34			0.94	ug/L	8270D
Bis(2-ethylhexyl) Phthalate	2.5	B		2.4	ug/L	8270D
Diphenyl Ether	2900			25	ug/L	8270D

CLIENT ID: MW-401 — **Lab ID: K2304530-026**

Analyte	Results	Flag	MDL	MRL	Units	Method
Benzene	2.4			0.50	ug/L	8260C
Biphenyl	40			0.94	ug/L	8270D
Bis(2-ethylhexyl) Phthalate	2.5	B		2.4	ug/L	8270D
Diphenyl Ether	3000			25	ug/L	8270D

CLIENT ID: PZ-107 — **Lab ID: K2304530-025**

Analyte	Results	Flag	MDL	MRL	Units	Method
Biphenyl	150			0.94	ug/L	8270D
Bis(2-ethylhexyl) Phthalate	2.7	B		2.4	ug/L	8270D
Diphenyl Ether	480			5.0	ug/L	8270D

CLIENT ID: MW-256 — **Lab ID: K2304530-018**

Analyte	Results	Flag	MDL	MRL	Units	Method
Diphenyl Ether	15			1.0	ug/L	8270D

CLIENT ID: MW-245 — **Lab ID: K2304530-019**

Analyte	Results	Flag	MDL	MRL	Units	Method
Diphenyl Ether	98			1.0	ug/L	8270D

CLIENT ID: PDW-117 — **Lab ID: K2304530-021**

Analyte	Results	Flag	MDL	MRL	Units	Method
Diphenyl Ether	1900			25	ug/L	8270D

CLIENT ID: NIA E-SUMP — **Lab ID: K2304530-022**

Analyte	Results	Flag	MDL	MRL	Units	Method
Diphenyl Ether	95			1.0	ug/L	8270D

CLIENT ID: ISRW-1 — **Lab ID: K2304530-001**

Analyte	Results	Flag	MDL	MRL	Units	Method
Toluene	28000			1300	ug/L	8260C

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: ISRW-3			Lab ID: K2304530-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	90000			2500	ug/L	8260C

CLIENT ID: ISRW-5			Lab ID: K2304530-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Toluene	44000			2500	ug/L	8260C

CHAIN OF CUSTODY

SR# 12304530

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE _____ OF _____ COC# _____

PROJECT NAME	Emerald Kalama Chemical
PROJECT NUMBER	EKC-0423
PROJECT MANAGER	Rich Trusx
COMPANY NAME	RSEC
ADDRESS	958 Hood View Ct
CITY/STATE/ZIP	Hood River OR. 97031
E-MAIL ADDRESS	richa@rsecinc.com
PHONE #	541.490.4223 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, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ CO_2☐ Methane☐ Ethane☐ Ethene☐	REMARKS
ISRW-1	4/18	0900		GW	3		X														
ISRW-2b		0915																			
ISRW-3		0930																			
ISRW-4		0945																			
ISRW-5		1000																			
ISRW-6		1015																			
ISRW-7		1030																			
ISRW-8		1645																			
ISRW-9		1100																			
ISRW-10		1115																			

REPORT REQUIREMENTS

- X 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. # EKC-0423

Bill To: Richa@rsecinc.com

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:

All benzene + toluene only 8260

Container Supply Number

130018

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature: RT	Date/Time: 4/19	Signature:	Date/Time: 4/19/23 1552	Signature	Date/Time	Signature	Date/Time
Printed Name: R Trusx	Firm: RSEC	Printed Name	Firm	Printed Name	Firm	Printed Name	Firm

CHAIN OF CUSTODY

SR# K23045 30

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE ____ OF ____ COC# ____

PROJECT NAME: Emerald Kalama Chemical
PROJECT NUMBER: EKC-0423
PROJECT MANAGER: Rich Trujet
COMPANY NAME: RSEC
ADDRESS: 958 Hood View Ct
CITY/STATE/ZIP: Hood River OR 97031
E-MAIL ADDRESS: richa@rsecinc.com
PHONE #: 541.490.4223 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 ☐ 8021 ☐ BTEX ☐	Hydrocarbons Gas ☐ Diesel ☐ Oil ☐ (*see below) 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, PO4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	Alkalinity ☐ CO_3 ☐ HCO_3 ☐	Dioxins/Furans 1613 ☐ 8290 ☐	Dissolved Gases RSK 175 ☐ CO_2 ☐ Methane ☐ Ethane ☐ Ethene ☐	REMARKS
USRW-2	4/18	1345		GW	2	X																	only DPO
KC-14	4/18	1115			3		X																B+T only
MW-239	4/18	1300			3		X																"
MW-97	4/18	1325			3		X																"
MW-243	4/18	1025			3		X																"
MW-250	4/18	1155		↓	3		X																"
Trip Blank					2		X																"

REPORT REQUIREMENTS

- X 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. # EKC-0423
Bill To: richa@rsecinc.com

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:

USRW-2 diphenyl ether only (DPO)
"B+T" = benzene + toluene 8260

Container Supply Number

130018

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature	Date/Time 4/19	Signature	Date/Time 4/19/23 1553	Signature	Date/Time	Signature	Date/Time
Printed Name Trujet	Firm RSEC	Printed Name Holland	Firm ALS	Printed Name	Firm	Printed Name	Firm

CHAIN OF CUSTODY

SR# K2304530

1317 South 13th Ave., Kelso, WA 98626 | +1 360 577 7222 | +1 800 695 7222 | +1 360 636 1068 (fax)

PAGE ____ OF ____ COC# ____

PROJECT NAME: Emerald Kalama Chem
PROJECT NUMBER: EKC-0423
PROJECT MANAGER: Rich Truax
COMPANY NAME: RSEC
ADDRESS: 958 Hood View Ct
CITY/STATE/ZIP: Hood River, OR 97031
E-MAIL ADDRESS: richa@rsecinc.com
PHONE #: 541-490-4323 FAX #:
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	REMARKS
MW-256	4/19	1315		GW	2	Diphenyl ether (DPO)
MW-245	4/19	1500			2	"
KC-9	4/19	1220			5	B+T and DPO
PDW-117	4/19	1140			5	"
NIA E-Sump	4/19	1340			5	B+T, biphenyl, DPO
NIA W-Sump	4/19	1416			5	"
MS/MSD (E-Sump)	4/19	1340			7	"
PZ-104	4/18	1730			5	B+T, biphenyl, DEHP, DPO
PZ-107	4/19	1020			5	"
MW-401	4/18	1745			5	"

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, 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, T-Phos
TOX 9020☐ AOX 1650☐ 506☐
Alkalinity ☐ CO_3☐ HCO_3☐
Dioxins/Furans 1613☐ 8290☐
Dissolved Gases RSK 175☐ CO_2☐ Methane☐ Ethane☐ Ethene☐

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
___ V. EDD

INVOICE INFORMATION

P.O. # EKC-0423
Bill To: richa@rsecinc.com

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:

MW-250: diphenyl ether (DPO) only
MW-245: " "
KC-9 + PDW-117: benzene toluene and DPO
E+W Sumps: benz + tol and biphenyl + DPO
PZ104 + MW401: benz + tol and biphenyl, bis(2-ethylhexyl) phthalate + DPO

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

Container Supply Number

130018

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: R	Signature:	Signature:	Signature:
Date/Time: 4/19	Date/Time: 4/21/23 1553	Date/Time:	Date/Time:
Printed Name: R Truax	Printed Name:	Printed Name:	Printed Name:
Firm: RSEC	Firm: ALS	Firm:	Firm:

PM HH

Cooler Receipt and Preservation Form

Client Emerald Kalama Service Request K23 04530

Received: 4/19/23 Opened: 4/19/23 By: VM Unloaded: 4/19/23 By: VM

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

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp indicate with "X"	PM Notified If out of temp	Tracking Number NA	Filed
5.1		IR01	Cooler 1				
6.0		IR01	Cooler 2				
6.0		IR01	Cooler 3				

4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column above:
   If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":
5. Were samples received within the method specified temperature ranges? NA Y N
   If no, were they received on ice and same day as collected? If not, notate the cooler # above and notify the PM. NA Y N

If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*

6. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
7. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
8. Were samples received in good condition (unbroken) NA Y N
9. Were all sample labels complete (ie, analysis, preservation, etc.)? NA Y N
10. Did all sample labels and tags agree with custody papers? NA Y N
11. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
12. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
13. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
14. Was C12/Res negative? NA Y N
15. Were samples received within the method specified time limit? If not, notate the error below and notify the PM NA Y N
16. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? NA Y N Underfilled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, Resolutions: _____

Volatile Organic Compounds by GC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 09:00
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-1	**Units:**	ug/L
Lab Code:	K2304530-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	50	100	04/21/23 19:25	
Toluene	**28000**	1300	2500	04/21/23 17:22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/21/23 19:25	
Dibromofluoromethane	100	73 - 122	04/21/23 19:25	
Toluene-d8	102	65 - 144	04/21/23 19:25	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 09:15
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-2b	**Units:**	ug/L
Lab Code:	K2304530-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**62**	50	100	04/21/23 19:49	
Toluene	**43000**	1300	2500	04/21/23 17:47	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/21/23 19:49	
Dibromofluoromethane	102	73 - 122	04/21/23 19:49	
Toluene-d8	103	65 - 144	04/21/23 19:49	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 09:30
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-3	**Units:**	ug/L
Lab Code:	K2304530-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	130	250	04/21/23 21:03	
Toluene	**90000**	2500	5000	04/21/23 19:00	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	87	68 - 117	04/21/23 21:03	
Dibromofluoromethane	98	73 - 122	04/21/23 21:03	
Toluene-d8	102	65 - 144	04/21/23 21:03	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 09:45
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-4	**Units:**	ug/L
Lab Code:	K2304530-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**28**	25	50	04/21/23 20:14	
Toluene	**5400**	250	500	04/21/23 18:11	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/21/23 20:14	
Dibromofluoromethane	103	73 - 122	04/21/23 20:14	
Toluene-d8	102	65 - 144	04/21/23 20:14	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 10:00
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-5	**Units:**	ug/L
Lab Code:	K2304530-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	100	200	04/21/23 20:38	
Toluene	**44000**	2500	5000	04/21/23 18:36	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/21/23 20:38	
Dibromofluoromethane	101	73 - 122	04/21/23 20:38	
Toluene-d8	102	65 - 144	04/21/23 20:38	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 10:15
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-6	**Units:**	ug/L
Lab Code:	K2304530-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**30**	13	25	04/24/23 20:11	
Toluene	**4700**	250	500	04/24/23 18:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	04/24/23 20:11	
Dibromofluoromethane	105	73 - 122	04/24/23 20:11	
Toluene-d8	101	65 - 144	04/24/23 20:11	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 10:30
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-7	**Units:**	ug/L
Lab Code:	K2304530-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/24/23 18:33	
Toluene	ND U	0.50	1	04/24/23 18:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	04/24/23 18:33	
Dibromofluoromethane	108	73 - 122	04/24/23 18:33	
Toluene-d8	107	65 - 144	04/24/23 18:33	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 10:45
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-8	**Units:**	ug/L
Lab Code:	K2304530-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**76**	50	100	04/24/23 20:35	
Toluene	**57000**	1300	2500	04/24/23 19:22	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	04/24/23 20:35	
Dibromofluoromethane	104	73 - 122	04/24/23 20:35	
Toluene-d8	101	65 - 144	04/24/23 20:35	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 11:00
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-9	**Units:**	ug/L
Lab Code:	K2304530-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**33**	25	50	04/24/23 21:00	
Toluene	**25000**	1000	2000	04/24/23 19:46	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	85	68 - 117	04/24/23 21:00	
Dibromofluoromethane	102	73 - 122	04/24/23 21:00	
Toluene-d8	101	65 - 144	04/24/23 21:00	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 11:15
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	ISRW-10	**Units:**	ug/L
Lab Code:	K2304530-010	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**45**	25	50	04/25/23 19:50	
Toluene	**32000**	1000	2000	04/25/23 17:48	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	84	68 - 117	04/25/23 19:50	
Dibromofluoromethane	103	73 - 122	04/25/23 19:50	
Toluene-d8	106	65 - 144	04/25/23 19:50	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 11:15
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	KC-14	**Units:**	ug/L
Lab Code:	K2304530-012	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 19:25	
Toluene	ND U	0.50	1	04/25/23 19:25	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 19:25	
Dibromofluoromethane	108	73 - 122	04/25/23 19:25	
Toluene-d8	108	65 - 144	04/25/23 19:25	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 13:00
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-239	**Units:**	ug/L
Lab Code:	K2304530-013	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**5.7**	0.50	1	04/25/23 18:37	
Toluene	**82**	2.5	5	04/27/23 12:38	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	04/25/23 18:37	
Dibromofluoromethane	101	73 - 122	04/25/23 18:37	
Toluene-d8	110	65 - 144	04/25/23 18:37	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 13:25
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-97	**Units:**	ug/L
Lab Code:	K2304530-014	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**5.3**	0.50	1	04/25/23 19:01	
Toluene	**59**	0.50	1	04/25/23 19:01	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	04/25/23 19:01	
Dibromofluoromethane	103	73 - 122	04/25/23 19:01	
Toluene-d8	107	65 - 144	04/25/23 19:01	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 10:25
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-243	**Units:**	ug/L
Lab Code:	K2304530-015	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 14:08	
Toluene	ND U	0.50	1	04/25/23 14:08	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	87	68 - 117	04/25/23 14:08	
Dibromofluoromethane	110	73 - 122	04/25/23 14:08	
Toluene-d8	102	65 - 144	04/25/23 14:08	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 11:55
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-250	**Units:**	ug/L
Lab Code:	K2304530-016	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 14:32	
Toluene	ND U	0.50	1	04/25/23 14:32	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	87	68 - 117	04/25/23 14:32	
Dibromofluoromethane	108	73 - 122	04/25/23 14:32	
Toluene-d8	102	65 - 144	04/25/23 14:32	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	Trip Blank	**Units:**	ug/L
Lab Code:	K2304530-017	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 13:19	
Toluene	ND U	0.50	1	04/25/23 13:19	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 13:19	
Dibromofluoromethane	109	73 - 122	04/25/23 13:19	
Toluene-d8	103	65 - 144	04/25/23 13:19	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 12:20
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	KC-9	**Units:**	ug/L
Lab Code:	K2304530-020	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**0.91**	0.50	1	04/25/23 14:56	
Toluene	ND U	0.50	1	04/25/23 14:56	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 14:56	
Dibromofluoromethane	107	73 - 122	04/25/23 14:56	
Toluene-d8	103	65 - 144	04/25/23 14:56	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 11:40
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PDW-117	**Units:**	ug/L
Lab Code:	K2304530-021	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 15:21	
Toluene	ND U	0.50	1	04/25/23 15:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/25/23 15:21	
Dibromofluoromethane	109	73 - 122	04/25/23 15:21	
Toluene-d8	103	65 - 144	04/25/23 15:21	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 13:40
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	NIA E-SUMP	**Units:**	ug/L
Lab Code:	K2304530-022	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 15:45	
Toluene	ND U	0.50	1	04/25/23 15:45	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 15:45	
Dibromofluoromethane	109	73 - 122	04/25/23 15:45	
Toluene-d8	105	65 - 144	04/25/23 15:45	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 14:10
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	NIA W-SUMP	**Units:**	ug/L
Lab Code:	K2304530-023	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**2.3**	0.50	1	04/25/23 16:10	
Toluene	**3.0**	0.50	1	04/25/23 16:10	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	87	68 - 117	04/25/23 16:10	
Dibromofluoromethane	108	73 - 122	04/25/23 16:10	
Toluene-d8	107	65 - 144	04/25/23 16:10	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 17:30
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PZ-104	**Units:**	ug/L
Lab Code:	K2304530-024	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**2.3**	0.50	1	04/25/23 16:34	
Toluene	ND U	0.50	1	04/25/23 16:34	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	04/25/23 16:34	
Dibromofluoromethane	109	73 - 122	04/25/23 16:34	
Toluene-d8	107	65 - 144	04/25/23 16:34	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 10:20
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PZ-107	**Units:**	ug/L
Lab Code:	K2304530-025	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 16:59	
Toluene	ND U	0.50	1	04/25/23 16:59	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 16:59	
Dibromofluoromethane	108	73 - 122	04/25/23 16:59	
Toluene-d8	106	65 - 144	04/25/23 16:59	

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Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 17:45
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-401	**Units:**	ug/L
Lab Code:	K2304530-026	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	**2.4**	0.50	1	04/25/23 17:23	
Toluene	ND U	0.50	1	04/25/23 17:23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	90	68 - 117	04/25/23 17:23	
Dibromofluoromethane	108	73 - 122	04/25/23 17:23	
Toluene-d8	111	65 - 144	04/25/23 17:23	

Semivolatile Organic Compounds by GC/MS

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Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 13:45
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	USRW-2	**Units:**	ug/L
Lab Code:	K2304530-011	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Diphenyl Ether	ND U	1.0	1	05/31/23 13:13	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	86	48 - 114	05/31/23 13:13	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 13:15
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-256	**Units:**	ug/L
Lab Code:	K2304530-018	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Diphenyl Ether	**15**	1.0	1	05/31/23 13:38	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	84	48 - 114	05/31/23 13:38	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 15:00
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-245	**Units:**	ug/L
Lab Code:	K2304530-019	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Diphenyl Ether	**98**	1.0	1	05/31/23 14:02	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	84	48 - 114	05/31/23 14:02	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 12:20
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	KC-9	**Units:**	ug/L
Lab Code:	K2304530-020	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Diphenyl Ether	**1800**	25	25	05/31/23 15:38	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	90	48 - 114	05/31/23 18:04	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 11:40
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PDW-117	**Units:**	ug/L
Lab Code:	K2304530-021	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Diphenyl Ether	**1900**	25	25	05/31/23 16:03	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	83	48 - 114	05/31/23 18:28	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 13:40
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	NIA E-SUMP	**Units:**	ug/L
Lab Code:	K2304530-022	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND	U	0.98	1	05/31/23 14:26	4/25/23	
Diphenyl Ether	**95**		1.0	1	05/31/23 14:26	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	84	48 - 114	05/31/23 14:26	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 14:10
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	NIA W-SUMP	**Units:**	ug/L
Lab Code:	K2304530-023	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	**7.0**	0.96	1	05/31/23 17:16	4/25/23	
Diphenyl Ether	**410**	5.0	5	05/31/23 15:14	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	89	48 - 114	05/31/23 17:16	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 17:30
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PZ-104	**Units:**	ug/L
Lab Code:	K2304530-024	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	**34**		0.94	1	05/31/23 18:53	4/25/23	
Bis(2-ethylhexyl) Phthalate	**2.5**	**B**	2.4	1	05/31/23 18:53	4/25/23	*
Diphenyl Ether	**2900**		25	25	05/31/23 16:27	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	87	48 - 114	05/31/23 18:53	
p-Terphenyl-d14	87	22 - 146	05/31/23 18:53	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23 10:20
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	PZ-107	**Units:**	ug/L
Lab Code:	K2304530-025	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	**150**		0.94	1	05/31/23 17:40	4/25/23	
Bis(2-ethylhexyl) Phthalate	**2.7**	**B**	2.4	1	05/31/23 17:40	4/25/23	*
Diphenyl Ether	**480**		5.0	5	05/31/23 14:50	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	75	48 - 114	05/31/23 17:40	
p-Terphenyl-d14	90	22 - 146	05/31/23 17:40	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/18/23 17:45
Sample Matrix:	Water	**Date Received:**	04/19/23 15:53
Sample Name:	MW-401	**Units:**	ug/L
Lab Code:	K2304530-026	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	**40**		0.94	1	05/31/23 19:17	4/25/23	
Bis(2-ethylhexyl) Phthalate	**2.5**	**B**	2.4	1	05/31/23 19:17	4/25/23	*
Diphenyl Ether	**3000**		25	25	05/31/23 16:51	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	84	48 - 114	05/31/23 19:17	
p-Terphenyl-d14	85	22 - 146	05/31/23 19:17	

QC Summary Forms

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

Client: RSEC Inc **Service Request:** K2304530
Project: Emerald Kalama Chemical/EKC-0423
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Extraction Method: None

Sample Name	Lab Code	4-Bromofluorobenzene 68 - 117	Dibromofluoromethane 73 - 122	Toluene-d8 65 - 144
ISRW-1	K2304530-001	89	100	102
ISRW-2b	K2304530-002	89	102	103
ISRW-3	K2304530-003	87	98	102
ISRW-4	K2304530-004	89	103	102
ISRW-5	K2304530-005	89	101	102
ISRW-6	K2304530-006	84	105	101
ISRW-7	K2304530-007	85	108	107
ISRW-8	K2304530-008	84	104	101
ISRW-9	K2304530-009	85	102	101
ISRW-10	K2304530-010	84	103	106
KC-14	K2304530-012	88	108	108
MW-239	K2304530-013	91	101	110
MW-97	K2304530-014	90	103	107
MW-243	K2304530-015	87	110	102
MW-250	K2304530-016	87	108	102
Trip Blank	K2304530-017	88	109	103
KC-9	K2304530-020	88	107	103
PDW-117	K2304530-021	89	109	103
NIA E-SUMP	K2304530-022	88	109	105
NIA W-SUMP	K2304530-023	87	108	107
PZ-104	K2304530-024	91	109	107
PZ-107	K2304530-025	88	108	106
MW-401	K2304530-026	90	108	111
Lab Control Sample	KQ2307336-03	99	110	108
Duplicate Lab Control Sample	KQ2307336-04	101	109	107
Method Blank	KQ2307336-05	91	104	102
Lab Control Sample	KQ2307425-03	101	108	108
Duplicate Lab Control Sample	KQ2307425-04	99	109	108
Method Blank	KQ2307425-05	89	109	103
Lab Control Sample	KQ2307426-02	99	108	108
Duplicate Lab Control Sample	KQ2307426-03	101	110	109
Method Blank	KQ2307426-04	88	109	101
NIA E-SUMP MS	KQ2307426-06	97	108	106
NIA E-SUMP DMS	KQ2307426-07	100	109	108
Lab Control Sample	KQ2307769-03	98	108	108
Duplicate Lab Control Sample	KQ2307769-04	100	109	108
Method Blank	KQ2307769-05	88	108	102

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23
Sample Matrix:	Water	**Date Received:**	04/19/23
		Date Analyzed:	04/25/23
		Date Extracted:	NA

Duplicate Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	NIA E-SUMP	**Units:**	ug/L
Lab Code:	K2304530-022	**Basis:**	NA
Analysis Method:	8260C		
Prep Method:	None		

		Matrix Spike KQ2307426-06			Duplicate Matrix Spike KQ2307426-07					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	ND U	10.3	10.0	103	9.41	10.0	94	63-144	9	30
Toluene	ND U	10.7	10.0	107	9.63	10.0	96	71-136	10	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.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2307336-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/21/23 12:04	
Toluene	ND U	0.50	1	04/21/23 12:04	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	91	68 - 117	04/21/23 12:04	
Dibromofluoromethane	104	73 - 122	04/21/23 12:04	
Toluene-d8	102	65 - 144	04/21/23 12:04	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2307425-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/24/23 12:01	
Toluene	ND U	0.50	1	04/24/23 12:01	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	89	68 - 117	04/24/23 12:01	
Dibromofluoromethane	109	73 - 122	04/24/23 12:01	
Toluene-d8	103	65 - 144	04/24/23 12:01	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2307426-04	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/25/23 12:54	
Toluene	ND U	0.50	1	04/25/23 12:54	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/25/23 12:54	
Dibromofluoromethane	109	73 - 122	04/25/23 12:54	
Toluene-d8	101	65 - 144	04/25/23 12:54	

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2307769-05	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: None

Analyte Name	Result	MRL	Dil.	Date Analyzed	Q
Benzene	ND U	0.50	1	04/27/23 12:14	
Toluene	ND U	0.50	1	04/27/23 12:14	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	88	68 - 117	04/27/23 12:14	
Dibromofluoromethane	108	73 - 122	04/27/23 12:14	
Toluene-d8	102	65 - 144	04/27/23 12:14	

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QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Analyzed:**	04/21/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	801671

	Lab Control Sample KQ2307336-03			Duplicate Lab Control Sample KQ2307336-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	10.3	10.0	103	9.89	10.0	99	69-124	4	30
Toluene	10.7	10.0	107	10.2	10.0	102	69-124	4	30

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Analyzed:**	04/24/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	801893

	Lab Control Sample KQ2307425-03			Duplicate Lab Control Sample KQ2307425-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.69	10.0	97	9.88	10.0	99	69-124	2	30
Toluene	10.0	10.0	100	10.2	10.0	102	69-124	2	30

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QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Analyzed:**	04/25/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	802012

	Lab Control Sample KQ2307426-02			Duplicate Lab Control Sample KQ2307426-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	10.3	10.0	103	10.4	10.0	104	69-124	<1	30
Toluene	10.6	10.0	106	10.6	10.0	106	69-124	<1	30

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QA/QC Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Analyzed:**	04/27/23
Sample Matrix:	Water	**Date Extracted:**	NA

Duplicate Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analysis Method:	8260C	**Units:**	ug/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	802346

	Lab Control Sample KQ2307769-03			Duplicate Lab Control Sample KQ2307769-04					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benzene	9.71	10.0	97	9.77	10.0	98	69-124	<1	30
Toluene	9.90	10.0	99	10.0	10.0	100	69-124	1	30

Client: RSEC Inc **Service Request:** K2304530
Project: Emerald Kalama Chemical/EKC-0423
Sample Matrix: Water

SURROGATE RECOVERY SUMMARY
Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Extraction Method: EPA 3520C

Sample Name	Lab Code	2-Fluorobiphenyl 48 - 114	p-Terphenyl-d14 22 - 146
USRW-2	K2304530-011	86	
MW-256	K2304530-018	84	
MW-245	K2304530-019	84	
KC-9	K2304530-020	90	
PDW-117	K2304530-021	83	
NIA E-SUMP	K2304530-022	84	
NIA W-SUMP	K2304530-023	89	
PZ-104	K2304530-024	87	87
PZ-107	K2304530-025	75	90
MW-401	K2304530-026	84	85
Method Blank	KQ2307427-01	83	99
Lab Control Sample	KQ2307427-02	86	100
NIA E-SUMP MS	KQ2307427-03	88	
NIA E-SUMP DMS	KQ2307427-04	87	

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	04/19/23
Sample Matrix:	Water	**Date Received:**	04/19/23
		Date Analyzed:	05/31/23
		Date Extracted:	04/25/23

Duplicate Matrix Spike Summary
Semivolatile Organic Compounds by GC/MS SIM

Sample Name:	NIA E-SUMP	**Units:**	ug/L
Lab Code:	K2304530-022	**Basis:**	NA
Analysis Method:	8270D		
Prep Method:	EPA 3520C		

		Matrix Spike KQ2307427-03			Duplicate Matrix Spike KQ2307427-04					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Biphenyl	ND U	4.24	4.90	87	4.17	4.90	85	70-130	2	30
Diphenyl Ether	95	121	4.90	533 #	96.6	4.90	34 #	70-130	22	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.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Analytical Report

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	KQ2307427-01	**Basis:**	NA

Semivolatile Organic Compounds by GC/MS SIM

Analysis Method: 8270D
Prep Method: EPA 3520C

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Biphenyl	ND U	0.94	1	05/31/23 11:37	4/25/23	
Bis(2-ethylhexyl) Phthalate	**2.5**	2.4	1	05/31/23 11:37	4/25/23	
Diphenyl Ether	ND U	1.0	1	05/31/23 11:37	4/25/23	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	83	48 - 114	05/31/23 11:37	
p-Terphenyl-d14	99	22 - 146	05/31/23 11:37	

Client:	RSEC Inc	**Service Request:**	K2304530
Project:	Emerald Kalama Chemical/EKC-0423	**Date Analyzed:**	05/31/23
Sample Matrix:	Water	**Date Extracted:**	04/25/23

Lab Control Sample Summary
Semivolatile Organic Compounds by GC/MS SIM

Analysis Method:	8270D	**Units:**	ug/L
Prep Method:	EPA 3520C	**Basis:**	NA
		Analysis Lot:	805898

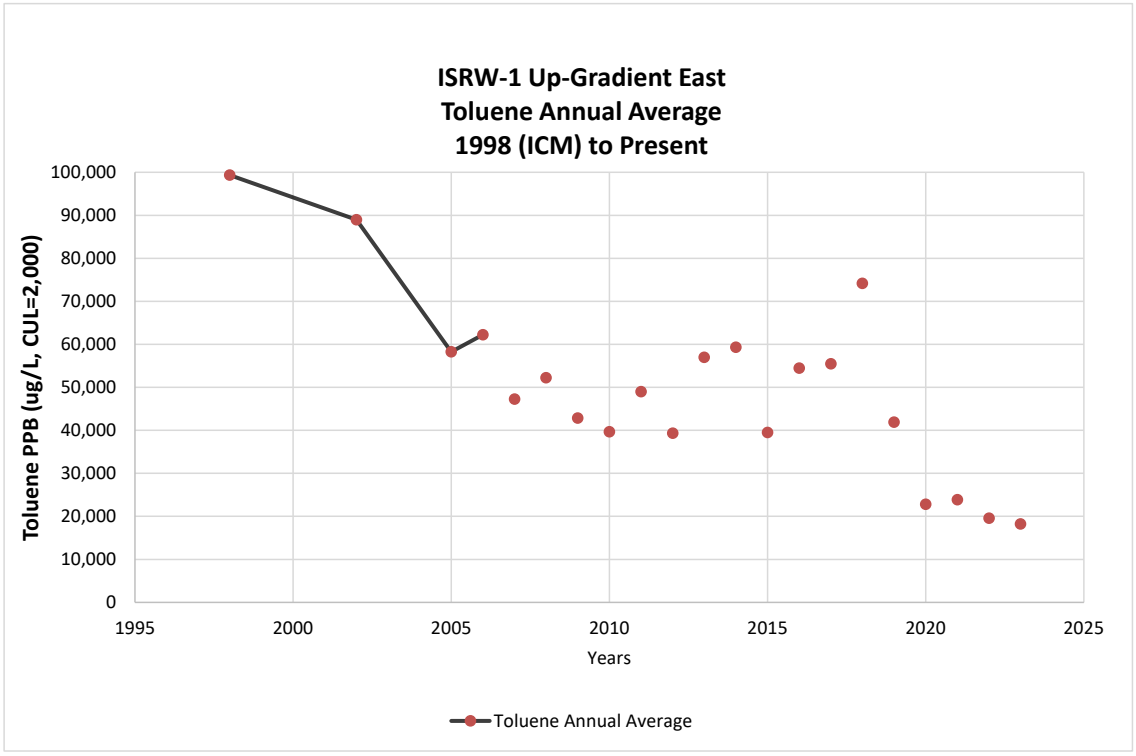
Lab Control Sample
KQ2307427-02

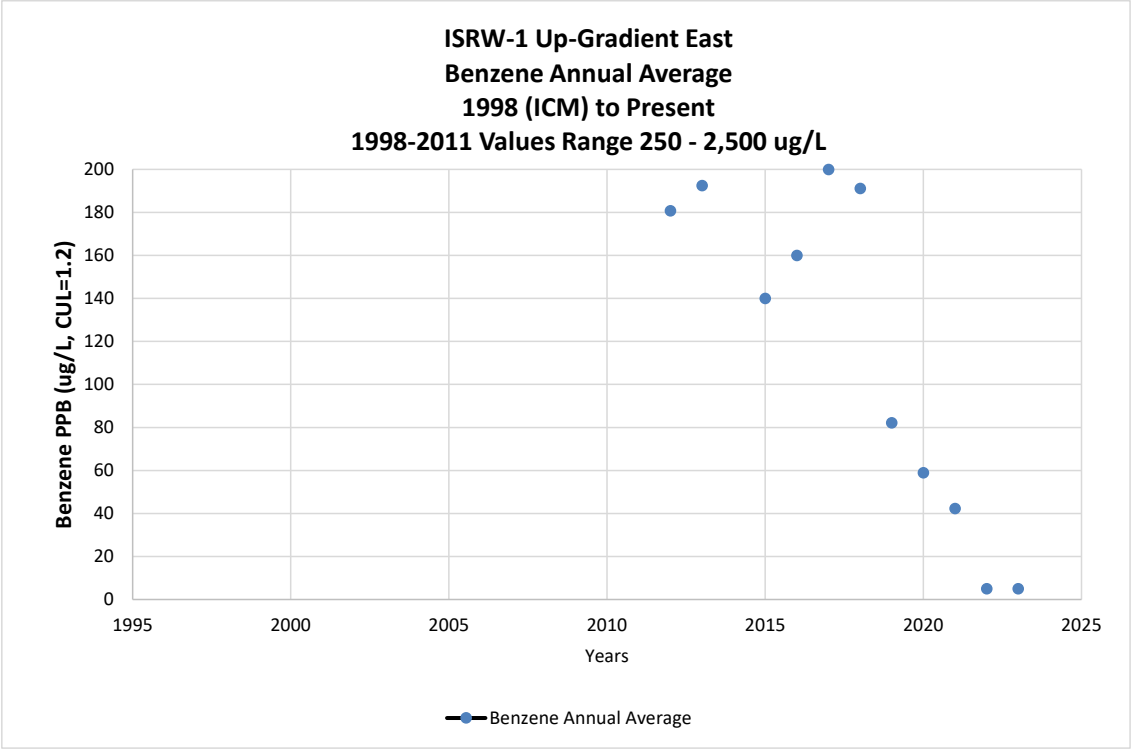
Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
Biphenyl	4.11	5.00	82	70-130
Bis(2-ethylhexyl) Phthalate	6.34	5.00	127 *	64-122
Diphenyl Ether	4.13	5.00	83	70-130

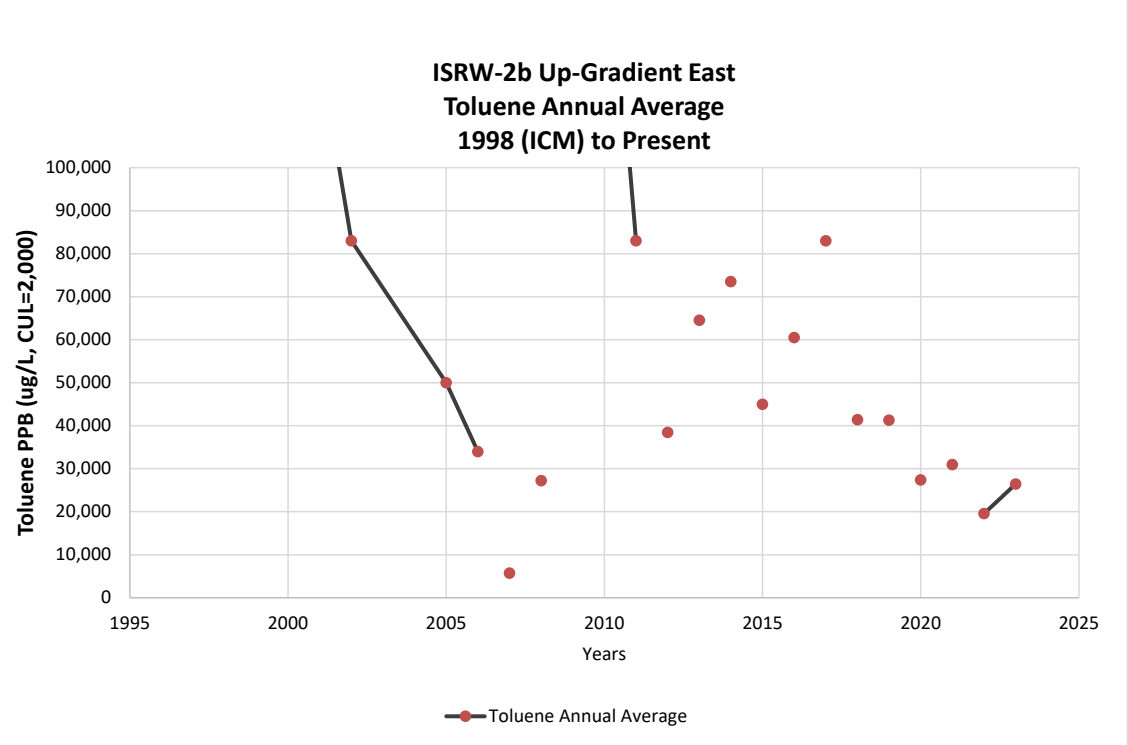
Appendix C

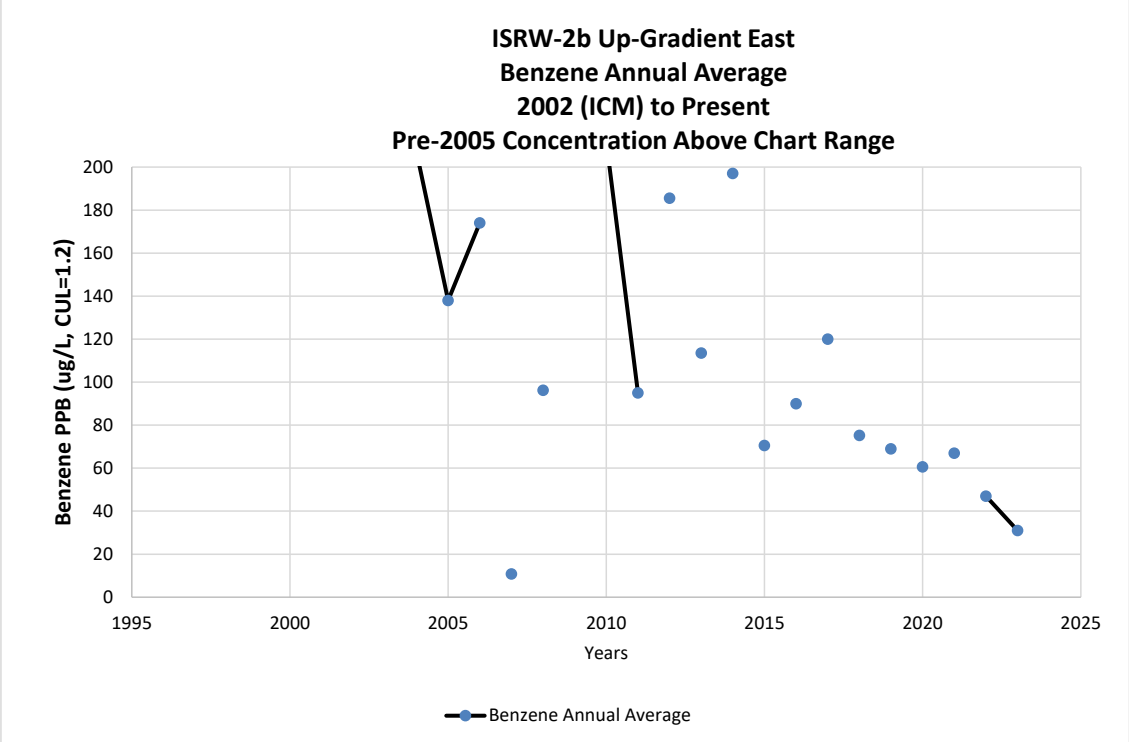
ISRW Benzene & Toluene Concentration Trend Charts

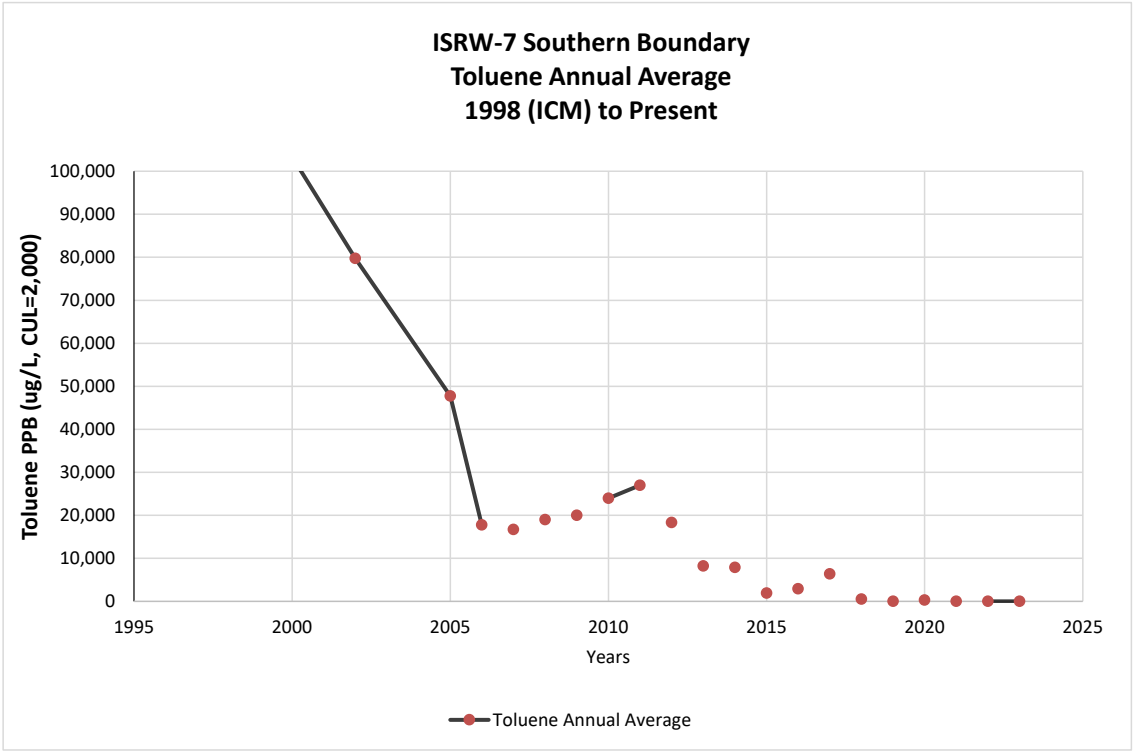
ISRW-1

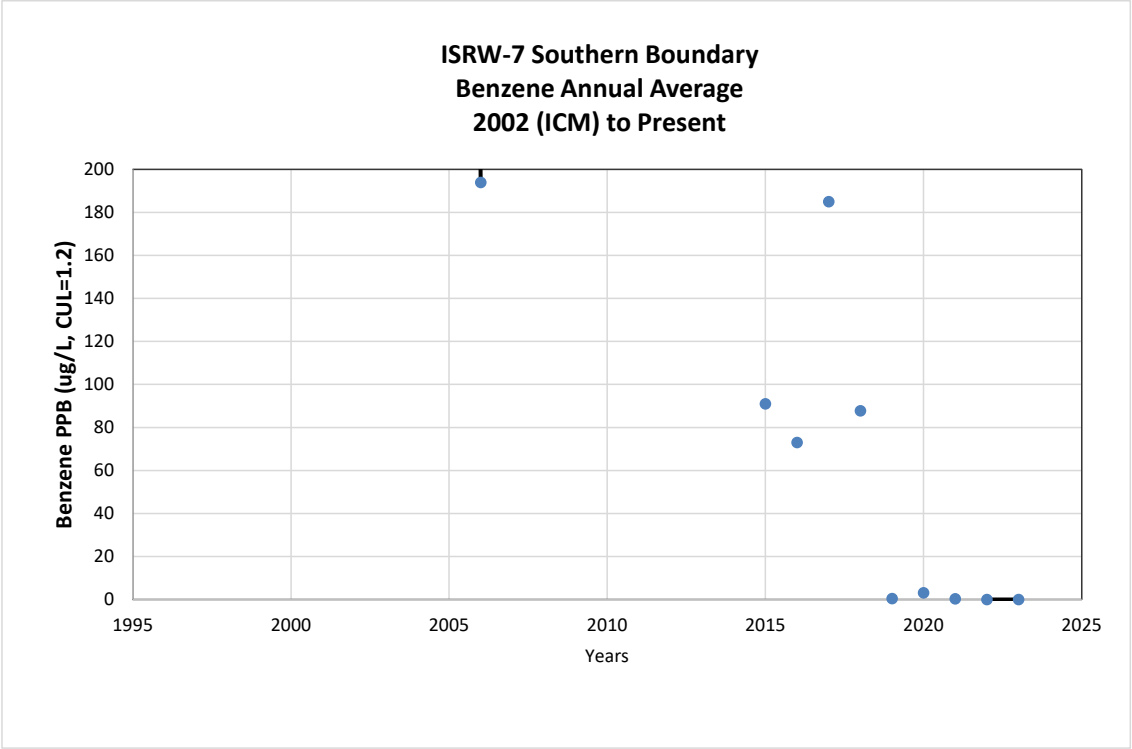

ISRW-1 Up-Gradient East
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

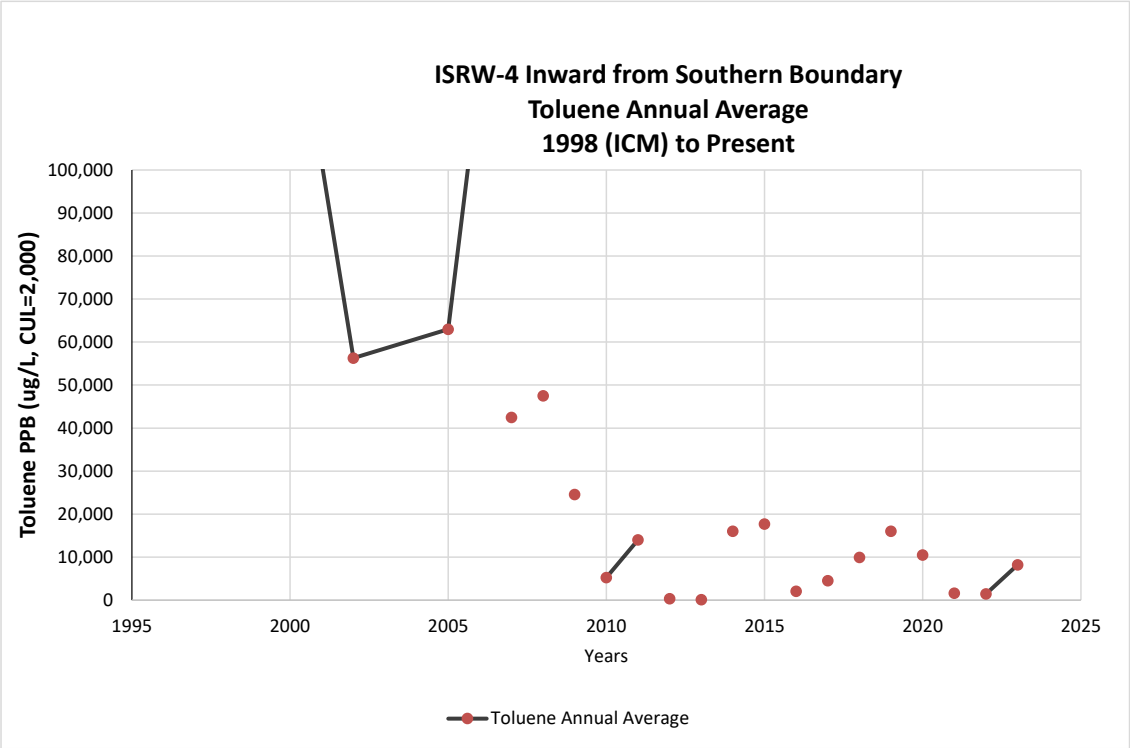

ISRW-1 Up-Gradient East
Benzene Annual Average
1998 (ICM) to Present
1998-2011 Values Range 250 - 2,500 ug/L
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years
Benzene Annual Average

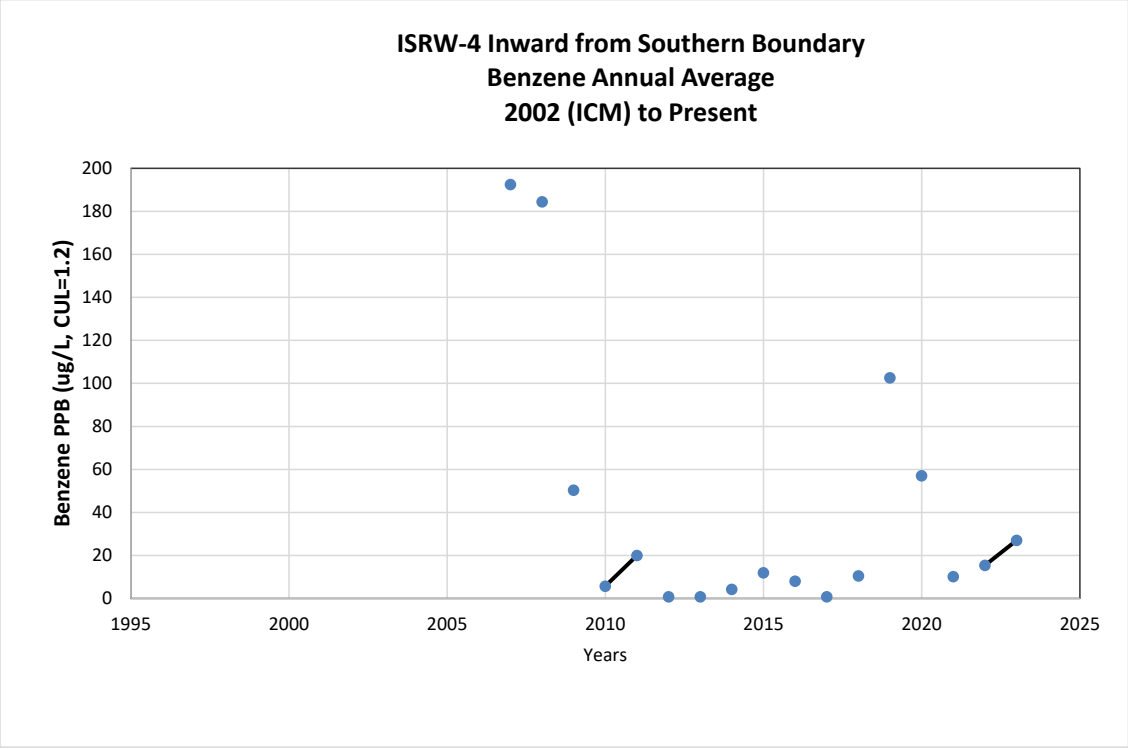

ISRW-2b Up-Gradient East
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

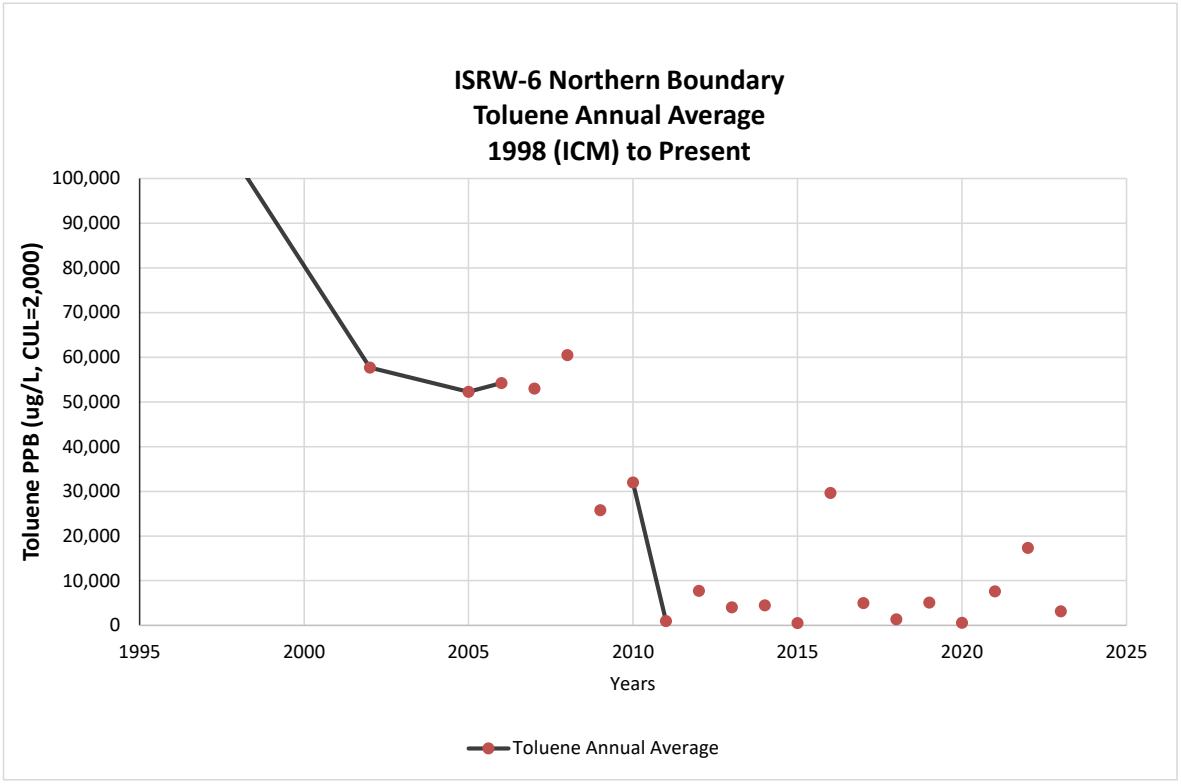

ISRW-2b Up-Gradient East
Benzene Annual Average
2002 (ICM) to Present
Pre-2005 Concentration Above Chart Range
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years
Benzene Annual Average

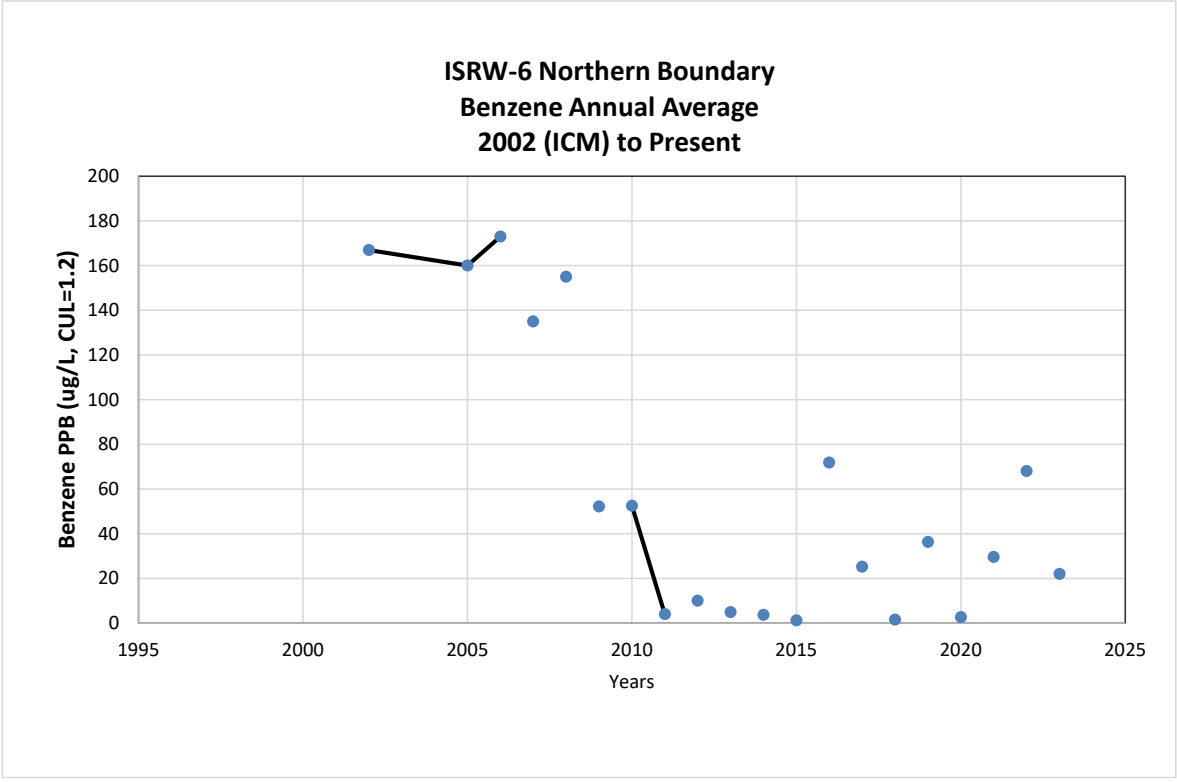

ISRW-7 Southern Boundary
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

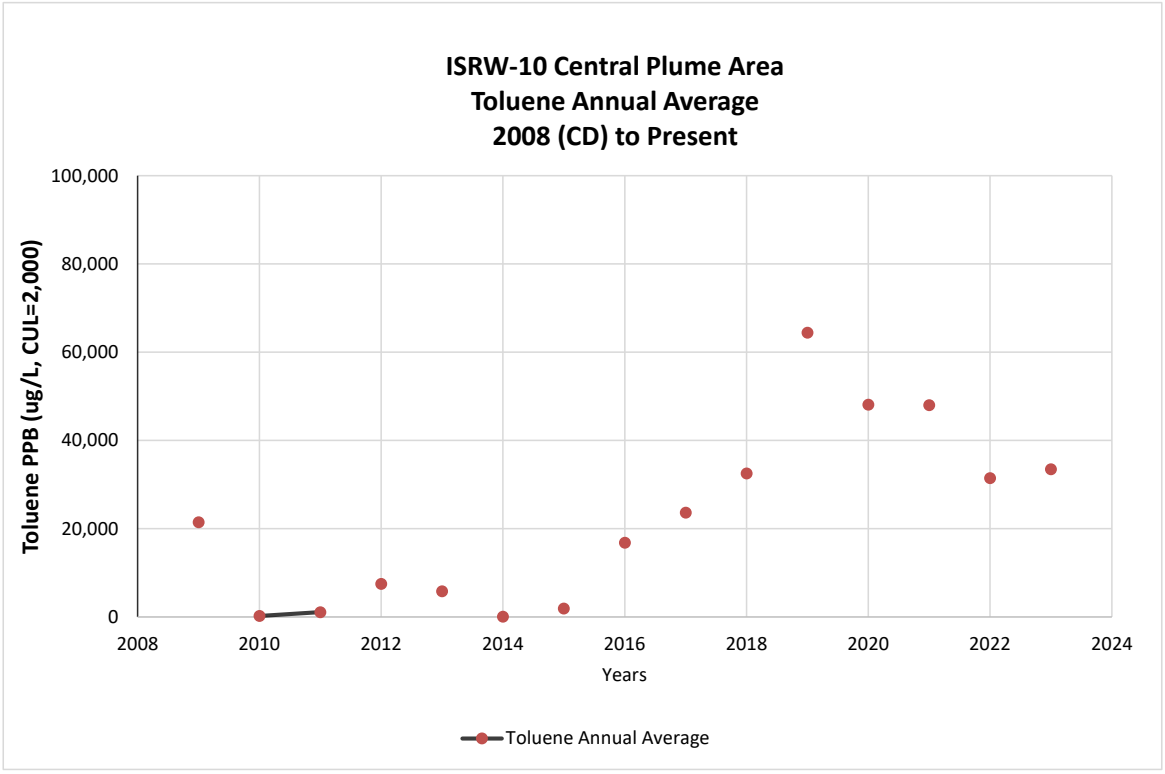

ISRW-7 Southern Boundary
Benzene Annual Average
2002 (ICM) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years

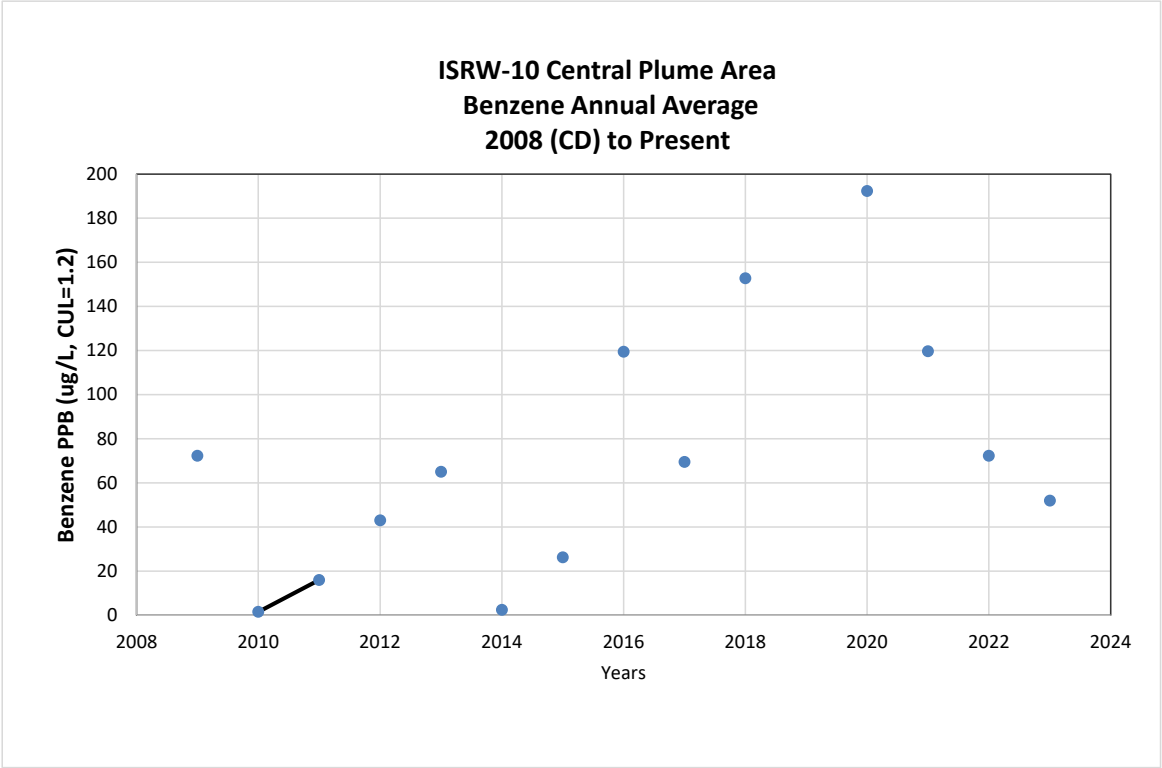

ISRW-4 Inward from Southern Boundary
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

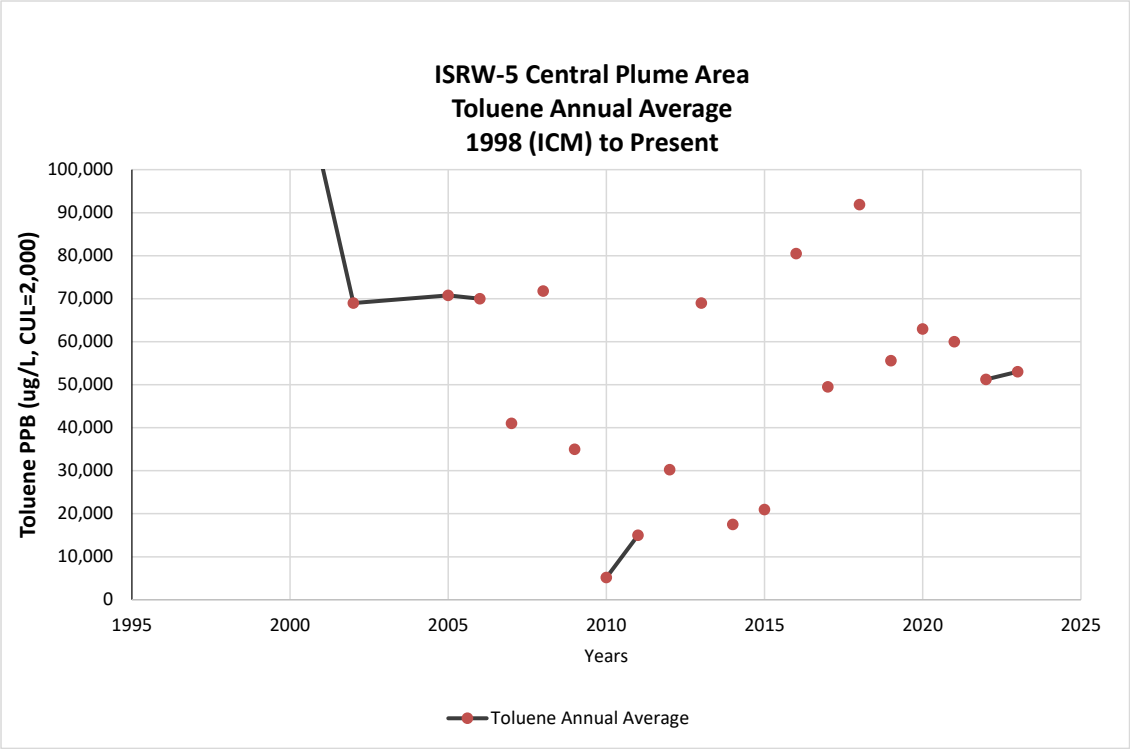

ISRW-4 Inward from Southern Boundary
Benzene Annual Average
2002 (ICM) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years

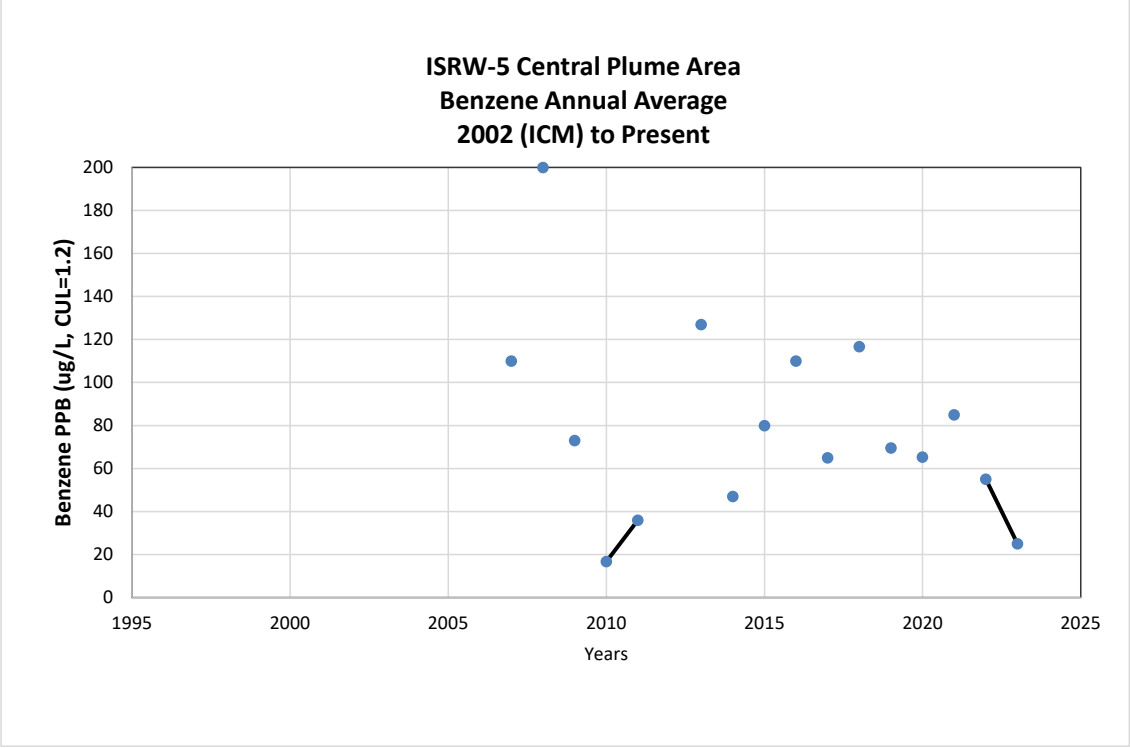

ISRW-6 Northern Boundary
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

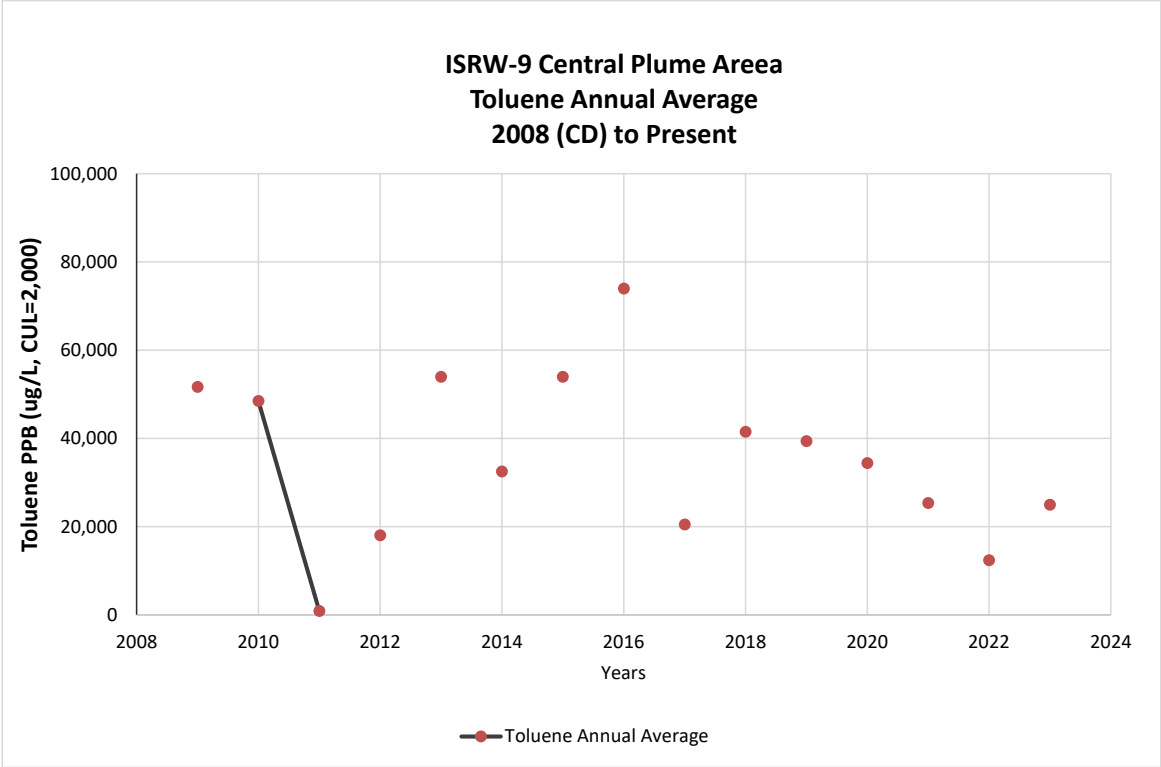

ISRW-6 Northern Boundary
Benzene Annual Average
2002 (ICM) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years

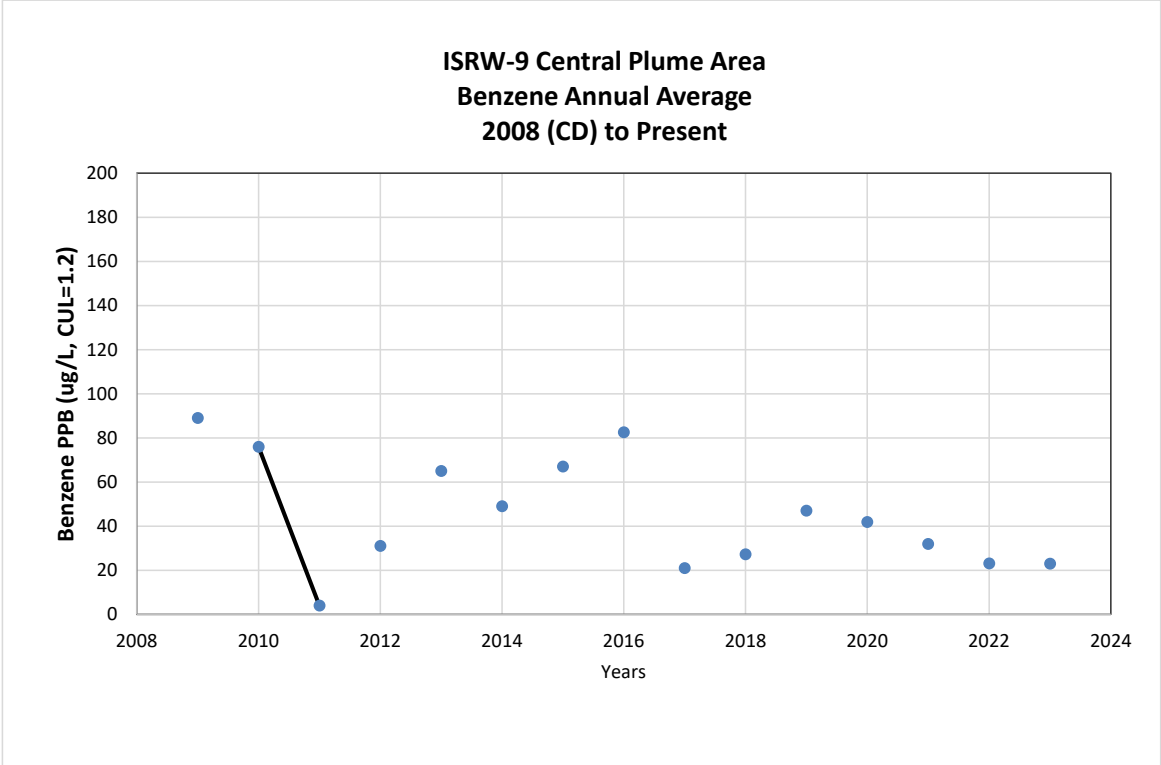

ISRW-10 Central Plume Area
Toluene Annual Average
2008 (CD) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
80,000
60,000
40,000
20,000
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years
Toluene Annual Average

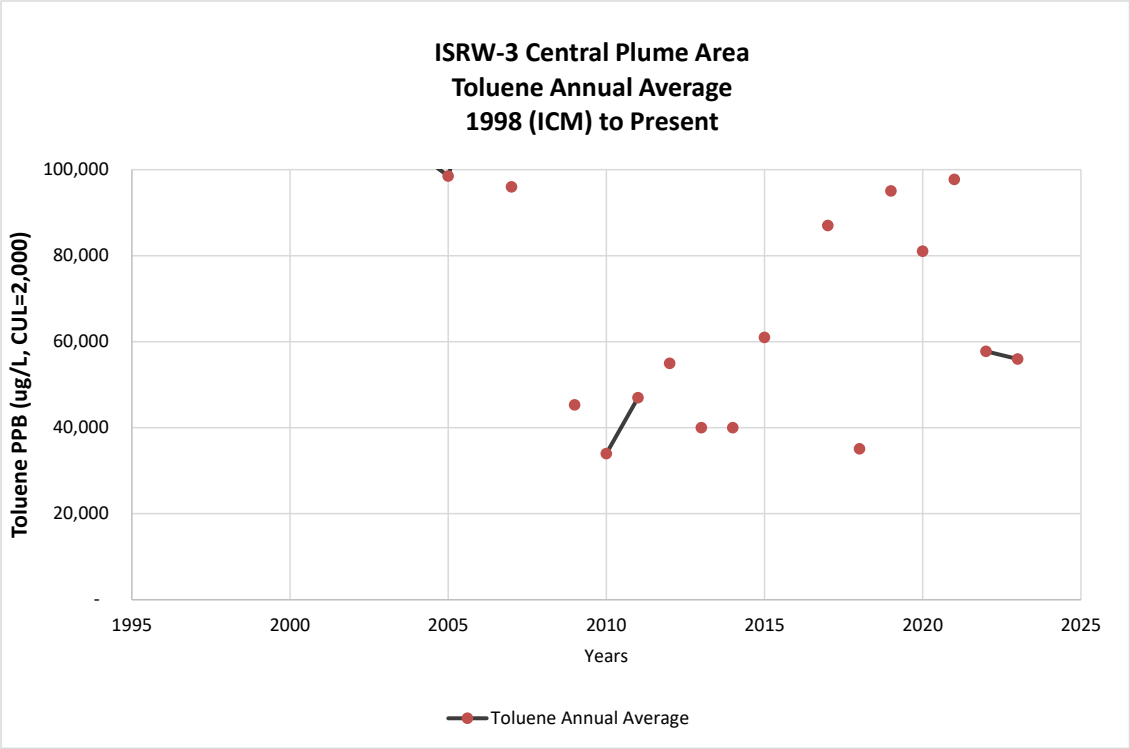

ISRW-10 Central Plume Area
Benzene Annual Average
2008 (CD) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years

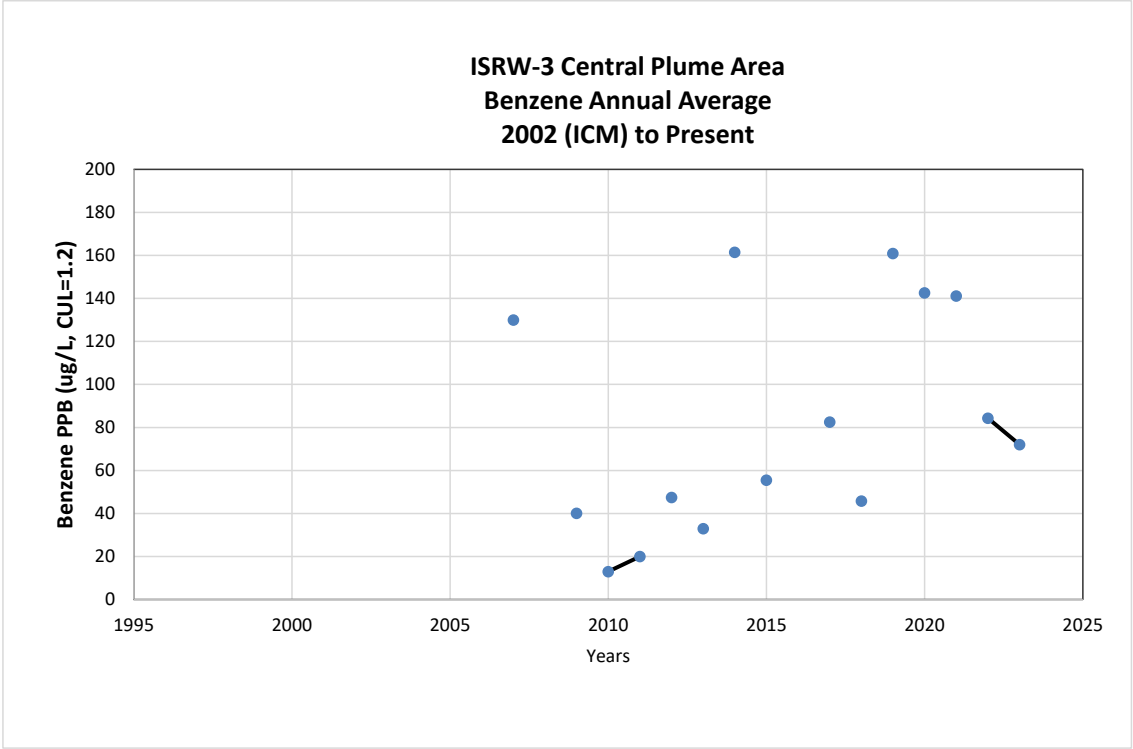

ISRW-5 Central Plume Area
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average

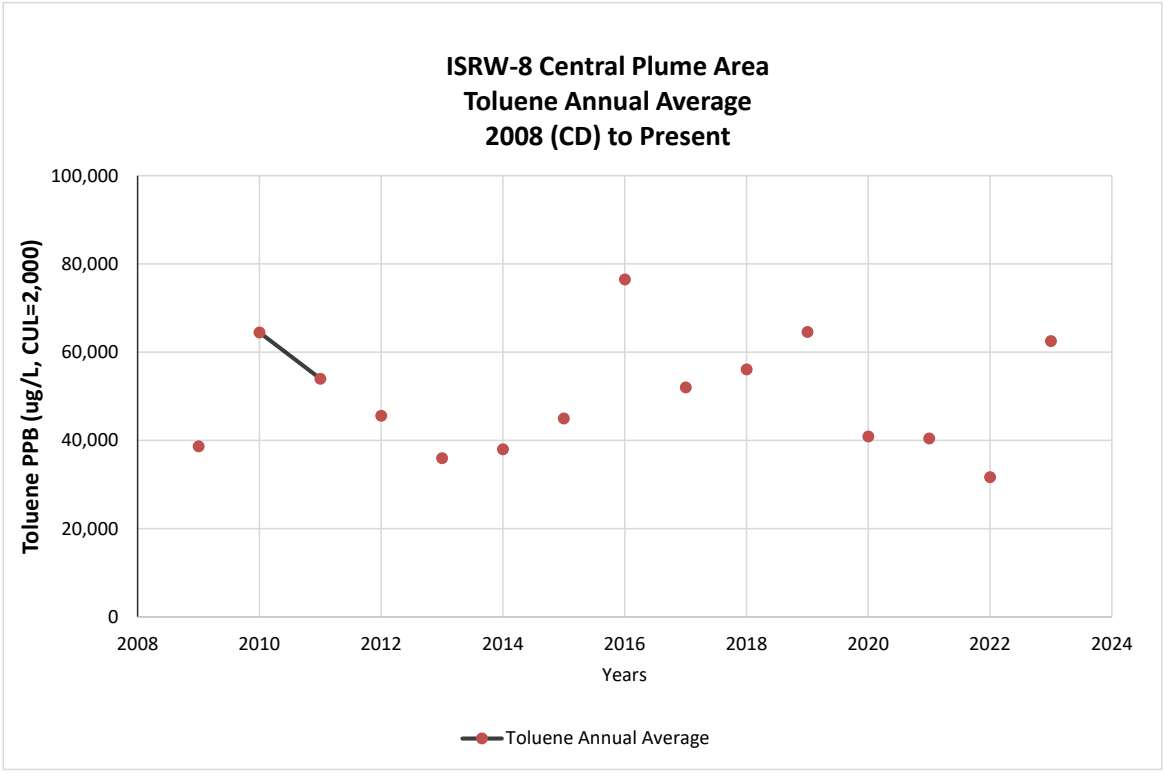

ISRW-5 Central Plume Area
Benzene Annual Average
2002 (ICM) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years

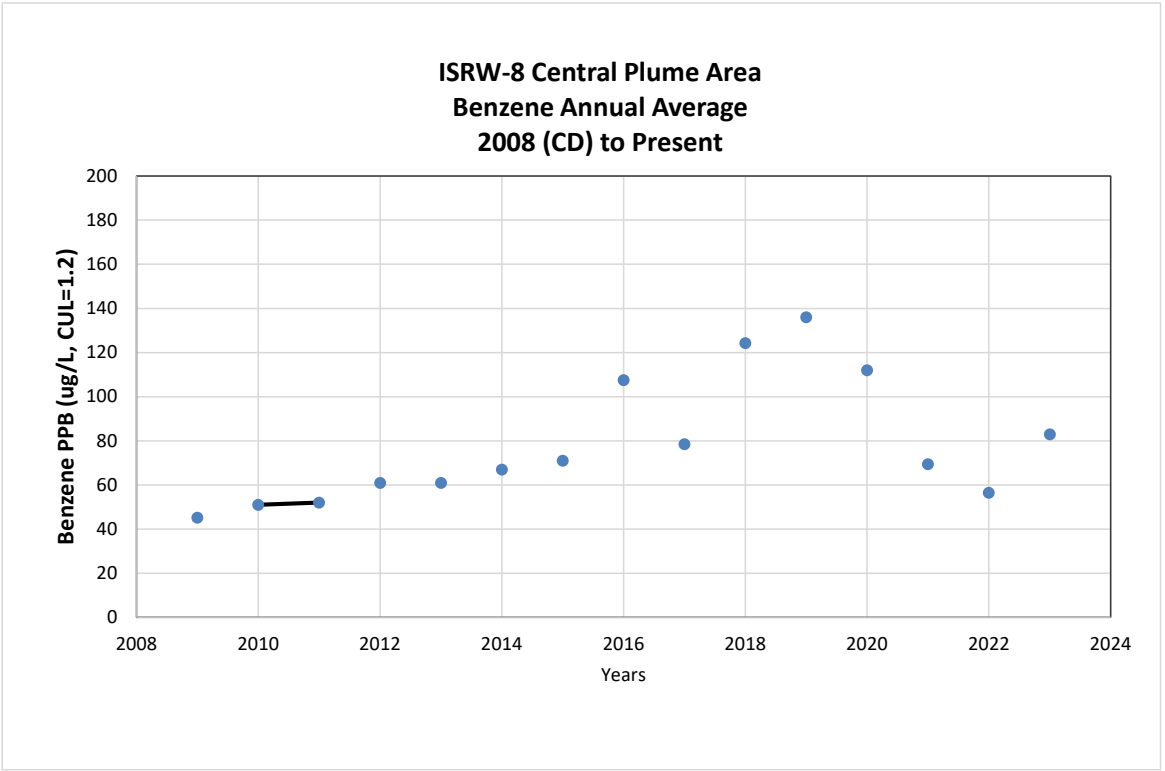

ISRW-9 Central Plume Areea
Toluene Annual Average
2008 (CD) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
80,000
60,000
40,000
20,000
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years
Toluene Annual Average


ISRW-9 Central Plume Area
Benzene Annual Average
2008 (CD) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years


ISRW-3 Central Plume Area
Toluene Annual Average
1998 (ICM) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
80,000
60,000
40,000
20,000
-
1995
2000
2005
2010
2015
2020
2025
Years
Toluene Annual Average


ISRW-3 Central Plume Area
Benzene Annual Average
2002 (ICM) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
1995
2000
2005
2010
2015
2020
2025
Years


ISRW-8 Central Plume Area
Toluene Annual Average
2008 (CD) to Present
Toluene PPB (ug/L, CUL=2,000)
100,000
80,000
60,000
40,000
20,000
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years
Toluene Annual Average


ISRW-8 Central Plume Area
Benzene Annual Average
2008 (CD) to Present
Benzene PPB (ug/L, CUL=1.2)
200
180
160
140
120
100
80
60
40
20
0
2008
2010
2012
2014
2016
2018
2020
2022
2024
Years