hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

Via FedEx and Email

September 29, 2015

Toxics Cleanup Program
State of Washington - Department of Ecology
300 Desmond Drive
Lacy, WA 98503

Attention: Mr. Eugene Radcliff, L.G.

Re: Sediment and Sediment Pore Water Sampling Report
Former Clariant Corporation Facility
Kalama, WA
Facility No. 24634187
VCP Project No. SWO492
H&H Job No. CLR-045

Dear Eugene:

On behalf of Clariant Corporation (Clariant), Hart & Hickman, PC (H&H) is submitting the enclosed report to document sediment and sediment pore water sampling activities completed at the former Clariant facility located in Kalama, WA. Please note that the report includes a request for permission to relocate the current ground water points of compliance (POCs) at the site to the pore water sample locations which were sampled in July 2015 (as documented in the enclosed report).

We are requesting that Ecology provide an opinion on this submittal at this time.

Should you have any questions or need any additional information, please feel free to contact me at 704-586-0007.

Sincerely,

Hart & Hickman, PC

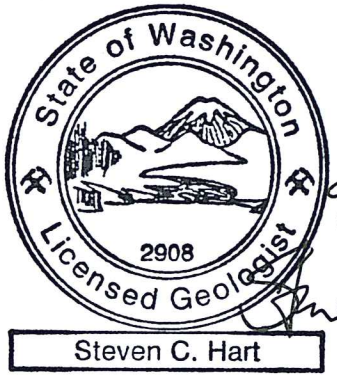
Steven C. Hart, L.G.
Principal

Enclosures (3): Sediment and Sediment Pore Water Sampling Report (two hard copies and one electronic file on CD-ROM)

Sediment and Sediment Pore Water Sampling Report
Former Clariant Corporation Facility

Kalama, Washington
Facility No. 24634187
State of Washington
Department of Ecology
VCP Project No. SWO492

H&H Job No. CLR-045
September 30, 2015



hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

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Sediment and Sediment Pore Water Sampling Report
Former Clariant Corporation Facility
404 N Hendrickson Drive
Kalama, Washington
H&H Job No. CLR-045

Table of Contents

List of Tables

List of Figures

List of Appendices

Sediment and Sediment Pore Water Sampling Report
Former Clariant Corporation Facility
404 N Hendrickson Drive
Kalama, Washington
H&H Job No. CLR-045

1.0 Introduction and Purpose

On behalf of Clariant Corporation (Clariant), Hart & Hickman, PC (H&H) is submitting this report to document sediment and sediment pore water sampling activities completed at the former Clariant facility located at 404 N Hendrickson Drive in Kalama, WA and to request relocation of the current ground water points of compliance (POCs) at the site. The current POCs are two onsite monitor wells located at the edge of site's western property boundary which is adjacent to the Columbia River. The POC wells have concentrations of zinc which are significantly higher than the cleanup level (CUL). Clariant has conducted ground water remedial action (RA) feasibility studies and has implemented multiple remedies to address impacts to site ground water; however, the remedies have not effectively reduced zinc concentrations to levels that achieve the CUL at the POCs. It appears that feasible remedies with the potential to effectively reduce and maintain zinc concentrations below the CUL at the POCs are limited (or, do not exist) in large part due to the interaction between the Columbia River and the site aquifer. Therefore, Clariant believes it is not practicable to meet the CUL at the current POCs within a reasonable restoration time frame.

The sediment and sediment pore water sampling activities were completed following discussions with the Washington State Department of Ecology (Ecology) concerning relocation of the site's current ground water POCs to points within the Columbia River as close as technically possible to the locations where impacted ground water discharges from the site aquifer into the surface water. Ecology indicated that collection of pore water samples from the sediments at the location of impacted ground water discharge from the site aquifer into surface water is more appropriate and representative for demonstrating achievement of CULs than collection of surface water samples adjacent to the site due to inherent problems associated with mixing and dilution

which may not allow for collection of a sample representative of ground water at the location of discharge into the surface water.

A summary of the RA activities previously completed at the site and further discussion of the site's POCs and CULs are presented in Section 2.0. The sediment and sediment pore water sampling methods and results are presented in Section 3.0. Conclusions and a request for relocation of the site's ground water POCs are presented in Section 4.0.

2.0 Site Cleanup Levels and Previous Remedial Activities

The site is located adjacent to the Columbia River. RA activities have previously been completed at the site to address soil and ground water impacted with cadmium and/or zinc above CULs. A brief summary of the RA activities and CULs are presented below. The RA activities have been documented in several reports which have previously been submitted to Ecology.

2.1 Soil CULs and RA Activities

Under the terrestrial ecological receptors evaluation procedures of Model Toxics Control Act (MTCA) and the human exposure via direct contact evaluation procedures of MTCA, the standard POC for soil is 15 ft below ground surface (bgs). Per MTCA, this represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities. The applicable CUL (protective of terrestrial ecology and human health) utilized for the RA was 2 milligrams per kilogram (mg/kg) for cadmium and 360 mg/kg for zinc to the POC depth of 15 ft bgs. During several removal actions, Clariant previously removed approximately 27,500 tons of soil in the location of Former Settling Basin #2 (FSB2). The approximate extent of the previous soil excavation is indicated in Figure 4. Results of post excavation sampling indicate that impacted soil has been removed to the applicable CULs at the POC.

2.2 Ground Water CULs and RA Activities

In accordance with Washington Administrative Code (WAC), the applicable CULs for on-site ground water are the Maximum Contaminant Levels (MCLs) of 5 micrograms per liter (µg/L) for cadmium and 5,000 µg/L for zinc. Because site ground water is not being used for drinking water, a ground water use restriction may be used in lieu of meeting the MCL-based CULs for site ground water. Because the site is located adjacent to the Columbia River and because there is communication between site ground water and the river, the CULs for cadmium and zinc at the site's property boundary with the Columbia River are surface water standards calculated per

WAC 173-201A-240 for protection of aquatic life. Please note that based on historical ground water sampling, the horizontal extent of the dissolved cadmium plume does not appear to extend to the western edge of the property.

The calculated acute and chronic surface water standards for cadmium are 2.1 µg/L and 0.7 µg/L, respectively, and the acute and chronic surface water standards for zinc are 72 µg/L and 66 µg/L, respectively. These standards were calculated using a Columbia River water hardness of 58 milligrams per liter (mg/L) which was obtained from the Camp Dresser & McKee, Inc. (CDM) Feasibility Study dated October 10, 2008. Ecology has previously approved monitoring wells AB1 and AB2 as alternative ground water POCs for the site. Therefore, the goal of previously-completed ground water RA activities was to remediate ground water such that dissolved zinc is at or below applicable surface water standards in wells AB1 and AB2.

In addition to the soil removal activities (mentioned above) which removed the primary sources of cadmium and zinc in vadose zone soil, the following RA activities have been completed at the site to address ground water impacts:

- In September 2010, 23 vertical injection wells and six horizontal injection wells were installed at the site and calcium polysulfide (CaSx) was injected into the wells to address dissolved cadmium and/or zinc in ground water. CaSx is a lime-sulfur solution designed to be used in various treatment systems as a metal precipitating agent and has been used for in-situ treatment of ground water impacted with metals. Post-injection monitoring indicated initial reduction of zinc concentrations in ground water followed by a rebound in concentrations.

- In September 2011, a pilot test was performed using three existing injection wells and one newly installed extraction well to inject CaSx and recirculate ground water in an effort to assist with CaSx distribution in the aquifer. Post-injection monitoring indicated reduction of zinc concentrations in the pilot test area.

- In December 2011, six additional recovery wells were installed at the site and full-scale injection of CaSx and ground water recirculation was performed. Post-injection monitoring indicated initial reduction of zinc concentrations in ground water followed by a rebound in concentrations. A geochemical evaluation completed in early 2013 concluded that the CaSx applications resulted in temporary reducing conditions needed to immobilize zinc, but influence from the Columbia River subsequently oxidized solid zinc compounds resulting in increased dissolved zinc concentrations in the aquifer. Decreased pH may have also dissolved residual zinc carbonate.

- Based on the results of the geochemical evaluation, a pilot test injection of magnesium hydroxide and ferrous sulfate was performed using four existing injection wells during June 2013 to increase aquifer pH and augment the aquifer with iron adsorbent. Field observations and post-injection ground water monitoring indicate that the injection was likely successful in distributing iron within the aquifer, but distribution of the insoluble magnesium hydroxide was likely limited and therefore had limited effectiveness in increasing aquifer pH. H&H concluded that significant amounts of additional magnesium hydroxide would be needed to substantially raise pH and lower dissolved zinc concentrations, but that the long-term effectiveness of adjusting the aquifer pH on reducing dissolved zinc concentrations is not likely due to the interactions between the Columbia River and the site aquifer.

Please note that the Columbia River is subject to tidal fluctuations at the location of the site and that river and ground water table elevations have varied significantly since completion of RA activities in 2010. Based on verified Columbia River elevation data obtained from the National Oceanic and Atmospheric Association (NOAA), the elevation of the Columbia River can fluctuate by as much as approximately 7 ft between low and high tides in the vicinity of the site. And, since 2010, depth-to-ground water measured during monitoring events has ranged from approximately 15.5 (the approximate bottom depth of the previous excavations in the northern portion of the site) to 24 ft bgs.

Generally, historical ground water elevation data indicate that shallow ground water flow at the site is influenced by the tidal elevation variations of the Columbia River. In the eastern portion of the site, there is a hydraulic gradient from east to west toward the river. In the western portion of the site, hydraulic communication between the river and shallow ground water results in a temporal mound in the ground water table near the river that creates a relatively weak hydraulic gradient from west to east in that area. The ground water mound near the river is temporal and its presence depends upon the timing and magnitude of the tides. The converging hydraulic gradients appear to cause ground water in the central portion of the site (where maximum cadmium and zinc concentrations are located) to be temporally stagnant.

3.0 Sediment and Sediment Pore Water Sampling

On July 21 and 22, 2015, H&H personnel collected sediment and sediment pore water samples at the eastern edge of the Columbia River adjacent to the site at the locations depicted in Figures 2 and 3, respectively. Three sediment and sediment pore water samples were collected downgradient of each of the POC wells AB1 and AB2. One pair of samples (i.e., sediment and sediment pore water) was collected along an imaginary line extending from each of POC wells to perpendicular with the river, and two sample pairs were collected 20 ft and 40 ft downstream of the in-line sample locations. For example, sediment sample SED AB1-A was collected along an imaginary line extending from POC well AB1 to perpendicular with the river, and sediment samples SED AB1-B and SED AB1-C were collected 20 ft and 40 downstream of SED AB1-A, respectively. Sediment pore water samples were identified with the prefix "PW" (e.g., PW AB1-A, PW AB2-B, etc.).

H&H selected the locations and distribution of the sediment and sediment pore water samples in an effort to collect samples from the points where the zinc ground water plumes are most likely to discharge from the site aquifer into the surface water. Sediment and sediment pore water sample locations and ground water zinc concentrations and isoconcentration contours from January 2015 are depicted in Figures 2 and 3. In addition, an upstream pair of sediment and sediment pore water samples (identified as SED-US/PW-US and SED-DS/PW-DS) were collected from locations near the southern and northern boundaries of the site to evaluate potential background levels of zinc and cadmium.

3.1 Sampling Methods

Sediment and sediment pore water sample pairs were collected from the lowest point accessible from the river bank at the time of sampling. At each sampling location (except the upstream and downstream locations where no rip rap was present), rip rap was removed from the river bank until underlying sediment was exposed. Then, a 24" long, 1/4" diameter PushPoint sediment pore water sampler obtained from MHE Products was inserted to a depth of approximately 18"

below the top of the sediment, or to refusal depth (which was not encountered shallower than 12" below the top of sediment at any of the sample locations). The PushPoint sampler is a machined sampling tool consisting of a tubular stainless steel body constructed with an approximately 2-inch long screened zone at the bottom end and a sampling port at the top end. After inserting the PushPoint sampler at each sample locations, 1/4" diameter polyethylene tubing was connected by Tygon tubing to the top the sampler. Photographs of the PushPoint sampling are included in Appendix A.

After each PushPoint sampler was installed, pore water was purged from the sampler at a rate of approximately 100 milliliters per minute (mL/min) using a peristaltic pump. Pore water parameters that included conductivity, dissolved oxygen (DO), pH, oxidation-reduction potential (ORP), and turbidity were measured in the field during the low-flow purging and prior to sample collection. A summary of the pore water field parameter data is included in Table 1. After pore water parameters stabilized during purging, pore water was pumped through a 0.45-micron field-filter and was then poured directly from the filter outlet into laboratory-supplied sample containers, which were then sealed, labeled, placed into a laboratory-supplied sample cooler, and covered with ice. The cooler was delivered under standard chain-of-custody protocols to Test America of Nashville, TN, and the samples were analyzed for cadmium and zinc by EPA Method 6010B. The laboratory analytical report and chain-of-custody record for the samples is included in Appendix B.

In addition, conductivity, DO, pH, ORP, and turbidity measurements were collected from the surface water at the PW-US, PW-DS, PW AB1-B, and PW AB2-B sample locations. The surface water field parameter data are summarized in Table 1. At each sample location, DO measured in the surface water was significantly higher than DO measured in pore water. The difference in DO levels measured in pore water and surface water is an indicator of hydraulic separation between the screened interval of the PushPoint sampler and the surface water.

The PushPoint sampler was also used as a piezometer to measure the potentiometric surface of the pore water relative to the surface of the Columbia River by establishing a continuous stream

of water in the tubing connected to the sampler and maintaining a portion of the tubing below the river surface and the open end of the tubing above the river surface. At each sample location, the potentiometric surface of the pore water was higher than that of the river surface (indicating a hydraulic gradient from the pore water to the surface water at the time of sampling). The approximate potentiometric surface in each sample point relative to the river surface is shown in Table 1. Note that the relative difference between the pore water potentiometric surface and the river surface was generally larger in samples collected closest to low tide (e.g., PW AB2-A, PW AB2-B, and PW AB2-C). The relative difference between the pore water potentiometric surface and the river surface is another indicator of hydraulic separation between the screened interval of the PushPoint sampler and the surface water.

After pore water samples and potentiometric surface measurements were collected at each pore water sample location, the PushPoint sampler was removed and a sediment sample was collected from the location. Sediments were collected by field personnel using a gloved hand and placed directly into laboratory-supplied sample containers, which were then sealed, labeled, placed into a laboratory-supplied sample cooler, and covered with ice. The cooler was delivered under standard chain-of-custody protocols to Test America of Nashville, TN, and the samples were analyzed for cadmium and zinc by EPA Method 6010B.

3.2 Sample Results

Analytical results of the sediment pore water samples are summarized in Table 2. As shown in the table, there were no detections of cadmium or zinc in any of the pore water samples. Sediment pore water sample locations are depicted along with ground water zinc concentrations and isoconcentration contours in Figure 3. A cross-section transect location map and cross-section are included as Figures 4 and 5, respectively.

Analytical results of the sediment samples are summarized in Table 3. As shown in the table, cadmium was not detected in any of the sediment samples. Zinc was detected in each of the sediment samples at concentrations ranging from 27.4 mg/kg to 61.9 mg/kg. These detections

are significantly lower than the Freshwater Sediment Cleanup Objective (from the WAC Sediment Management Standards) for zinc (3,200 mg/kg). The detections are also less than the natural background zinc concentration in Washington State soils (86.0 mg/kg) published in Ecology's Toxic Cleanup Program Publication No. 94-115. Sediment sample locations are depicted along with ground water zinc concentrations and isoconcentration contours in Figure 2.

4.0 Conclusions and Request for POC Relocation

H&H has completed sediment and sediment pore water sampling at the former Clariant facility located in Kalama, WA. The results of the sampling indicate that sediment at the eastern edge of the Columbia River located adjacent to the site are not impacted with cadmium or zinc above natural background levels, and concentrations of cadmium and zinc were not detected in sediment pore water samples. The sediment and sediment pore water samples (except for an upstream and downstream sample) were collected from locations where the zinc ground water plumes associated with site are most likely to discharge from the site aquifer into surface water.

At the time of sampling, the Columbia River level was lower than levels which have existed at the time of nearly every ground water sampling event completed at the site since 2002, the samples were collected at or near the time of low tide, and pore water potentiometric surfaces were significantly higher than the river surface. Therefore, the sampling appears to have been conducted under hydraulic conditions which favor a potentially high rate of ground water discharge to the river. Based upon the results, it appears that zinc concentrations above the CUL in ground water do not extend to the river due to the hydraulic interaction between the Columbia River and ground water as discussed in Section 2.2. As such, there is no indication of sediment or surface water impact in the vicinity of the site.

As previously discussed, the current POCs are two onsite monitor wells (AB1 and AB2) located at the edge of site's western property boundary which is adjacent to the Columbia River. The wells are impacted with concentrations of zinc which are significantly higher than the CUL and it appears that feasible remedies with the potential to effectively reduce and maintain zinc concentrations below the CUL at the POCs are limited (or, do not exist) in large part due to the interaction between the Columbia River and the site aquifer. Therefore, Clariant believes it is not practicable to meet the CUL at the current POCs within a reasonable restoration time frame. As such, Clariant requests that Ecology grant permission for Clariant to relocate the current POCs to the pore water sample locations which were sampled in July 2015. These points appear to be located as close as technically possible to the locations where the zinc ground water plumes

associated with site are most likely to discharge from the site aquifer into the surface water.

Clariant proposes to sample the proposed POCs (i.e., the pore water sample locations) on a quarterly basis for one year in order to evaluate whether or not cadmium or zinc concentrations above the CUL in ground water extend to the river under varying hydraulic conditions which are anticipated to occur throughout the year as a result of seasonal river level fluctuations. The proposed pore water sampling will be conducted using the methods described in Section 3.1. In addition, during the proposed sampling events, ground water elevations will be measured in the current POC wells (AB1 and AB2) and ground water samples will be collected from the these wells for analysis of cadmium and zinc. If zinc concentrations above the CUL are not detected in the pore water samples during the first year, Clariant proposes to reduce the sampling frequency to a semi-annual basis and perform the sampling for a period of two years. If zinc concentrations above the CUL are not identified in the pore water samples during the proposed three-year sampling period, Clariant believes a no further action (NFA) designation will be warranted for the site.

Table 1
Summary of Sediment Pore Water Field Parameter Data and
Estimated Columbia River Levels
Former Clariant Facility
Kalama, WA
H&H Project No. CLR-045

Sample ID / Location	Sample Date	Sample Time (LST)	Conductivity (µs/cm)	DO (mg/L)	pH (s.u.)	ORP (mV)	Turbidity (NTU)	Pore Water Potentiometric Surface (ft ACRS)	High (CRD)[1]		Low (CRD)[1]	
									Time (LST)	Elevation (ft)	Time (LST)	Elevation (ft)
Surface Water at Upstream Location	07/22/15	10:50	129	8.7	6.91	301	5.4	--	7:30	2.90	14:45	0.02
PW-US	07/22/15	10:45	146	7.8	7.70	262	0.7	0.08				
Surface Water at Downstream Location	07/22/15	10:05	137	8.3	6.99	314	2.5	--				
PW-DS	07/22/15	10:00	134	6.4	7.42	293	0.6	0.08				
Surface Water at AB1 Sample Group	07/21/15	11:20	126	9.1	8.13	228	3.4	--	19:30	3.51	14:30	-0.05
PW AB1-A	07/21/15	10:25	132	4.2	6.35	320	0.1	0.25				
PW AB1-B	07/21/15	11:15	118	3.4	5.96	332	0.1	0.30				
PW AB1-C	07/21/15	12:00	133	6.1	6.50	336	17.5	0.33				
Surface Water at AB2 Sample Group	07/21/15	15:10	124	8.3	6.88	306	11.6	--				
PW AB2-A	07/21/15	14:25	128	2.4	6.95	304	0.0	0.58				
PW AB2-B	07/21/15	15:05	121	2.9	6.91	304	6.6	0.50				
PW AB2-C	07/21/15	15:35	120	2.8	6.92	321	1.3	0.50				

Notes

LST = local standard time

µs/cm - microsiemens per centimeter

DO = dissolved oxygen; mg/L = milligrams per liter

ORP - oxidation reduction potential, mV - millivolts

NTU - Nephelometric turbidity units (measuree prior to field filtering)

ft ACRS = approximate feet above Columbia River surface

CRD = Columbia River Datum

1) High/Low CRD elevations and times are estimated for the site location using verified Longview and St. Helens station data from NOAA website. The site is approximately half way between the two stations; therefore, tides for the site were calculated using the difference between the times and water level data at these two stations. The elevations are based on MLLW.

Table 2
Summary of Pore Water Cadmium and Zinc Analytical Data
Former Clariant Facility
Kalama, WA
H&H Project No. CLR-045

Sample ID	Sample Date	Sample Time	Dissolved Cadmium (µg/L)	Dissolved Zinc (µg/L)
PW-US	07/22/15	10:45	<1.0	<50.0
PW-DS	07/22/15	10:00	<1.0	<50.0
PW AB1-A	07/21/15	10:25	<1.0	<50.0
PW AB1-B	07/21/15	11:15	<1.0	<50.0
PW AB1-C	07/21/15	12:00	<1.0	<50.0
PW AB2-A	07/21/15	14:25	<1.0	<50.0
PW AB2-B	07/21/15	15:05	<1.0	<50.0
PW AB2-C	07/21/15	15:35	<1.0	<50.0
Acute Freshwater Surface Water Standard*			**2.1**	**72**
Chronic Freshwater Surface Water Standard*			**0.7**	**66**

Note
µg/L = micrograms per liter
Samples were field-filtered and analyzed by EPA Method 6010B for dissolved cadmium and zinc only
*Surface water standards calculated per Washington Administrative Code (WAC) 173-201A-240 (revised January 2012) using an average Columbia River water hardness of 58 milligrams per liter.

Table 3
Summary of Sediment Analytical Data
Former Clariant Facility
Kalama, WA
H&H Project No. CLR-045

Sample ID	Sample Date	Cadmium (mg/kg)	Zinc (mg/kg)
SED-US	07/22/15	<1.20	31.1
SED-DS	07/22/15	<1.28	27.4
SED AB1-A	07/21/15	<1.24	47.9
SED AB1-B	07/21/15	<1.29	44.5
SED AB1-C	07/21/15	<1.25	61.9
SED AB2-A	07/21/15	<1.27	55.1
SED AB2-B	07/21/15	<1.22	35.1
SED AB2-C	07/21/15	<1.08	51.7
Sediment Standard[1]		**2.1**	**3,200**
Natural Background Soil Concentration[2]		**1.0**	**86.0**

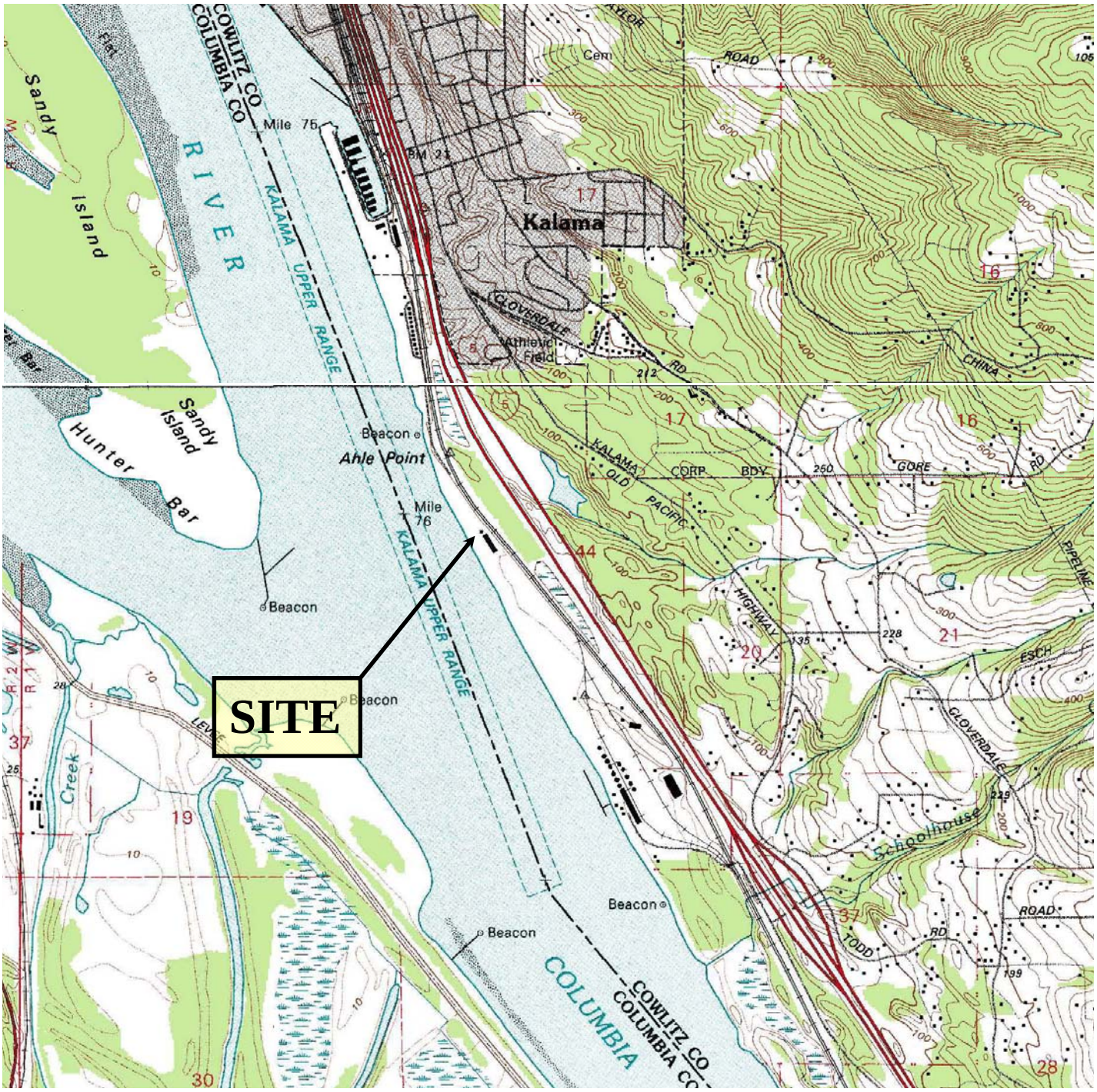
Notes:

mg/kg = milligrams per kilogram

Samples were analyzed by EPA Method 6010B for cadmium and zinc only

[1]Freshwater Sediment Cleanup Objectives form Table VI of Washington Administrative Code (WAC) 173-204-563 Sediment Management Standards.

[2]Natural Background Soil Metals Concentrations in Washington State. Washington Department of Ecology - Toxics Cleanup Program Publication No. 94-115 (October 1994)



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APPROXIMATE

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U.S.G.S. QUADRANGLE MAP

DEER ISLAND & KALAMA, WA 7.5 MIN. TOPOGRAPHIC QUADRANGLES

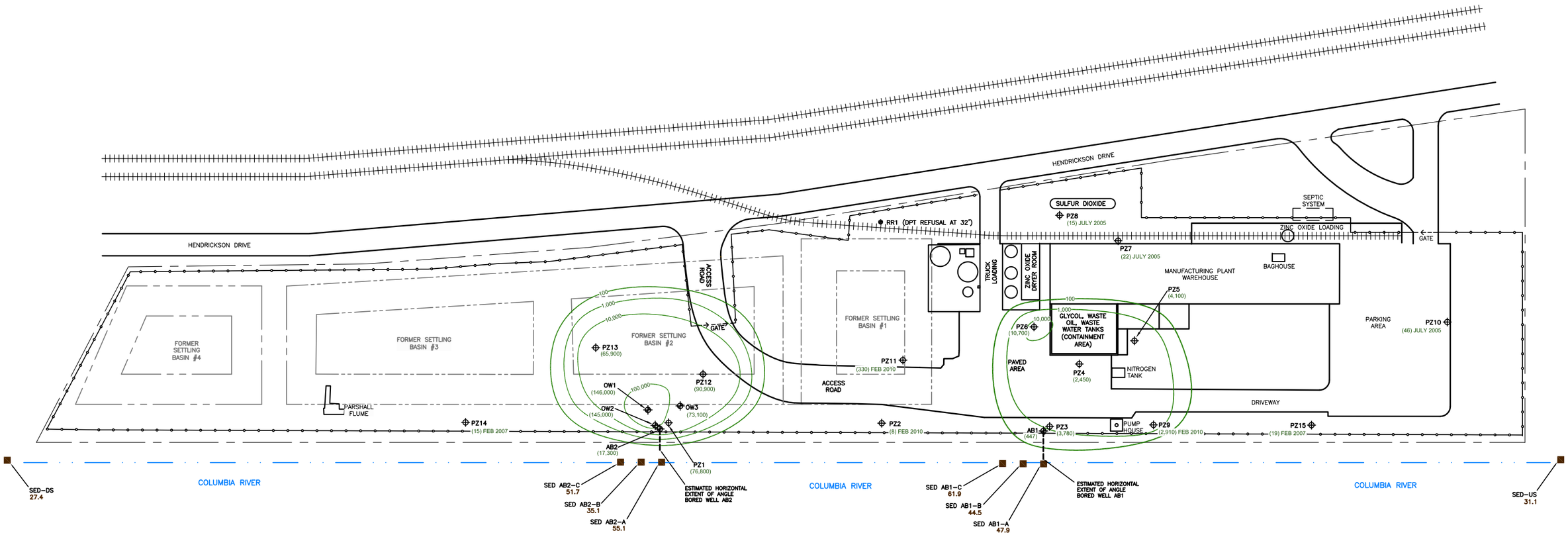
QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE	SITE LOCATION MAP
PROJECT	CLARIANT CORPORATION KALAMA, WASHINGTON

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street – Suite 100
Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

DATE:	09-18-12	REVISION NO:	0
JOB NO:	CLR-045	FIGURE NO:	1



LEGEND:

- PROPERTY LINE
- FENCE LINE
- RAILROAD TRACK
- APPROXIMATE EAST EDGE OF COLUMBIA RIVER
- EXTENT OF FORMER SETTLING BASIN
- MONITORING/OBSERVATION WELL
- PIEZOMETER
- (447) ZINC CONCENTRATION (µg/L)
- 1,000 ZINC ISOCONCENTRATION CONTOUR IN µg/L
- SEDIMENT SAMPLE LOCATION
- 27.4 SEDIMENT SAMPLE ZINC CONCENTRATION (mg/kg)

NOTES
1. HISTORICAL GROUND WATER SAMPLE DATA USED TO AID IN CONTOURING.
2. GROUND WATER ZINC DATA FROM JANUARY 2015 UNLESS OTHERWISE INDICATED (BY DATE).
3. SEDIMENT SAMPLES COLLECTED JULY 2015.

APPROXIMATE
0 100 200
SCALE IN FEET

TITLE
SEDIMENT SAMPLE ZINC CONCENTRATION AND GROUND WATER ZINC ISOCONCENTRATION OVERLAY MAP

PROJECT
CLARIANT - KALAMA SITE
404 HENDRICKSON DRIVE
KALAMA, WASHINGTON

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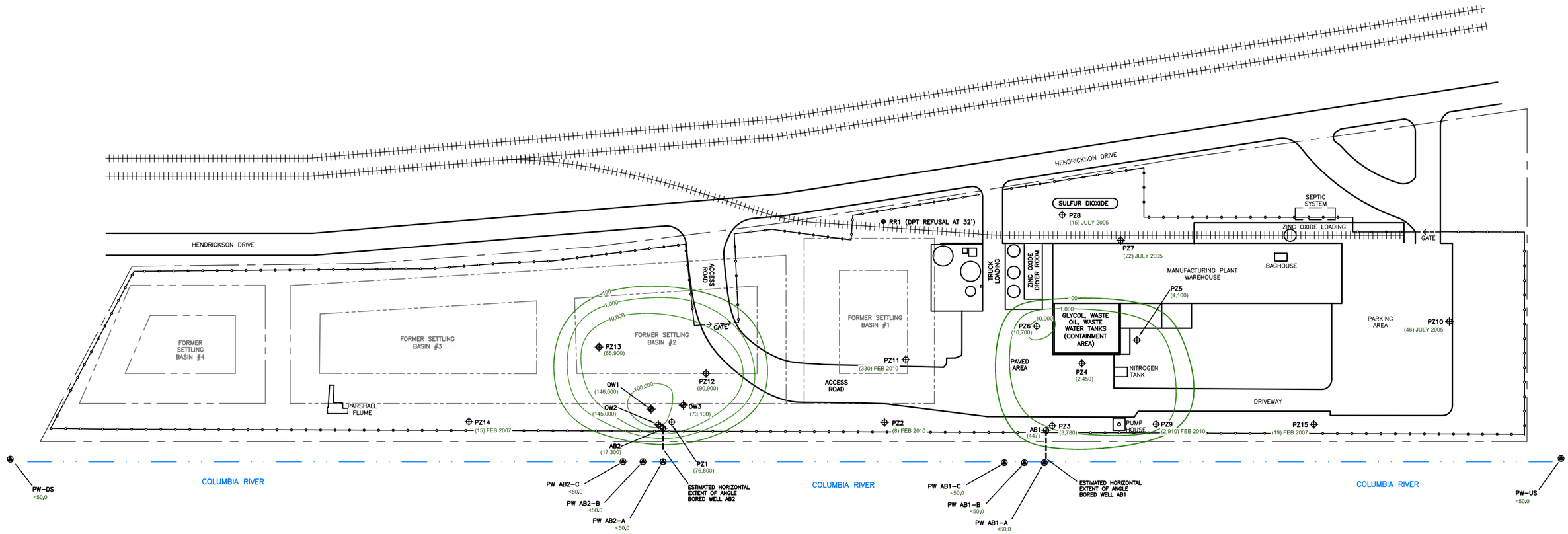
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 08/29/15	REVISION NO. 0
JOB NO. CLR-045	FIGURE NO. 2

S:\AAA-Master Projects\Clariant - CLR\CLR-045 Kalama, WA RAPOC Relocation Effort\Figures.dwg, FIG.2 SED, 8/31/2015 4:43:53 PM



LEGEND:

- PROPERTY LINE
- FENCE LINE
- RAILROAD TRACK
- APPROXIMATE EAST EDGE OF COLUMBIA RIVER
- EXTENT OF FORMER SETTLING BASIN
- MONITORING/OBSERVATION WELL
- PIEZOMETER
- (447) JANUARY 2015 ZINC CONCENTRATION (µg/L)
- 1,000 ZINC ISOCONCENTRATION CONTOUR IN µg/L
- SEDIMENT PORE WATER SAMPLE LOCATION
- <50.0 JULY 2015 SEDIMENT PORE WATER SAMPLE ZINC CONCENTRATION (µg/L)

NOTES
1. HISTORICAL GROUND WATER SAMPLE DATA USED TO AID IN CONTOURING.
2. GROUND WATER ZINC DATA FROM JANUARY 2015 UNLESS OTHERWISE INDICATED (BY DATE).
3. SEDIMENT PORE WATER SAMPLES COLLECTED JULY 2015.

APPROXIMATE
0 100 200
SCALE IN FEET

TITLE
SEDIMENT PORE WATER ZINC CONCENTRATION AND GROUND WATER ZINC ISOCONCENTRATION OVERLAY MAP

PROJECT
CLARIANT - KALAMA SITE
404 HENDRICKSON DRIVE
KALAMA, WASHINGTON

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704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 08/29/15	REVISION NO. 0
JOB NO. CLR–045	FIGURE NO. 3

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HENDRICKSON DRIVE

SULFUR DIOXIDE

PZ8
(15) JULY 2005

PZ7
(22) JULY 2005

RR1 (DPT REFUSAL AT 32')

MANUFACTURING PLANT
WAREHOUSE

TRUCK LOADING

ZINC OXIDE DRYER ROOM

GLYCOL, WASTE OIL, WASTE WATER TANKS (CONTAINMENT AREA)

PAVED AREA

NITROGEN TANK

PUMP HOUSE

FORMER SETTLING BASIN #3

FORMER SETTLING BASIN #2

FORMER SETTLING BASIN #1

ACCESS ROAD

ACCESS ROAD

GATE

PARSHALL FLUME

A

A'

IW-1
IW-2
IW-3
IW-4
IW-5
IW-6
IW-7
IW-8
IW-9
IW-10
IW-11
IW-12
IW-13
IW-14
IW-15
IW-16
IW-17
IW-18
IW-19
IW-20
IW-21
IW-22
IW-23

PZ13
(65,900)

PZ12
(90,900)

PZ11
(330) FEB 2010

PZ6
(10,700)

PZ4
(2,450)

PZ5
(4,100)

PZ3
(3,780)

PZ9
(2,910) FEB 2010

PZ14
(15) FEB 2007

PZ2
(8) FEB 2010

PZ1
(76,800)

OW1
(146,000)

OW2
(145,000)

OW3
(73,100)

AB1
(447)

AB2
(17,300)

100
1,000
10,000
100,000

PW AB2-C
<50.0

PW AB2-B
<50.0

PW AB2-A
<50.0

PW AB1-C
<50.0

PW AB1-B
<50.0

PW AB1-A
<50.0

ESTIMATED HORIZONTAL EXTENT OF ANGLE BORED WELL AB2

ESTIMATED HORIZONTAL EXTENT OF ANGLE BORED WELL AB1

COLUMBIA RIVER

RIVER FLOW DIRECTION

LEGEND:

- PROPERTY LINE
- FENCE LINE
- APPROXIMATE EAST EDGE OF COLUMBIA RIVER
- RAILROAD TRACK
- EXTENT OF FORMER SETTLING BASIN (FSB)
- PERIMETER OF FSB SOIL EXCAVATION AREAS
- 2002 BORING
- MONITORING/OBSERVATION WELL
- PIEZOMETER
- (447) JANUARY 2015 ZINC CONCENTRATION (µg/L)
- 1,000 ZINC ISOCONCENTRATION CONTOUR IN µg/L
- SEDIMENT PORE WATER SAMPLE LOCATION
- <50.0 JULY 2015 SEDIMENT PORE WATER SAMPLE ZINC CONCENTRATION (µg/L)
- A CROSS-SECTION TRANSECT LINE

NOTES
1. HISTORICAL GROUND WATER SAMPLE DATA USED TO AID IN CONTOURING.
2. THE BOTTOM OF ANGLE WELLS AB1 AND AB2 ARE LOCATED APPROXIMATELY 30 AND 20 FEET (RESPECTIVELY) SOUTHWEST OF THE WELL LOCATION DEPICTED ON THE MAP. THE DASHED LINES EXTENDING TOWARD THE COLUMBIA RIVER FROM THOSE WELLS INDICATE THE ESTIMATED LATERAL EXTENT OF EACH WELL IN THAT DIRECTION.

APPROXIMATE
0 60 120
SCALE IN FEET

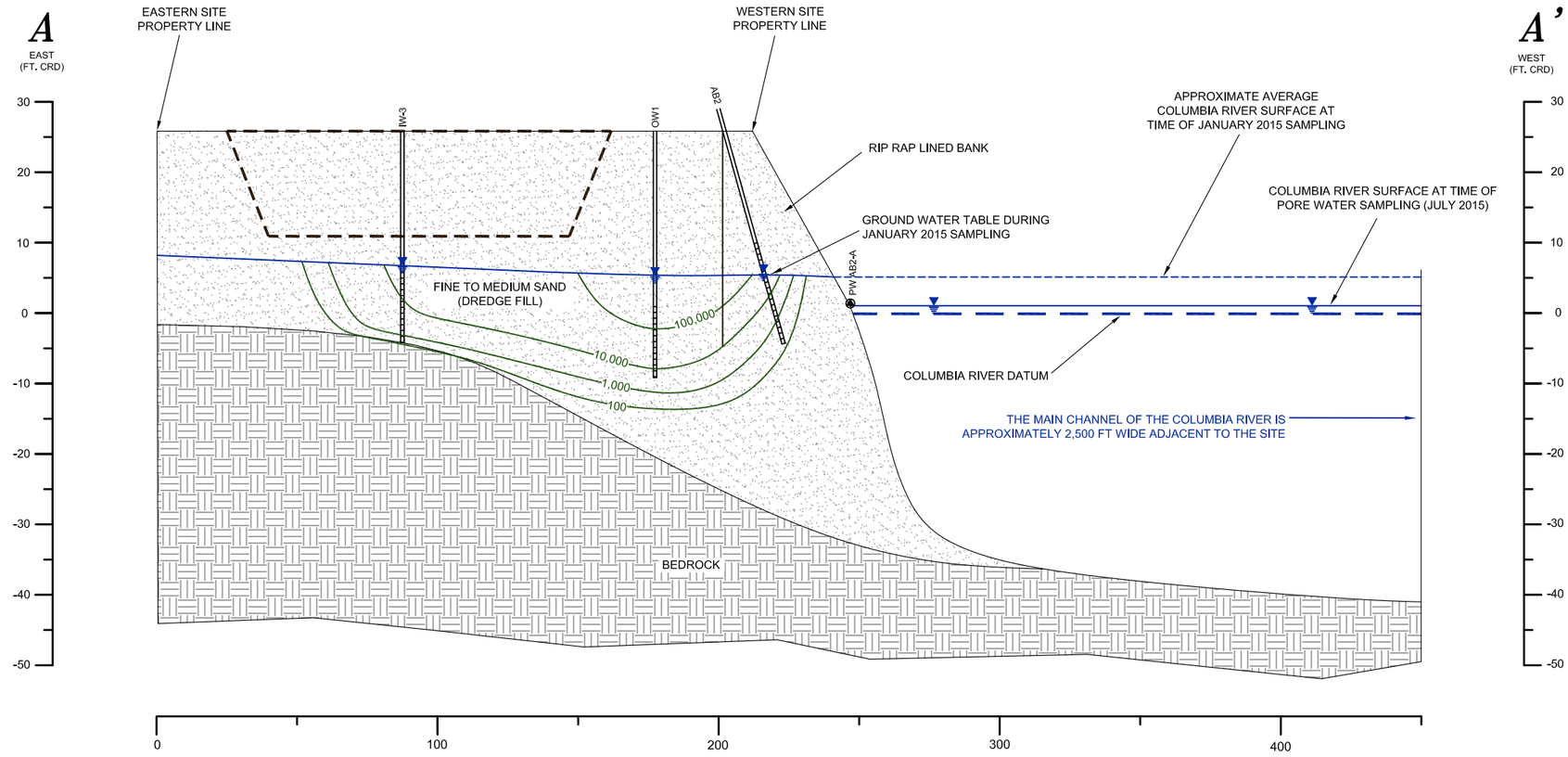
TITLE
CROSS-SECTION TRANSECT LOCATION MAP

PROJECT
CLARIANT - KALAMA SITE
404 HENDRICKSON DRIVE
KALAMA, WASHINGTON

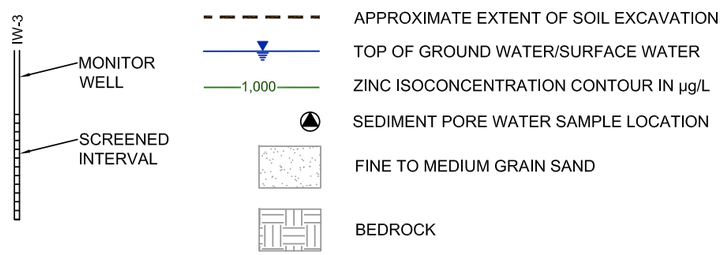
hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

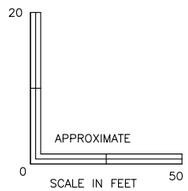
DATE: 08/29/15 | REVISION NO. 0
JOB NO. CLR-045 | FIGURE NO. 4

S:\AAA-Master Projects\Clariant - CLR\CLR-045 Kalama, WA RA\POC Relocation Effort\Figures.dwg, FIG.4 TRANS, 8/31/2015 4:44:50 PM



LEGEND





NOTES
1. COLUMBIA RIVER IS TIDAL AT SITE LOCATION
2. GROUND WATER ELEVATIONS ARE FROM JANUARY 7, 2015
3. EASTERN LIMIT OF 43 FT FEDERALLY MAINTAINED DEEP DRAFT NAVIGATION CHANNEL LOCATED APPROXIMATELY 900 FT FROM WESTERN SITE PROPERTY BOUNDARY.

TITLE
CROSS-SECTION A-A'

PROJECT
CLARIANT - KALAMA SITE
404 HENDRICKSON DRIVE
KALAMA, WASHINGTON

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 08/29/15 | REVISION NO. 0
JOB NO. CLR–045 | FIGURE NO. 5

S:\AAA-Master Projects\Clariant - CLR\CLR-045 Kalama, WA RA\POC Relocation Effort\X-Section.dwg, Fig 3, 9/1/2015 4:21:55 PM

Appendix A

Photographs

Photograph 1: Columbia River adjacent to site (upstream view)

Photograph 2: Columbia River adjacent to site (downstream view)

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Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

Photograph 3: Typical pore water sampling setup.

Photograph 4: Typical pore water sampling setup.

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2923 South Tryon Street – Suite 100
Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

Photograph 5: Pore water potentiometric surface relative to river surface.

Photograph 6: Artesian flow from Pushpoint sampler.

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Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

Appendix B

Laboratory Analytical Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-83446-1
TestAmerica Sample Delivery Group: CLR-045-2
Client Project/Site: Clariant Kalama

For:
Hart & Hickman, PC
2923 S Tryon Street
Suite 100
Charlotte, North Carolina 28203

Attn: Mr. Scott Drury

Authorized for release by:
7/29/2015 1:05:25 PM

Ken Hayes, Project Manager II
(615)301-5035
ken.hayes@testamericainc.com

Table of Contents

Sample Summary

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-83446-1	PW AB1-A	Water	07/21/15 10:25	07/23/15 08:45
490-83446-2	SED AB1-A	Solid	07/21/15 10:40	07/23/15 08:45
490-83446-3	PW AB1-B	Water	07/21/15 11:15	07/23/15 08:45
490-83446-4	SED AB1-B	Solid	07/21/15 11:20	07/23/15 08:45
490-83446-5	PW AB1-C	Water	07/21/15 12:00	07/23/15 08:45
490-83446-6	SED AB1-C	Solid	07/21/15 12:05	07/23/15 08:45
490-83446-7	PW AB2-A	Water	07/21/15 14:25	07/23/15 08:45
490-83446-8	SED AB2-A	Solid	07/21/15 14:30	07/23/15 08:45
490-83446-9	PW AB2-B	Water	07/21/15 15:05	07/23/15 08:45
490-83446-10	SED AB2-B	Solid	07/21/15 15:10	07/23/15 08:45
490-83446-11	PW AB2-C	Water	07/21/15 15:35	07/23/15 08:45
490-83446-12	SED AB2-C	Solid	07/21/15 15:40	07/23/15 08:45
490-83446-13	PW-US	Water	07/22/15 10:45	07/23/15 08:45
490-83446-14	SED-US	Solid	07/22/15 10:50	07/23/15 08:45
490-83446-15	PW-DS	Water	07/22/15 10:00	07/23/15 08:45
490-83446-16	SED-DS	Solid	07/22/15 10:05	07/23/15 08:45

Job ID: 490-83446-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-83446-1

Comments
No additional comments.

Receipt
The samples were received on 7/23/2015 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB1-A
Date Collected: 07/21/15 10:25
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-1
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 02:01	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 02:01	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-A
Date Collected: 07/21/15 10:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-2
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	78		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-A

Date Collected: 07/21/15 10:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-2

Matrix: Solid
Percent Solids: 77.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.24		mg/Kg	☼	07/24/15 07:26	07/25/15 16:04	1
Zinc	**47.9**		12.4		mg/Kg	☼	07/24/15 07:26	07/25/15 16:04	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB1-B
Date Collected: 07/21/15 11:15
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-3
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:20	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:20	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-B
Date Collected: 07/21/15 11:20
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-4
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	76		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-B

Date Collected: 07/21/15 11:20
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-4

Matrix: Solid
Percent Solids: 76.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.29		mg/Kg	☼	07/24/15 07:26	07/25/15 16:25	1
Zinc	**44.5**		12.9		mg/Kg	☼	07/24/15 07:26	07/25/15 16:25	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB1-C

Date Collected: 07/21/15 12:00
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-5

Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 00:59	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 00:59	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-C
Date Collected: 07/21/15 12:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-6
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	80		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB1-C
Date Collected: 07/21/15 12:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-6
Matrix: Solid
Percent Solids: 80.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.25		mg/Kg	☼	07/24/15 07:26	07/25/15 16:29	1
Zinc	**61.9**		12.5		mg/Kg	☼	07/24/15 07:26	07/25/15 16:29	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB2-A

Date Collected: 07/21/15 14:25
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-7

Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:34	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:34	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-A
Date Collected: 07/21/15 14:30
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-8
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	79		0.10		%			07/24/15 11:55	1

Client Sample Results

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-A
Date Collected: 07/21/15 14:30
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-8
Matrix: Solid
Percent Solids: 79.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.27		mg/Kg	☼	07/24/15 07:26	07/25/15 16:33	1
Zinc	**55.1**		12.7		mg/Kg	☼	07/24/15 07:26	07/25/15 16:33	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB2-B
Date Collected: 07/21/15 15:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-9
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:29	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:29	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-B
Date Collected: 07/21/15 15:10
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-10
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	80		0.10		%			07/24/15 11:55	1

Client Sample Results

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-B
Date Collected: 07/21/15 15:10
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-10
Matrix: Solid
Percent Solids: 80.2

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.22		mg/Kg	☼	07/24/15 07:26	07/25/15 16:47	1
Zinc	**35.1**		12.2		mg/Kg	☼	07/24/15 07:26	07/25/15 16:47	1

Client Sample Results

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB2-C
Date Collected: 07/21/15 15:35
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-11
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:25	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:25	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-C
Date Collected: 07/21/15 15:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-12
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	90		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED AB2-C
Date Collected: 07/21/15 15:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-12
Matrix: Solid
Percent Solids: 90.1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.08		mg/Kg	☼	07/24/15 07:26	07/25/15 16:51	1
Zinc	**51.7**		10.8		mg/Kg	☼	07/24/15 07:26	07/25/15 16:51	1

Client Sample Results

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW-US
Date Collected: 07/22/15 10:45
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-13
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:52	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:52	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED-US
Date Collected: 07/22/15 10:50
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-14
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	80		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED-US
Date Collected: 07/22/15 10:50
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-14
Matrix: Solid
Percent Solids: 80.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.20		mg/Kg	☼	07/24/15 07:26	07/25/15 16:55	1
Zinc	**31.1**		12.0		mg/Kg	☼	07/24/15 07:26	07/25/15 16:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW-DS
Date Collected: 07/22/15 10:00
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-15
Matrix: Water

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 01:38	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 01:38	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED-DS
Date Collected: 07/22/15 10:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-16
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	76		0.10		%			07/24/15 11:55	1

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: SED-DS
Date Collected: 07/22/15 10:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-16
Matrix: Solid
Percent Solids: 76.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.28		mg/Kg	☼	07/24/15 07:26	07/25/15 17:00	1
Zinc	**27.4**		12.8		mg/Kg	☼	07/24/15 07:26	07/25/15 17:00	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 490-267595/1-A
Matrix: Solid
Analysis Batch: 268277

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 267595

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.990		mg/Kg		07/24/15 07:26	07/25/15 15:41	1
Zinc	ND		9.90		mg/Kg		07/24/15 07:26	07/25/15 15:41	1

Lab Sample ID: LCS 490-267595/2-A
Matrix: Solid
Analysis Batch: 268277

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267595

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	19.3	18.52		mg/Kg		96	80 - 120
Zinc	193	182.8		mg/Kg		95	80 - 120

Lab Sample ID: 490-83446-2 MS
Matrix: Solid
Analysis Batch: 268277

Client Sample ID: SED AB1-A
Prep Type: Total/NA
Prep Batch: 267595

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		24.8	22.52		mg/Kg	☼	90	75 - 125
Zinc	47.9		248	252.7		mg/Kg	☼	83	75 - 125

Lab Sample ID: 490-83446-2 MSD
Matrix: Solid
Analysis Batch: 268277

Client Sample ID: SED AB1-A
Prep Type: Total/NA
Prep Batch: 267595

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		25.6	24.74		mg/Kg	☼	96	75 - 125	9	20
Zinc	47.9		256	271.8		mg/Kg	☼	87	75 - 125	7	20

Lab Sample ID: MB 490-267816/1-A
Matrix: Water
Analysis Batch: 268272

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 267816

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100		mg/L		07/24/15 15:05	07/27/15 00:27	1
Zinc	ND		0.0500		mg/L		07/24/15 15:05	07/27/15 00:27	1

Lab Sample ID: LCS 490-267816/2-A
Matrix: Water
Analysis Batch: 268272

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267816

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.0500	0.04790		mg/L		96	80 - 120
Zinc	0.500	0.4753		mg/L		95	80 - 120

Lab Sample ID: LCSD 490-267816/3-A
Matrix: Water
Analysis Batch: 268272

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 267816

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.0500	0.04850		mg/L		97	80 - 120	1	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCSD 490-267816/3-A
Matrix: Water
Analysis Batch: 268272

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 267816

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Zinc			0.500	0.4838		mg/L		97	80 - 120	2	20

Lab Sample ID: 490-83446-5 MS
Matrix: Water
Analysis Batch: 268272

Client Sample ID: PW AB1-C
Prep Type: Total/NA
Prep Batch: 267816

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium	ND		0.0500	0.04810		mg/L		96	75 - 125		
Zinc	ND		0.500	0.4791		mg/L		96	75 - 125		

Lab Sample ID: 490-83446-5 MSD
Matrix: Water
Analysis Batch: 268272

Client Sample ID: PW AB1-C
Prep Type: Total/NA
Prep Batch: 267816

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.0500	0.04730		mg/L		95	75 - 125	2	20
Zinc	ND		0.500	0.4732		mg/L		95	75 - 125	1	20

Method: Moisture - Percent Moisture

Lab Sample ID: 490-83446-2 DU
Matrix: Solid
Analysis Batch: 267723

Client Sample ID: SED AB1-A
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Solids	78			78		%				0.4	20

Metals

Prep Batch: 267595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-2	SED AB1-A	Total/NA	Solid	3051A	
490-83446-2 MS	SED AB1-A	Total/NA	Solid	3051A	
490-83446-2 MSD	SED AB1-A	Total/NA	Solid	3051A	
490-83446-4	SED AB1-B	Total/NA	Solid	3051A	
490-83446-6	SED AB1-C	Total/NA	Solid	3051A	
490-83446-8	SED AB2-A	Total/NA	Solid	3051A	
490-83446-10	SED AB2-B	Total/NA	Solid	3051A	
490-83446-12	SED AB2-C	Total/NA	Solid	3051A	
490-83446-14	SED-US	Total/NA	Solid	3051A	
490-83446-16	SED-DS	Total/NA	Solid	3051A	
LCS 490-267595/2-A	Lab Control Sample	Total/NA	Solid	3051A	
MB 490-267595/1-A	Method Blank	Total/NA	Solid	3051A	

Prep Batch: 267816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-1	PW AB1-A	Total/NA	Water	3010A	
490-83446-3	PW AB1-B	Total/NA	Water	3010A	
490-83446-5	PW AB1-C	Total/NA	Water	3010A	
490-83446-5 MS	PW AB1-C	Total/NA	Water	3010A	
490-83446-5 MSD	PW AB1-C	Total/NA	Water	3010A	
490-83446-7	PW AB2-A	Total/NA	Water	3010A	
490-83446-9	PW AB2-B	Total/NA	Water	3010A	
490-83446-11	PW AB2-C	Total/NA	Water	3010A	
490-83446-13	PW-US	Total/NA	Water	3010A	
490-83446-15	PW-DS	Total/NA	Water	3010A	
LCS 490-267816/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 490-267816/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 490-267816/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 268272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-1	PW AB1-A	Total/NA	Water	6010B	267816
490-83446-3	PW AB1-B	Total/NA	Water	6010B	267816
490-83446-5	PW AB1-C	Total/NA	Water	6010B	267816
490-83446-5 MS	PW AB1-C	Total/NA	Water	6010B	267816
490-83446-5 MSD	PW AB1-C	Total/NA	Water	6010B	267816
490-83446-7	PW AB2-A	Total/NA	Water	6010B	267816
490-83446-9	PW AB2-B	Total/NA	Water	6010B	267816
490-83446-11	PW AB2-C	Total/NA	Water	6010B	267816
490-83446-13	PW-US	Total/NA	Water	6010B	267816
490-83446-15	PW-DS	Total/NA	Water	6010B	267816
LCS 490-267816/2-A	Lab Control Sample	Total/NA	Water	6010B	267816
LCSD 490-267816/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	267816
MB 490-267816/1-A	Method Blank	Total/NA	Water	6010B	267816

Analysis Batch: 268277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-2	SED AB1-A	Total/NA	Solid	6010B	267595
490-83446-2 MS	SED AB1-A	Total/NA	Solid	6010B	267595
490-83446-2 MSD	SED AB1-A	Total/NA	Solid	6010B	267595
490-83446-4	SED AB1-B	Total/NA	Solid	6010B	267595

Metals (Continued)

Analysis Batch: 268277 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-6	SED AB1-C	Total/NA	Solid	6010B	267595
490-83446-8	SED AB2-A	Total/NA	Solid	6010B	267595
490-83446-10	SED AB2-B	Total/NA	Solid	6010B	267595
490-83446-12	SED AB2-C	Total/NA	Solid	6010B	267595
490-83446-14	SED-US	Total/NA	Solid	6010B	267595
490-83446-16	SED-DS	Total/NA	Solid	6010B	267595
LCS 490-267595/2-A	Lab Control Sample	Total/NA	Solid	6010B	267595
MB 490-267595/1-A	Method Blank	Total/NA	Solid	6010B	267595

General Chemistry

Analysis Batch: 267723

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-83446-2	SED AB1-A	Total/NA	Solid	Moisture	
490-83446-2 DU	SED AB1-A	Total/NA	Solid	Moisture	
490-83446-4	SED AB1-B	Total/NA	Solid	Moisture	
490-83446-6	SED AB1-C	Total/NA	Solid	Moisture	
490-83446-8	SED AB2-A	Total/NA	Solid	Moisture	
490-83446-10	SED AB2-B	Total/NA	Solid	Moisture	
490-83446-12	SED AB2-C	Total/NA	Solid	Moisture	
490-83446-14	SED-US	Total/NA	Solid	Moisture	
490-83446-16	SED-DS	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB1-A
Date Collected: 07/21/15 10:25
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 02:01	NJB	TAL NSH

Client Sample ID: SED AB1-A
Date Collected: 07/21/15 10:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB1-A
Date Collected: 07/21/15 10:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-2
Matrix: Solid
Percent Solids: 77.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.518 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.518 g	100 mL	268277	07/25/15 16:04	LEG	TAL NSH

Client Sample ID: PW AB1-B
Date Collected: 07/21/15 11:15
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:20	NJB	TAL NSH

Client Sample ID: SED AB1-B
Date Collected: 07/21/15 11:20
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB1-B
Date Collected: 07/21/15 11:20
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-4
Matrix: Solid
Percent Solids: 76.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.507 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.507 g	100 mL	268277	07/25/15 16:25	LEG	TAL NSH

Lab Chronicle

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB1-C
Date Collected: 07/21/15 12:00
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 00:59	NJB	TAL NSH

Client Sample ID: SED AB1-C
Date Collected: 07/21/15 12:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB1-C
Date Collected: 07/21/15 12:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-6
Matrix: Solid
Percent Solids: 80.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.498 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.498 g	100 mL	268277	07/25/15 16:29	LEG	TAL NSH

Client Sample ID: PW AB2-A
Date Collected: 07/21/15 14:25
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:34	NJB	TAL NSH

Client Sample ID: SED AB2-A
Date Collected: 07/21/15 14:30
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-8
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB2-A
Date Collected: 07/21/15 14:30
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-8
Matrix: Solid
Percent Solids: 79.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.497 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.497 g	100 mL	268277	07/25/15 16:33	LEG	TAL NSH

Lab Chronicle

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW AB2-B
Date Collected: 07/21/15 15:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:29	NJB	TAL NSH

Client Sample ID: SED AB2-B
Date Collected: 07/21/15 15:10
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB2-B
Date Collected: 07/21/15 15:10
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-10
Matrix: Solid
Percent Solids: 80.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.511 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.511 g	100 mL	268277	07/25/15 16:47	LEG	TAL NSH

Client Sample ID: PW AB2-C
Date Collected: 07/21/15 15:35
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:25	NJB	TAL NSH

Client Sample ID: SED AB2-C
Date Collected: 07/21/15 15:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-12
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED AB2-C
Date Collected: 07/21/15 15:40
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-12
Matrix: Solid
Percent Solids: 90.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.516 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.516 g	100 mL	268277	07/25/15 16:51	LEG	TAL NSH

Lab Chronicle

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Client Sample ID: PW-US
Date Collected: 07/22/15 10:45
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:52	NJB	TAL NSH

Client Sample ID: SED-US
Date Collected: 07/22/15 10:50
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED-US
Date Collected: 07/22/15 10:50
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-14
Matrix: Solid
Percent Solids: 80.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.520 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.520 g	100 mL	268277	07/25/15 16:55	LEG	TAL NSH

Client Sample ID: PW-DS
Date Collected: 07/22/15 10:00
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	50 mL	267816	07/24/15 15:05	ZLN	TAL NSH
Total/NA	Analysis	6010B		1	50 mL	50 mL	268272	07/27/15 01:38	NJB	TAL NSH

Client Sample ID: SED-DS
Date Collected: 07/22/15 10:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-16
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			267723	07/24/15 11:55	MAA	TAL NSH

Client Sample ID: SED-DS
Date Collected: 07/22/15 10:05
Date Received: 07/23/15 08:45

Lab Sample ID: 490-83446-16
Matrix: Solid
Percent Solids: 76.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			0.510 g	100 mL	267595	07/24/15 07:26	KMS	TAL NSH
Total/NA	Analysis	6010B		1	0.510 g	100 mL	268277	07/25/15 17:00	LEG	TAL NSH

Laboratory References:
TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL NSH
Moisture	Percent Moisture	EPA	TAL NSH

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Certification Summary

Client: Hart & Hickman, PC
Project/Site: Clariant Kalama

TestAmerica Job ID: 490-83446-1
SDG: CLR-045-2

Laboratory: TestAmerica Nashville

The certifications listed below are applicable to this report.

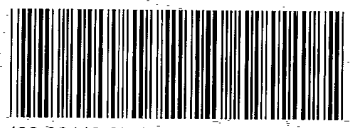
Authority	Program	EPA Region	Certification ID	Expiration Date
North Carolina (WW/SW)	State Program	4	387	12-31-15
Oregon	NELAP	10	TN200001	04-27-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Solids

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

COOLER RECEIPT FORM


490-83446 Chain of Custody

Cooler Received/Opened On 7/23/2015 @ 0845

1. Tracking # 5696 5479 (last 4 digits, FedEx)

Courier: FedEx IR Gun ID 96210146

2. Temperature of rep. sample or temp blank when opened: 1.5 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) HKG

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? HKG 7/23/15 YES...NO...NA

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) HKG

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES..NO..NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) HKG

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) HKG

I certify that I attached a label with the unique LIMS number to each container (intial) HKG

21. Were there Non-Conformance issues at login? YES..NO Was a NCM generated? YES..NO..#_____

BIS = Broken in shipment

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

Loc: 490
83446

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

7/29/2015

Client Information	Sampler: Scott Drury	Lab PM: Hayes, Ken	Carri	COC No: 490-41066-13911.1
Client Contact: Mr. Scott Drury	Phone: 9,3414,750	E-Mail: ken.hayes@testamericainc.com		Page: Page 1 of 2
Company: Hart & Hickman, PC				Job #: CLR.045-2
Address: 2923 S Tryon Street Suite 100	Due Date Requested:			
City: Charlotte	TAT Requested (days):			
State, Zip: NC, 28203				
Phone:	PO #: CLR-045-2			
Email: sdrury@harthickman.com	WO #: CLR-045-2			
Project Name: Clariant Kalama	Project #: 49000951			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B - (MOD) Custom Metals List Zn + Cd N	6010B - (MOD) Custom Metals List Zn + Cd D	Total Number of containers	Special Instructions/Note:
				Preservation Code:				N	D		
1	PW AB1-A	7/21/15	1025	G	W ~~Solid~~				X		
2	SED AB1-A	7/21/15	1040		Solid			X			
3	PW AB1-B	7/21/15	1115		W ~~Solid~~				X		
4	SED AB1-B	7/21/15	1120		Solid			X			
5	PW AB1-C	7/21/15	1200		W ~~Solid~~				X		
6	SED AB1-C	7/21/15	1205		Solid			X			
7	PW AB2-A	7/21/15	1425		W ~~Solid~~				X		
	~~PW AB2-B~~				Solid			X			
8	SED AB2-A	7/21/15	1430		~~Solid~~ S			X			
9	PW AB2-B	7/21/15	1505		W ~~Solid~~				X		
10	SED AB2-B	7/21/15	1510		S ~~Water~~			X			

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) II

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1				[signature] 1.5	7/23/15 0845	TAN
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Phone (615) 726-0177 Fax (615) 726-3404

Chain of Custody Record

Loc: 490
83446

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Scott Drury	Lab PM: Hayes, Ken	No(s):	COC No: 490-41066-13911.2
Client Contact: Mr. Scott Drury	Phone: 9194140750	E-Mail: ken.hayes@testamericainc.com		Page: Page 2 of 2
Company: Hart & Hickman, PC				Job #: CLR.045-2
Address: 2923 S Tryon Street Suite 100	Due Date Requested:			
City: Charlotte	TAT Requested (days):			
State, Zip: NC, 28203				
Phone:	PO #: CLR-045-2			
Email: sdrury@harthickman.com	WO #: CLR-045-2			
Project Name: Clariant Kalama	Project #: 49000951			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

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				Preservation Code:				N	D		
11	PWAB2-C	7/21/15	1535	G	Water				A		
12	SEDAB2-C	7/21/15	1540		S ~~Water~~			N			
13	PW-US	7/22/15	1045		Water				A		
14	SED-US	7/22/15	1050		S ~~Water~~			N			
15	PW-DS	7/22/15	1000		Water				A		
16	SED-DS	7/22/15	1005		S ~~Water~~			N			
					Water						
					Water						
					Water						

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Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
			1.5	7/22/15 0845	TAN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

7/29/2015

Login Sample Receipt Checklist

Client: Hart & Hickman, PC

Job Number: 490-83446-1
SDG Number: CLR-045-2

Login Number: 83446
List Number: 1
Creator: Gundi, Hozar K

List Source: TestAmerica Nashville

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	