

Valmont Station CCR Impoundments

Notification of Completion of Physical Closure

Consistent with 40 CFR § 257.102(h) of the Coal Combustion Residuals (CCR) Rule, PSCo is providing this notification that it has completed physical closure of CCR impoundments by removal of CCR.

Public Service Company of Colorado (PSCo), an Xcel Energy Company, is the owner of Valmont Station, which historically was a coal-fired, steam turbine electric generating station. The station was retired from coal-fired operations on September 30, 2017. During operations with coal, PSCo operated two CCR impoundments to temporarily store bottom ash generated at Valmont Station prior to beneficial use or final disposal in the permitted on-site landfill. The impoundments were originally constructed to a depth of approximately 25-feet below grade with sheet piling to a depth of approximately 30 feet around the perimeter of each impoundment.

Pursuant to section 257.102(g), PSCo prepared a Notification of Intent to initiate closure and placed it into the operating record, posted to Valmont Station's CCR Website, and notified the state as required by 257.105, 257.106 and 257.107. Per section 257.102(c), PSCo has completed physical removal of the CCR and decontamination of all areas affected by releases from the CCR units, except for ongoing groundwater corrective action, including removal of the CCR and decontamination of the underlying bedrock. Physical closure of the impoundments was initiated October 10, 2017 and was completed within 5-years, in September 2018, pursuant to 257.102(f)(ii). Physical closure of the impoundments was completed with oversight by a Qualified Professional Engineer. The physical closure activities and demonstration that constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed are documented in the attached October 16, 2018 CCR Removal Certification report. The certification excludes verification that groundwater monitoring concentrations do not exceed the groundwater protection standards established pursuant to 257.95(h) for the constituents listed in Appendix IV of 40 CFR 257. Accordingly, all physical closure and removal have been completed and all decontamination also has been completed, except for completion of groundwater corrective actions. Ongoing groundwater corrective action to meet groundwater protection standards will continue.

October 16, 2018

Xcel Energy
Ms. Jennifer McCarter
1800 Larimer St. Suite 1300
Denver, CO 80202

**RE: Xcel Energy Valmont Station
Bottom Ash Impoundments CCR Removal Certification**

Dear Ms. McCarter:

Xcel Energy contracted HDR Engineering, Inc. to provide oversight and engineer certification of removal of coal combustion residuals (CCR) from the impoundments 3A and 3B at the Valmont Generating Station (Valmont) under 40 CFR 257 (the CCR Rule).

GENERAL INFORMATION

The Valmont Station (Site) is located in Boulder County, CO (Figure 1). It historically consisted of six power generation units with all coal fired units closed before or in 2017. The site historically managed its bottom ash through on-site impoundments, called 3A Ash Pond and 3B Ash Pond. For this report, these will be referred to as impoundments or Pond 3A and Pond 3B. The CCR impoundments are immediately adjacent the southeast side of Leggett Reservoir, on the west side of Valmont Reservoir, and northwest of Hillcrest Reservoir.

The impoundments were originally constructed to a depth of approximately 25-feet below grade excavations. Subsequently, interlocking sheet-pile sections were driven to a depth of approximately 30 feet around the perimeter of each impoundment. Fly ash was beneficially used along the sheet-pile as a substitute for concrete to provide structural stability. During plant operations, bottom ash was pumped to these impoundments as slurry and the water decanted off into Leggett Reservoir through internal outfalls 003A and 003B of the Site's Clean Water Act discharge permit. This same dewatering approach was used for impoundment closure, allowing excavation of the CCR for disposal. The final disposal of CCR was in the permitted on-site Ash Disposal Facility (ADF) landfill located adjacent and north of Leggett Reservoir. The ADF landfill is not part of this closure submittal.

The impoundments were closed by removal of all CCR to weathered shale bedrock in the impoundment bottom and visually clean soil in embankment sides. After excavation was deemed complete by a visual inspection, confirmatory soil sampling was conducted on the impoundment bottom to provide chemical validation of CCR removal. This approach complied with the Closure Plan (dated January 5, 2018) for these two impoundments.

To facilitate dry excavation of CCR, the surrounding reservoirs were drawn down by gravity discharge at the Leggett Reservoir outlet, permitted outfall 001A, and then pumping after reservoir level had dropped to a level that would not accommodate gravity discharge. Seepage of surface water from the surrounding reservoirs into the impoundment area was minimal and was managed with pumping consistent with discharge permit requirements.

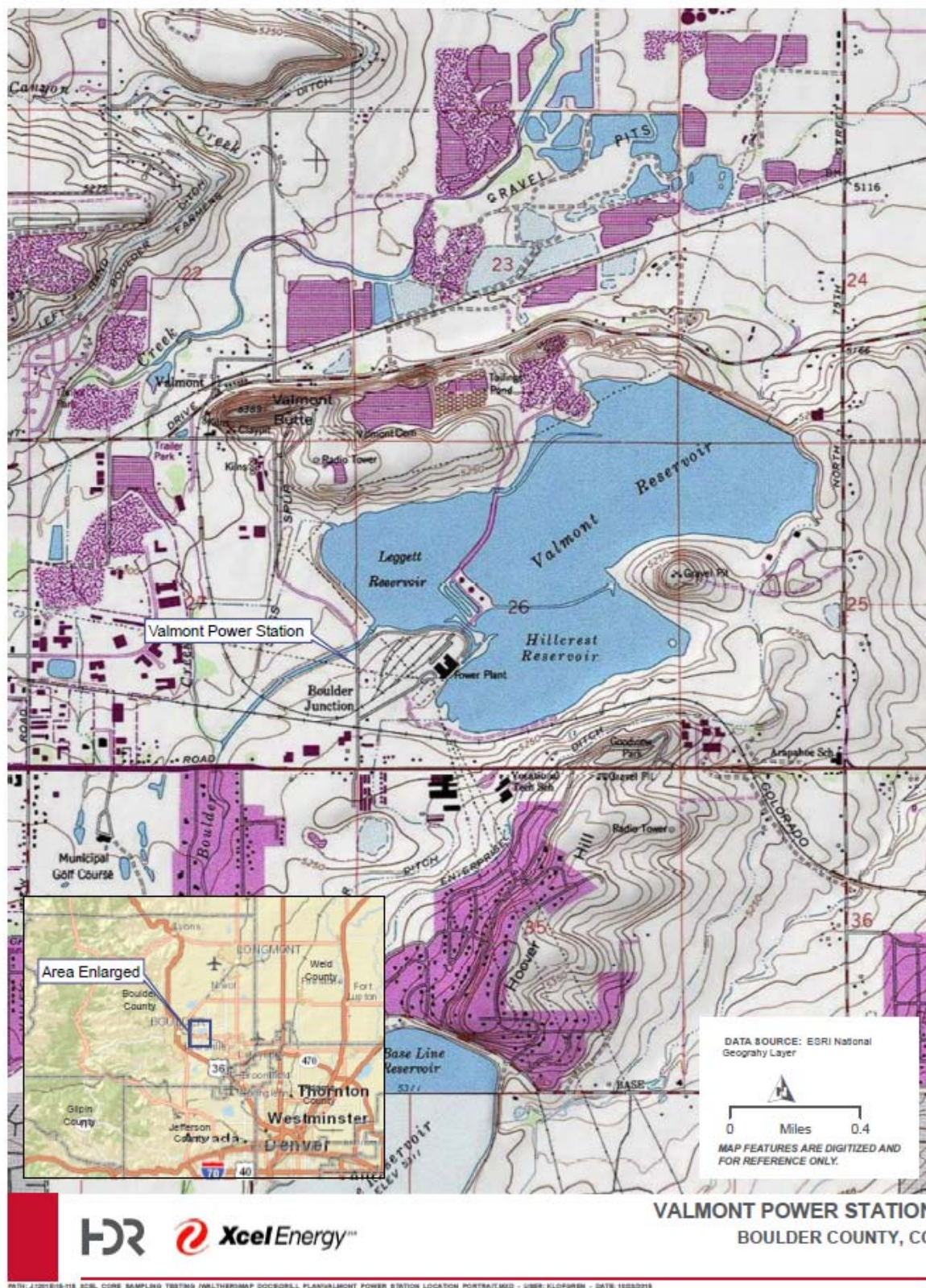


Figure 1. Vicinity map for Valmont Station.

The CCR Rule Section 257.102 (c) describes 'closure through removal of CCR' as:

1. Removing and decontaminating all areas affected by releases from the CCR unit;
2. Removal and decontamination are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed; and
3. Groundwater monitoring concentrations do not exceed the groundwater protection standards established pursuant to Section 257.95(h).

Xcel Energy initiated and completed the physical closure by excavation of ash, item 1 above, and performed the soil confirmation sampling of the post-excavation impoundment bottom material and analytical testing to verify complete removal of CCR (CCR removal), item 2 above.

CCR WASTE REMOVAL APPROACH

Removal of CCR was verified in multiple ways by a Colorado Professional Engineer. The primary verification of CCR removal was by on-site visual inspection. The secondary verification was by chemical analysis in the impoundments.

Site Visual Inspection

The visual inspection required observation of dry excavations (free standing water not covering excavation area) looking for the following characteristics of bottom ash including grey color, granular fine to coarse sand texture, and non-cohesiveness.

The site native soils are primarily a tan to tanish grey cohesive clay where the tanish grey is weathered bedrock. This clay material was indicative of both the undisturbed soil and the fill from an on-site borrow area used to construct the impoundment embankments. Where surface area was exposed by reservoir drawdown, the clay surface color was a dark tan to black (when saturated) depending on numerous factors including organic content. When the black clay would dry, the color would become grey.

Visual and physical verification for the absence/presence of CCR was performed in numerous site inspections and verified with test pits across the site within and outside the impoundments. Where CCR was identified, excavation continued until a continuous edge without identifiable CCR material was confirmed by a Professional Engineer. Verification of CCR removal from the bottom of excavation was performed with test pits to verify that CCR was not present. The test pits varied in depth and frequency depending on material type, uniformity, and known or expected site construction and operation methods. For example, test pit depth and frequency in the weathered bedrock impoundment bottom was shallow due to material hardness and uniform consistency of material across the bottom. Test pit depth in the impoundment embankments varied from 4' - 6' below apparent clean surface to verify that no residual CCR was present.

Chemical Analysis

Chemical analysis was utilized as a secondary verification of CCR removal of the impoundments for multiple reasons including verification in areas that had a continuous

reoccurring deposition of CCR and further testing of soil material supporting the visual clean verification. The chemical analysis approach is addressed below.

Establishment of Background Threshold Values

Eight locations around the facility were identified as unimpacted locations where samples could be collected to represent unimpacted, background soil samples. Soil samples from eight borings were collected and analyzed to establish background concentrations of the constituents of interest (COIs). A list of COIs was proposed by Xcel Energy and agreed upon by Colorado Department of Public Health and Environment (CDPHE) upon approval of the Background Soil Sampling Plan (October 31, 2016) for Xcel Energy's compliance with CDPHE Solid Waste regulations. The list of COIs approved by the CDPHE included all of the CCR Rule Appendix III and IV metals. For compliance with the CCR Rule, Radium 226 and 228 were added to the list.

HDR completed a statistical analysis of the background sample results to calculate reference background concentration levels reflective of the naturally occurring variation in each COI. For the purpose of this report, the reference background concentration levels are referred to as background threshold values (BTVs). The statistical method used to produce the BTVs for each COI is the upper tolerance limit (UTL). As recommended by the EPA Unified Guidance, HDR has selected the 95 percent upper tolerance limits (UTL95) to establish the background values for each of the COIs in the weathered bedrock. The summary of the background sampling and results of the background sampling and BTV calculations were provided in the Background Soil Sampling Memorandum (Attachment 1). The BTVs for the weathered bedrock material are provided in Table 1.

Determination of Confirmation Sampling Size and Spatial Distribution

EPA's ProUCL software was used to calculate an appropriate minimum number of confirmatory samples to be collected that would estimate the mean for each COI. The equation requires several assumptions about the data expected. The following assumptions were used:

- Normal distribution and an alpha of 0.05.
- Standard deviation was calculated for each COI of the site specific background sample results.
- Margin of error (Δ) is similar to a +/- of mean value. This value represents an acceptable error. The margin of error was assumed to be the difference between the estimated mean (assumed using background concentrations) and the EPA's 2016 Risk Based Residential Soil Screening Level for each COI.

The minimum number of confirmatory soil samples that needed to be collected was calculated for each of the COIs. Thus a range of sample sizes was calculated due to the number of COIs. Using 1-½ standard deviation of the clay samples concentrations, a range of the minimum number of samples to be collected was calculated between 2 and

11. Therefore, the minimum number of samples calculated from both ponds was 11. The sample locations for the two ponds were generated using the ESRI GIS random sample generator toolbox. The area of the ponds over which the random sample locations would be distributed was defined as the pond bottoms.

Determination of CCR Waste Removal Criteria

After laboratory analysis of the confirmatory samples, a statistical analysis of the confirmatory sample results was completed. As recommended by the EPA Unified Guidance, the 95 percent upper confidence limit (UCL95) was calculated for each COI, therefore, establishing one concentration value for each COI to be compared against screening values.

The CCR Rule 40 CFR 257.102 (c) does not define criteria to demonstrate that remaining soil is clean after removal of CCR. Therefore, multiple criteria (screening values) were used for redundant confirmation of CCR removal. First, the confirmatory clay concentration (UCL95) for each COI was compared to the 2016 EPA Regional Screening Levels (RSL) (Table 2; EPA, 2016). Although the site is zoned heavy industrial, to be conservative the EPA RSLs for residential exposure scenarios were used as screening levels to determine whether constituent concentrations in clay confirmation samples warrant further investigation or cleanup. The target hazard quotient (THQ) of 0.1 was used (rather than 1.0) based on the EPA guidance to use THQ=0.1 when looking at multiple COIs. Second, the confirmatory concentration (UCL95) for each COI was compared to the weathered bedrock BTV for each COI. Third, the EPA does not have RBSLs for radionuclides; however the EPA has Preliminary Remediation Goals (PRGs) for Radium 226 and 228 for both residential soils and worker composite soils (EPA, 2014). The PRGs for radium in residential soils are lower than certified laboratory reporting limits; therefore, the composite worker PRG is used for confirmatory soil screening (Table 1).

Evaluation of confirmation sample results to determine whether CCR removal was achieved was made in a sequential approach using both regulatory criteria and the site specific BTVs.

- If the confirmatory concentration (UCL95) for each COI was equal to or lower than the EPA RSLs (and PRG for radium), then no further action was required.
- If the confirmatory concentration (UCL95) exceeded the respective EPA RSLs (PRG for radium) for any COI, the confirmatory concentration (UCL95) for the exceeded COIs were compared to site specific 95UTL BTV. If the confirmatory concentration for those COIs were equal to or lower than the 95UTL BTV, then no further action was required.
- If there were exceedances of the EPA RSL (PRG) and the 95UTL BTV, then further investigation and potentially additional clay excavation would have been required.

IMPOUNDMENT EXCAVATION AND CONFIRMATION SAMPLE COLLECTION

CCR was removed from Ponds 3A and 3B (impoundments) at Valmont Station between April, 2018 and September, 2018.

The impoundments were excavated and all CCR was removed, except fly ash that was beneficially used as an integral component of remaining infrastructure. Inspections verifying removal were completed by a Colorado registered Professional Engineer. Approximately 60,000 cubic yards of waste material were excavated from both impoundments using an excavator and transported to the on-site Ash Disposal Facility (ADF). The surrounding sheet piles were removed around both embankments excluding the southeast end of both impoundments. The sheet pile remains in this area due to adjacent road stability and safety concerns during construction. In support of the remaining sheet pile in Pond 3B, fly ash that had been previously imported and placed abutting the sheet pile to provide structural support along the sheet pile remains in place. This beneficially reused fly ash has hardened to a consistency of approximately a low strength concrete. In final impoundment closure grading, this hardened fly ash has been covered with between approximately 4 to 12 feet of compacted soil backfill on the impoundment side of the sheet pile.

Adjacent reservoir water levels were managed (lowered) to minimize infiltration into the impoundments. Water that infiltrated the ponds was managed per Site discharge permit requirements. The visible CCR was removed, transported, and disposed in the on-site ADF landfill.

After the excavation was deemed complete by a visual inspection and shallow test pits, confirmatory samples were collected from the bottom of the impoundments for comparison to closure criteria discussed above. As shown in Figure 2, multiple soil samples were collected from each impoundment. Figure 2 provides the locations of the soil samples. Soil was collected at each location beginning from 2 inches below the surface, and up to 8 inches below the surface. Samples were stored in glass jars with one jar collected from each sample location for delivery to a laboratory for analyses.

The samples were delivered under chain of custody documentation to ALS Laboratories, Inc. in Fort Collins, Colorado for inorganic analysis. The metals were analyzed following EPA Method 6020A, mercury followed EPA Method 7471A, fluoride followed 300.0, and the radium 226 and 228 were detected following Method 903.1 and Gamma Spectroscopy, respectively. Results of the confirmatory soil sample analyses are provided in Table 1 and the laboratory reports are attached (Attachment 2).

DISCUSSION OF RESULTS

Results are summarized below following the approach outlined above for sequential evaluation of results against multiple criteria (Table 1).

- The 95UCL concentration for each COI was less than the EPA Residential RSLs, except for arsenic, cobalt, lithium, and thallium.

- Therefore, the confirmatory soil concentration for arsenic, cobalt, lithium and thallium was then compared to the calculated 95UTL BTV. The 95UCL concentration of each of these COIs was below the respective BTVs.

The sample analytics do not indicate the presence of CCR impacted soils. Due to the visibly clean excavation and analytical results below the established EPA and/or BTV analytic results, removal of CCR from the Ash Ponds 3A and 3B (impoundments) at Valmont Station have met the criteria in Section 257.102(c) for removal of CCR and potentially impacted soil (items 1 and 2 in initial closure list).

ADDITIONAL CCR REMOVAL

In addition to removal of CCR from the two impoundments, areas of CCR were identified adjacent to the impoundments that appeared to be incidental releases from historic operations or areas of past beneficial use not associated with remaining infrastructure. CCR in these areas was excavated and transported to the ADF for final disposal. These areas were visually inspected to evaluate for the presence of CCR and then verified as clean by a Professional Engineer. This included the following areas:

1. East of Bridge to Pond 3A – CCR was identified and removed along the exposed bank immediately east of the bridge to Pond 3A.
2. Under and West of Bridge to Pond 3A – CCR was identified and removed under and west of the exposed channel banks under and immediately west of the bridge to Pond 3A.
3. SE Impoundment End between Sheet Pile and Road – CCR was identified and removed outside the sheet pile and between the sheet pile and the pipe chase to depths of up to approximately 7 feet.
4. Embankment Ash – Numerous shallow (approximately 2') to deeper (approximately 6') areas of ash were encountered in both of the perimeter impoundment embankment fill areas. CCR in these areas was excavated and temporarily stockpiled in the impoundments for removal during impoundment excavation.
5. Outfall Ash – CCR was identified and removed outside of both impoundments adjacent to the internal outfalls. This limited CCR appeared to have migrated through these internal outfalls as "carryover" to the adjacent area of Leggett Reservoir during impoundment operation. Leggett Reservoir was pumped down to allow dry excavation of CCR and transport to the ADF for final disposal.

GROUNDWATER MONITORING

The third requirement for closure of an impoundment through removal of CCR is a demonstration that groundwater monitoring concentrations do not exceed the groundwater protection standards established pursuant to 257.95(h). Groundwater monitoring requirements will be documented separately and are not a part of this report.



Figure 2. Confirmatory Soil Sample Locations.

Table 1. Confirmatory Soil Sample Concentrations

Constituent	BTV (mg/kg)	EPA Risk Based Soil Screening Levels (RBSLs) 2016 (mg/kg)		Valmont Confirm 95UCL (mg/kg)	Valmont Confirmatory Soil Lab Result (mg/kg)										
	Weathered Bedrock	Residential	Industrial	95UCL	TP 1-1	TP 1-2	TP 1-3	TP 1-4	TP 1-5	TP 1-6	TP 2-1	TP 2-2	TP 2-3	TP 2-4	TP 2-5
Antimony	1.7	3.1	47	0.284	0.24	0.2	0.24	<0.12	0.35	<0.12	0.21	0.27	0.27	0.29	0.25
Arsenic	17.7	0.68	3	10.3	8	6.4	11	6.4	12	6	6.8	9	12	8.9	9.3
Barium	459	1500	22000	190	1500	46	61	1700	94	55	120	190	54	170	34
Beryllium	1.11	16	230	0.762	0.74	0.62	0.52	0.64	0.87	0.59	0.62	0.79	0.78	0.74	0.68
Boron	21.87	1600	23000	21.2	<18	18	<18	<18	19	20	17	<18	<18	29	17
Cadmium	0.44	7.1	98	0.250	<0.23	0.24	<0.23	<0.23	0.25	<0.23	0.22	<0.23	<0.23	0.25	0.23
Chromium Total	23.65	NV	NV	17.2	16	16	14	15	17	15	18	17	15	19	16
Cobalt	26.0	2.3	35	10.5	11	8.5	11	8.9	10	9.4	8.2	8.5	11	11	9.2
Fluoride	69.77	310	4700	37.8	41	16	55	35	28	22	16	11	19	21	36
Lead	30.46	400	800	20.5	17	15	16	16	23	15	16	21	25	18	18
Lithium	30.41	16	230	21.5	20	19	18	20	23	19	19	23	22	20	21
Mercury	0.056	1.1	4.6	0.071	<0.037	0.039	0.1	<0.03	0.043	0.076	0.049	0.058	0.05	0.054	0.041
Molybdenum	2.04	39	580	2.50	1.8	1.5	3.1	1.6	1.6	1.6	1.9	1.4	1.5	2.8	2.5
Selenium	3.2	39	580	2.37	1.5	1.5	2.1	1.4	2	1.6	1.4	4	1.9	2	1.4
Thallium	1.4	0.078	1.2	0.25	0.21	0.19	0.22	0.22	0.23	0.19	0.2	0.31	0.27	0.22	0.23

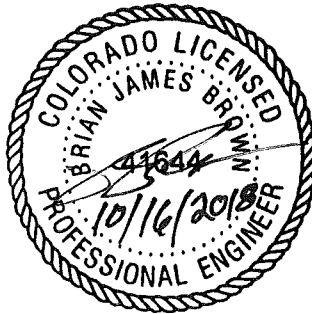
Constituent	BTV (mg/kg)	EPA Soil Preliminary Remediation Goals (PRGs) (pCi/g)	Valmont Confirm 95UCL (mg/kg)	Valmont Confirmatory Soil Lab Result (mg/kg)										
	Weathered Bedrock	Worker Composite	95UCL	TP 1-1	TP 1-2	TP 1-3	TP 1-4	TP 1-5	TP 1-6	TP 2-1	TP 2-2	TP 2-3	TP 2-4	TP 2-5
Radium 226	NV	3.1	0.973	0.88	0.57	1.08	1.03	1.03	0.87	0.65	0.9	0.79	0.84	0.8
Radium 228	NV	7.5	1.35	0.90	0.91	1.26	1.24	1.47	0.91	1.29	1.6	1.08	1.18	1.2

NV = No value; ND = Non-detect

CERTIFICATION STATEMENT

I certify that to the best of my knowledge, the visually identifiable CCR material in the impoundments (Ponds 3A and 3B) and incidental CCR releases in the impoundment vicinity at Valmont Station have been removed pursuant to the requirements of the Federal Coal Combustion Residuals Rule (40 CFR 257, specifically 257.102(c)). This certification does not include verification that groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to 257.95(h) for constituents listed in appendix IV of 40 CFR 257.

HDR Engineering, Inc.



Brian J Brown
Colorado Professional Engineer, # 41644

cc: Marie Vagher, Xcel Energy
Matt Rohr, HDR

ATTACHMENT 1

Soil Background Study

October 31, 2016

Mr. Andy Todd
Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, CO 80246-1530

RE: Soil Background Study for Valmont Station, Boulder, Colorado, Rev 1

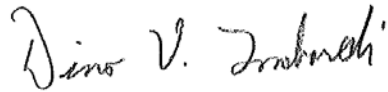
Dear Mr. Todd:

Public Service Company of Colorado, an Xcel Energy company, is submitting the revised Soil Background Study Plan for our Valmont Station per the feedback received in a letter from CDPHE, dated October 3, 2016. The revised Soil Background Study plan addresses CDPHE's comments. The following is a summary of revisions to the plan:

1. CDPHE requested Xcel Energy to add the laboratory analytical methods to be used for each of the constituents in Table 1 and to provide a more detailed description of the materials handling, preservation, and chain of custody procedures to be followed. In this revision, Xcel Energy has provided the analytical methods in Table 1 and has provided additional details regarding the materials handling, preservation, and chain of custody procedures in the Background Soil Collection Procedure section of the plan.
2. CDPHE requested the addition of additional constituents to be analyzed in the Closure Plan and the Soil Background Study. In this revision, Xcel Energy has added boron, speciated chromium (Cr(III) and Cr(VI)), fluoride, lithium, mercury, and molybdenum and has updated the limits in the table to reflect those provided in the May 2016 EPA Risk Based Screening Levels table.
3. CDPHE requested clarification regarding the final report to be provided once the Study's findings are complete. In this revision, Xcel Energy has provided clarification that a final report will be provided and shall include all relevant field, analytical, and statistical data, as well as an evaluation of conclusions drawn from the background study results regarding the adequacy of closure activities.

If you have any questions regarding this information, please contact me at (303) 294-2158.

Sincerely,

A handwritten signature in black ink that reads "Dino V. Lombardi". The signature is written in a cursive style with a large initial 'D'.

Dino V. Lombardi
Environmental Analyst V
Xcel Energy, Environmental Services

cc: Jerry Henderson, CDPHE
Marie Vagher, Xcel Energy
Matt Rohr, HDR

Enclosure:
Soil Background Study Plan for Valmont Station, Adams County, Colorado, Rev. 1



Memo

Date: Thursday, October 27, 2016

Project: Xcel Energy – Valmont Station

To: Colorado Department of Public Health & Environment

From: Xcel Energy

Subject: Valmont Soil Background Study, Revision 1

Attachments: Soil Background Sampling Locations

Reference: A) Closure Plan Submittal for Valmont Station, dated 26SEP2014
B) Letter from CDPHE Re: Review Comments Soil Background Study
Valmont Station Ponds, dated 03OCT2016

Introduction

Xcel Energy plans to clean close three Type B impoundments at the Valmont Station in accordance with 6 CCR 1007-2 Section 9: Waste Impoundments Regulations of Part 1 – Regulations Pertaining to Solid Waste Disposal Site and Facilities. Section 9.3.4 (F)(1)(e) of this regulation describes the provisions for a Background Study as part of Reference A to determine relevant background soil concentrations. This document represents the approach of the Background Study in accordance with those regulations.

Background

The Valmont Station is located at 1800 N. 63rd Street, Boulder, CO. Valmont Station consists of six units; however, the first four units have been retired. Unit 5 is a coal fired unit and is still in operations. This unit was placed into service in 1964 and is rated at 166 MW. Unit 5 is scheduled to retire at the end of 2017. The closure of this unit is part of Xcel Energy's compliance with the Clean Air, Clean Jobs Act. Unit 6 is a simple-cycle gas turbine and will continue to operate; however, it requires no water for its operation.



The Settling Pond, 3A Ash Pond (West), 3B Ash Pond (East) will be clean closed as part of the plant decommissioning. The Ash Ponds are located at the intersection of the Leggett Reservoir, Hillcrest Reservoir and the Valmont Reservoir. The Settling Pond is located along the western edge of the Leggett Reservoir.

The background study is applicable to the two active impoundments (3A and 3B Ash Ponds) and the inactive Settling Pond as detailed in the Reference A.

Background Properties

Background Sample Collection Procedure:

Soil samples will be taken from eight different locations (See Attachment) to establish the background concentrations for potential constituents of concern. The soil sample locations are either hydraulically up-gradient of the inactive impoundment or the reservoirs that encompass the active impoundments. Additionally, the locations are at the edge of the property in areas unlikely to have been impacted by industrial activities at the site.

A Geoprobe® rig will be used to collect the soil samples. The rig will be a direct push or percussion machine which advances a hollow stem drill string, without rotation, to collect soil samples.

In general, the soil profile of the site is comprised of two primary geologic layers; the Slocum Alluvium (consisting of gravel, sand, and silty deposits) underlain by low permeability siltstone and shale deposits of the Pierre Shale Formation. The depth of the alluvial layer varies from 6 feet to 16 feet below the ground surface.

The rig will procure a soil sample from the upper alluvial deposit at a depth of approximately 2 feet above the siltstone and shale layer and a sample from 2 feet below the layer. It is assumed that the siltstone and shale deposits underlying the alluvial soils are sufficiently impermeable to prevent the vertical movement of any constituents of concern at the site.

Soil samples will be collected in 4-ounce wide-mouth clean glass jars and stored in a cooler for transport to the laboratory. Samples will be stored and transported in a cooler at 4° Celsius. Coolers will be hand delivered to the laboratory. All sample



shipments for analyses will be accompanied by a chain-of-custody record. Form(s) will be completed and sent with the samples. The chain-of-custody form will identify the contents of each shipment, the requested analyses, and maintain the custodial integrity of the samples. The list of constituents and analytical methods to be followed by the laboratory are provided in Table 1.

All equipment used to collect soil samples will be decontaminated after the samples have been procured at each location. A brush will be used to remove gross particulate matter from the equipment. The equipment will then be washed thoroughly using a laboratory-grade detergent/potable water solution. The equipment will then be rinsed thoroughly with potable water followed by a thorough rinsing using a solution of 10% nitric acid and distilled water oralconox and distilled water. The equipment will then be rinsed thoroughly with distilled water and allowed to dry.

Upon completion of soil sampling, each borehole will be backfilled with hydrated bentonite to ground surface. The remaining soil bore material will be placed in drums and taken off-site for appropriate disposal.

Data Analysis

The eight background soil sample locations shown in the attached figure will be used to determine background concentrations at the Site. Each individual geologic layer will be analyzed independently. The samples will be analyzed for the constituents listed in Table 1. For parametric distributed constituents, a statistical method presented in R.D. Gibbons (1994) will be used to calculate prediction limits for multiple parameters/measurements. The equation proposed from Gibbons is the following:

$$\bar{x} + t_{[n-1, 1-\alpha^*/k]} s \sqrt{1 + \frac{1}{n}}$$

Where: \bar{x} is the sample mean
t is the t-distribution with n-1 degrees of freedom
s is the sample standard deviation



α^* is the sitewide false positive rate

n is the number of background water quality measurements

k is the number of future measurements for comparison

The background concentration values will be based on the results of this analysis and will incorporate the multiple strata being sampled in each probe location. For non-parametric distributed constituents, a non-parametric method will be used to analyze the data and establish background concentration limits. The final method chosen for the non-parametric data analysis will be established after the background data have been collected and the distributions analyzed.

Impoundment Floor Sampling:

In accordance with Reference A, a soil sample will be taken at the locations shown in Figure 2-1 (Reference A) The soil samples will be collected after removal of visible ash material using decontaminated stainless steel and/or Teflon-lined scoops, trowels, shovels, spoons, or spatulas. Each sample will be taken from the surface of the impoundment floor to a depth no greater than 4 inches. The samples will then be taken following the directions provided by the CQA Laboratory with regards to sample size, material handling and preservation, and chain of custody documentation.

Constituent Threshold

At a minimum, each of the samples will be analyzed for the parameters identified in Table 1.

Table 1: Inorganic Constituents of Concern for all Impoundments

Constituent of Concern	CAS No.	Analytical Method	Method Quantitation Limit (mg/kg)
Antimony	7440-36-0	EPA SW-846 Method 6010C	3.1
Arsenic	7440-38-2	EPA SW-846 Method 6010C	0.68
Barium	7440-39-3	EPA SW-846 Method 6010C	1,500
Beryllium	7440-41-7	EPA SW-846 Method 6010C	16



Boron	7440-42-8	EPA SW-846 Method 6010C	1,600
Cadmium	7440-43-9	EPA SW-846 Method 6010C	7.1
Chromium (Total)	7440-47-3	EPA SW-846 Method 6010C	--
Chromium (III)	16065-83-1	SM 3500	12,000
Chromium (VI)	18540-29-9	EPA SW-846 Method 3060A/7196A	0.3
Cobalt	7440-48-4	EPA SW-846 Method 6010C	2.3
Copper	7440-50-8	EPA SW-846 Method 6010C	310
Fluoride	16984-48-8	EPA SW-846 Method 9056	310
Lead	7439-92-1	EPA SW-846 Method 6010C	400
Lithium	7439-93-2	EPA SW-846 Method 6010C	16
Mercury	7439-97-6	EPA SW-846 Method 7471A	1.1
Molybdenum	7439-98-7	EPA SW-846 Method 6010C	39
Nickel	7440-02-0	EPA SW-846 Method 6010C	150
Selenium	7782-49-2	EPA SW-846 Method 6010C	39
Silver	7440-22-4	EPA SW-846 Method 6010C	39
Thallium	7440-28-0	EPA SW-846 Method 6010C	0.078
Vanadium	7440-62-2	EPA SW-846 Method 6010C	39
Zinc	7440-66-6	EPA SW-846 Method 6010C	2,300

Note: Values in Table 1 are derived from the EPA Risk Based Screening Levels (RBSLs) dated May 2016 for residential soils. A blank indicates that a standard or screening level has not been established.

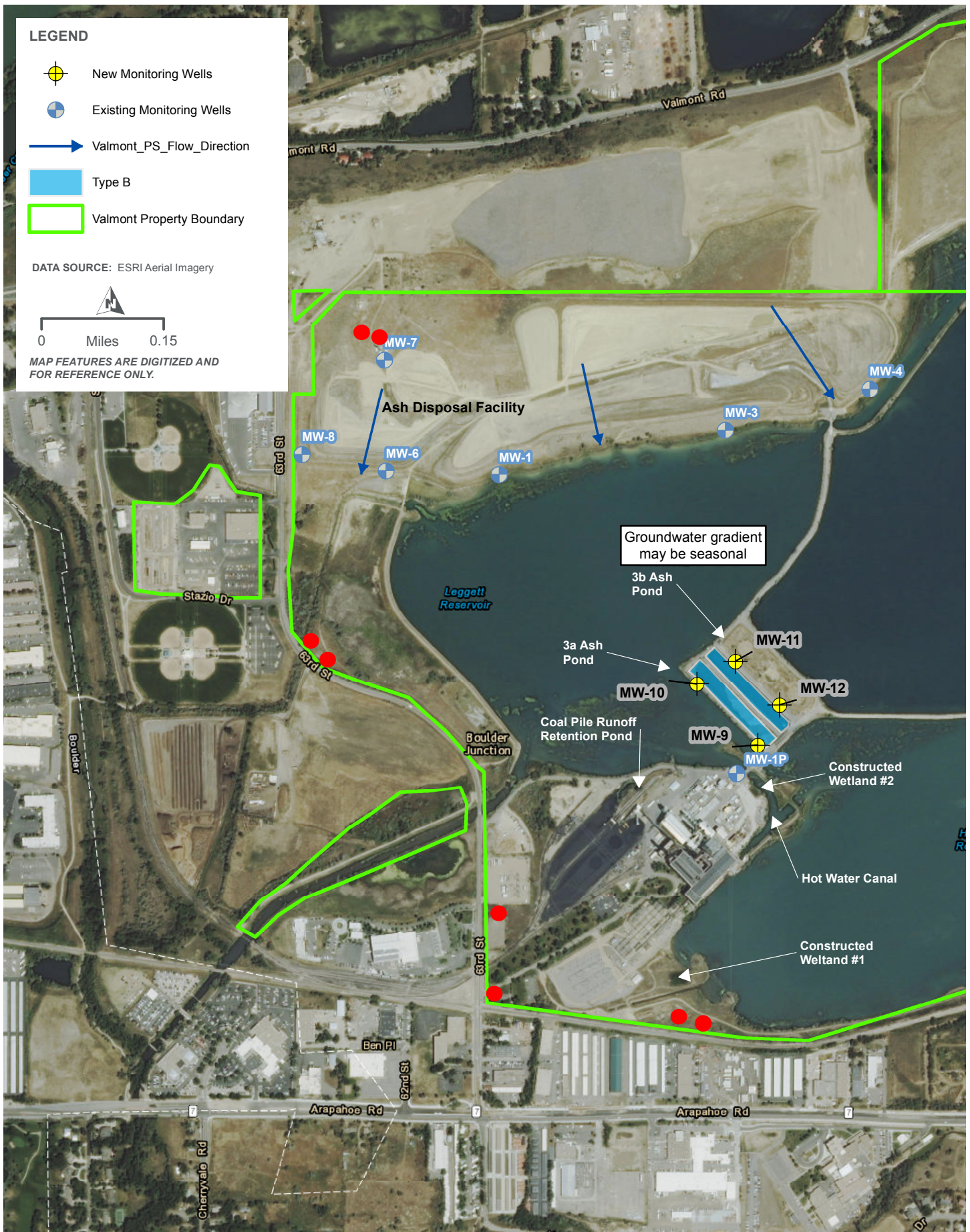
Soil samples from the impoundment floor having constituent concentrations greater than those identified in Table 1, will first be compared to the background concentrations for the respective geologic layer from which they were obtained. If the soil concentration exceeds the established background concentration for the same constituent, the sample will be flagged as potentially impacted. Xcel Energy will then meet with the Colorado Department of Health & Environment to discuss potential remedial actions required to close the impacted impoundment.

The EPA emphasizes that the Risk Based Screening Levels are not cleanup standards. The screening levels are chemical-specific concentrations for individual contaminants that may warrant further investigation or site cleanup.



Reporting

A report will be prepared to document field activities and soil sampling results. The report will include all relevant field, analytical, and statistical data. The report will include an evaluation of conclusions drawn from the background study results regarding the adequacy of closure activities. The results of the background study and proposed criteria will be submitted to CDPHE at the time of closure certification.



ATTACHMENT 2

Confirmatory Soil Laboratory Report



Friday, July 13, 2018

Matt Rohr
HDR
419 Canyon Blvd. Suite 316
Fort Collins, CO 80524

Re: ALS Workorder: 1806468
Project Name: Valmont 3A & 3B (CCR)
Project Number:

Dear Mr. Rohr:

Three solid samples were received from HDR, on 6/20/2018. The samples were scheduled for the following analyses:

Gamma Spectroscopy

Inorganics

Metals

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1806468

Metals:

The samples were analyzed following SW-846, 3rd Edition procedures. Analysis by ICPMS followed method 6020A and the current revision of SOP 827. Mercury analysis by CVAA followed method 7471A and the current revision of SOP 812.

All acceptance criteria were met.

Inorganics:

The samples were analyzed following EMSL procedures for the current revision of the following SOP and method:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Fluoride	300.0 Revision 2.1	1113

All acceptance criteria were met.

Gamma Spectroscopy:

The samples were analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713.

Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

All remaining acceptance criteria were met.

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1806468

Client Name: HDR

Client Project Name: Valmont 3A & 3B (CCR)

Client Project Number:

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
TP 1-3	1806468-1		SOLID	20-Jun-18	14:24
TP 1-6	1806468-2		SOLID	20-Jun-18	14:28
TP 1-4	1806468-3		SOLID	20-Jun-18	14:32



ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TE: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Expedite

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.
Turnaround time for samples received Saturday will be calculated beginning from the next business day.

PROJECT NAME Valmont 3A+3B (CCR)		TURNAROUND TIME FAST		SAMPLER		PAGE 1 of 1		ALS WORKORDER # 1806468	
PROJECT No.		SITE ID		DISPOSAL BY LAB		or RETURN		PARAMETER/METHOD REQUEST FOR ANALYSIS	
PURCHASE ORDER		EDD FORMAT		BILL TO COMPANY		INVOICE ATTN TO		ADDRESS	
CITY / STATE / ZIP		PHONE		FAX		E-MAIL		FAX	
COMPANY NAME HDP Inc.		ADDRESS		CITY / STATE / ZIP		PHONE		FAX	
SEND REPORT TO Matt Rohr		ADDRESS		CITY / STATE / ZIP		PHONE		FAX	
ADDRESS 1670 Broadway Ste 3400		CITY / STATE / ZIP		PHONE		FAX		E-MAIL	
CITY / STATE / ZIP Denver, CO 80202		PHONE		FAX		E-MAIL		FAX	
E-MAIL matt.rohr@hdpinc.com		PHONE		FAX		E-MAIL		FAX	
LAB ID		FIELD ID		MATRIX		SAMPLE DATE		SAMPLE TIME	
TP 1-3		S		6/20		2:24		1	
TP 1-6		S		6/20		2:28		1	
TP 1-4		S		6/20		2:32		1	
PRESERVATIVE		# OF BOTTLES		QC		A		B	
A		B		C		D		E	
F		G		H		I		J	
SEE NOTES		SECTION		A		B		C	
D		E		F		G		H	
I		J		K		L		M	
N		O		P		Q		R	
S		T		U		V		W	
X		Y		Z		AA		AB	
AC		AD		AE		AF		AG	
AH		AI		AJ		AK		AL	
AM		AN		AO		AP		AQ	
AR		AS		AT		AU		AV	
AW		AX		AY		AZ		BA	
BB		BC		BD		BE		BF	
BG		BH		BI		BJ		BK	
BL		BM		BN		BO		BP	
BQ		BR		BS		BT		BU	
BV		BW		BX		BY		BZ	
CA		CB		CC		CD		CE	
CF		CG		CH		CI		CJ	
CK		CL		CM		CN		CO	
CP		CQ		CR		CS		CT	
CU		CV		CW		CX		CY	
CZ		DA		DB		DC		DD	
DE		DF		DG		DH		DI	
DJ		DK		DL		DM		DN	
DO		DP		DQ		DR		DS	
DT		DU		DV		DW		DX	
DY		DZ		EA		EB		EC	
ED		EE		EF		EG		EH	
EI		EJ		EK		EL		EM	
EN		EO		EP		EQ		ER	
ES		ET		EU		EV		EW	
EX		EY		EZ		FA		FB	
FC		FD		FE		FF		FG	
FH		FI		FJ		FK		FL	
FM		FN		FO		FP		FQ	
FR		FS		FT		FU		FV	
FW		FX		FY		FZ		GA	
GB		GC		GD		GE		GF	
GG		GH		GI		GJ		GK	
GL		GM		GN		GO		GP	
GQ		GR		GS		GT		GU	
GV		GW		GX		GY		GZ	
HA		HB		HC		HD		HE	
HF		HG		HH		HI		HJ	
HK		HL		HM		HN		HO	
HP		HQ		HR		HS		HT	
HU		HV		HW		HX		HY	
HZ		IA		IB		IC		ID	
IE		IF		IG		IH		II	
IJ		IK		IL		IM		IN	
IO		IP		IQ		IR		IS	
IT		IU		IV		IW		IX	
IY		IZ		JA		JB		JC	
JD		JE		JF		JG		JH	
JJ		JK		JL		JM		JN	
JO		JP		JQ		JR		JS	
JT		JU		JV		JW		JX	
JY		JZ		KA		KB		KC	
KD		KE		KF		KG		KH	
KI		KJ		KK		KL		KM	
KN		KO		KP		KQ		KR	
KS		KT		KU		KV		KW	
KY		KZ		LA		LB		LC	
LD		LE		LF		LG		LH	
LI		LJ		LK		LL		LM	
LO		LP		LQ		LR		LS	
LT		LU		LV		LW		LX	
LY		LZ		MA		MB		MC	
MD		ME		MF		MG		MH	
MI		MJ		MK		ML		MM	
MN		MO		MP		MQ		MR	
MS		MT		MU		MV		MW	
MY		MZ		NA		NB		NC	
ND		NE		NF		NG		NH	
NI		NJ		NK		NL		NM	
NO		NP		NQ		NR		NS	
NT		NU		NV		NW		NX	
NY		NZ		OA		OB		OC	
OD		OE		OF		OG		OH	
OI		OJ		OK		OL		OM	
ON		OO		OP		OQ		OR	
OS		OT		OU		OV		OW	
OY		OZ		PA		PB		PC	
PD		PE		PF		PG		PH	
PI		PJ		PK		PL		PM	
PN		PO		PP		PQ		PR	
PS		PT		PU		PV		PW	
PY		PZ		QA		QB		QC	
QD		QE		QF		QG		QH	
QI		QJ		QK		QL		QM	
QN		QO		QP		QQ		QR	
QS		QT		QU		QV		QW	
QY		QZ		RA		RB		RC	
RD		RE		RF		RG		RH	
RI		RJ		RK		RL		RM	
RO		RP		RQ		RR		RS	
RT		RU		RV		RW		RX	
RY		RZ		SA		SB		SC	
SD		SE		SF		SG		SH	
SI		SJ		SK		SL		SM	
SN		SO		SP		SQ		SR	
SS		ST		SU		SV		SW	
SY		SZ		TA		TB		TC	
TD		TE		TF		TG		TH	
TI		TJ		TK		TL		TM	
TO		TP		TQ		TR		TS	
TT		TU		TV		TW		TX	
TY		TZ		UA		UB		UC	
UD		UE		UF		UG		UH	
UI		UJ		UK		UL		UM	
UN		UO		UP		UQ		UR	
US		UT		UU		UV		UW	
UY		UZ		VA		VB		VC	
VD		VE		VF		VG		VH	
VI		VJ		VK		VL		VM	
VO		VP		VQ		VR		VS	
VT		VU		VV		VW		VX	
VY		VZ		WA		WB		WC	
WD		WE		WF		WG		WH	
WI		WJ		WK		WL		WM	
WO		WP		WQ		WR		WS	
WT		WU		WV		WW		WX	
WY		WZ		XA		XB		XC	
XD		XE		XF		XG		XH	
XI		XJ		XK		XL		XM	
XO		XP		XQ		XR		XS	
XT		XU		XV		XW		XX	
XY		XZ		YA		YB		YC	
YD		YE		YF		YG		YH	
YI		YJ		YK		YL		YM	
YO		YP		YQ		YR		YS	
YT		YU		YV		YW		YX	
YY		YZ		ZA		ZB		ZC	
ZD		ZE		ZF		ZG		ZH	
ZI		ZJ		ZK		ZL		ZM	
ZO		ZP		ZQ		ZR		ZS	
ZT		ZU		ZV		ZW		ZX	
ZY		ZZ		AA		AB		AC	
AD		AE		AF		AG		AH	
AI		AJ		AK		AL		AM	
AO		AP		AQ		AR		AS	
AT		AU		AV		AW		AX	
AY		AZ		BA		BB		BC	
BD		BE		BF		BG		BH	
BI		BJ		BK		BL		BM	
BO		BP		BQ		BR		BS	
BT		BU		BV		BW		BX	
BY		BZ		CA		CB		CC	
CD		CE		CF		CG		CH	
CI		CJ		CK		CL		CM	
CO		CP		CQ		CR		CS	
CT		CU		CV		CW		CX	
CY		CZ		DA		DB		DC	
DD		DE		DF		DG		DH	
DI		DJ		DK		DL		DM	
DO		DP		DQ		DR		DS	
DT		DU		DV		DW		DX	
DY		DZ		EA		EB		EC	
ED		EE		EF		EG		EH	
EI		EJ		EK		EL		EM	
EO		EP		EQ		ER		ES	
ET		EU		EV		EW		EX	
EY		EZ		FA		FB		FC	
FD		FE		FF		FG		FH	
FI		FJ		FK		FL		FM	
FO		FP		FQ		FR		FS	
FT		FU		FV		FW		FX	
FY		FZ		GA		GB		GC	
GD		GE		GF		GG		GH	
GI		GJ		GK		GL		GM	
GO		GP		GQ		GR		GS	
GT		GU		GV		GW		GX	
GY		GZ		HA		HB		HC	
HD		HE		HF		HG		HH	
HI		HJ		HK		HL		HM	
HO		HP		HQ		HR		HS	
HT		HU		HV		HW		HX	
HY		HZ		IA		IB		IC	
ID		IE		IF		IG		IH	
II		IJ		IK		IL		IM	
IO		IP		IQ		IR		IS	
IT		IU		IV		IW		IX	
IY		IZ		JA		JB		JC	
JD		JE		JF		JG		JH	
JI		JJ		JK		JL		JM	
JO		JP		JQ		JR		JS	
JT		JU		JV		JW		JX	
JY		JZ		KA		KB		KC	
KD		KE		KF		KG		KH	
KI		KJ		KK		KL		KM	
KO		KP		KQ		KR		KS	
KT		KU		KV		KW		KX	
KY		KZ		LA		LB		LC	
LD		LE		LF		LG		LH	
LI		LJ		LK		LL		LM	
LO		LP		LQ		LR		LS	
LT		LU		LV		LW		LX	
LY		LZ		MA		MB		MC	
MD		ME		MF		MG		MH	
MI		MJ		MK		ML		MM	
MO		MP		MQ		MR		MS	
MT		MU		MV		MW		MX	
MY		MZ		NA		NB		NC	
ND		NE		NF		NG		NH	
NI		NJ		NK		NL		NM	
NO		NP		NQ		NR		NS	
NT		NU		NV		NW		NX	
NY		NZ		OA		OB		OC	
OD		OE		OF		OG		OH	
OI		OJ		OK		OL		OM	
OO		OP		OQ		OR		OS	
OT		OU		OV		OW		OX	
OY		OZ		PA		PB		PC	
PD		PE		PF		PG		PH	
PI		PJ		PK		PL		PM	
PO		PP		PQ		PR		PS	
PT		PU		PV		PW		PX	
PY		PZ		QA		QB		QC	
QD		QE		QF		QG		QH	
QI		QJ		QK		QL		QM	
QO		QP		QQ		QR		QS	
QT		QU		QV		QW		QX	
QY		QZ							



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: HDR

Workorder No: 1806468

Project Manager: KO

Initials: AK Date: 6/20/18

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are Custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	N/A	YES	NO
16. Were the samples shipped on ice?		YES	<input checked="" type="radio"/> NO
17. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 <input checked="" type="radio"/> #3 #4	RAD ONLY	YES <input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>26.2</u>			
No. of custody seals on cooler: <u>0</u>			
External µR/hr reading: <u>N/A</u>			
Background µR/hr reading: <u>12</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <input checked="" type="radio"/> N/A (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / ☒ N/A Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 6-21-18

Client: HDR
Project: Valmont 3A & 3B (CCR)
Sample ID: TP 1-3
Legal Location:
Collection Date: 6/20/2018 14:24

Date: 13-Jul-18
Work Order: 1806468
Lab ID: 1806468-1
Matrix: SOLID
Percent Moisture: 15.0

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.26 (+/- 0.57)	TI	SOP 713 0.83	pCi/g	Prep Date: 7/3/2018 NA	PrepBy: NMP 7/9/2018 13:04
ICPMS Metals						
ARSENIC	11000		SW6020 220	UG/KG	Prep Date: 6/29/2018 10	PrepBy: JML 7/5/2018 17:13
BORON	ND		17000	UG/KG	10	7/5/2018 17:13
BARIUM	61000		550	UG/KG	10	7/5/2018 17:13
BERYLLIUM	520		55	UG/KG	10	7/5/2018 17:13
CADMIUM	ND		220	UG/KG	10	7/5/2018 17:13
COBALT	11000		550	UG/KG	10	7/5/2018 17:13
CHROMIUM	14000		1100	UG/KG	10	7/5/2018 17:13
LITHIUM	18000		2200	UG/KG	10	7/5/2018 17:13
MOLYBDENUM	3100		220	UG/KG	10	7/5/2018 17:13
LEAD	16000		220	UG/KG	10	7/5/2018 17:13
ANTIMONY	240		110	UG/KG	10	7/5/2018 17:13
SELENIUM	2100		1100	UG/KG	10	7/5/2018 17:13
THALLIUM	220		11	UG/KG	10	7/5/2018 17:13
Ion Chromatography						
FLUORIDE	55		EPA300.0 1.2	MG/KG	Prep Date: 7/1/2018 1	PrepBy: HMA 7/2/2018 01:23
Mercury						
MERCURY	0.1		SW7471 0.038	MG/KG	Prep Date: 6/25/2018 1	PrepBy: KJM 6/25/2018 17:01
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	1.08 (+/- 0.33)		SOP 783 0.19	pCi/g	Prep Date: 7/5/2018 NA	PrepBy: LOW 7/10/2018 10:48

Client: HDR
 Project: Valmont 3A & 3B (CCR)
 Sample ID: TP 1-6
 Legal Location:
 Collection Date: 6/20/2018 14:28

Date: 13-Jul-18
 Work Order: 1806468
 Lab ID: 1806468-2
 Matrix: SOLID
 Percent Moisture: 17.5

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	0.91 (+/- 0.47)	LT,TI	SOP 713 0.66	pCi/g	Prep Date: 7/3/2018 NA	PrepBy: NMP 7/9/2018 13:47
ICPMS Metals						
			SW6020		Prep Date: 6/29/2018	PrepBy: JML
ARSENIC	6000		240	UG/KG	10	7/5/2018 17:16
BORON	20000		18000	UG/KG	10	7/5/2018 17:16
BARIUM	55000		600	UG/KG	10	7/5/2018 17:16
BERYLLIUM	590		60	UG/KG	10	7/5/2018 17:16
CADMIUM	ND		240	UG/KG	10	7/5/2018 17:16
COBALT	9400		600	UG/KG	10	7/5/2018 17:16
CHROMIUM	15000		1200	UG/KG	10	7/5/2018 17:16
LITHIUM	19000		2400	UG/KG	10	7/5/2018 17:16
MOLYBDENUM	1600		240	UG/KG	10	7/5/2018 17:16
LEAD	15000		240	UG/KG	10	7/5/2018 17:16
ANTIMONY	ND		120	UG/KG	10	7/5/2018 17:16
SELENIUM	1600		1200	UG/KG	10	7/5/2018 17:16
THALLIUM	190		12	UG/KG	10	7/5/2018 17:16
Ion Chromatography						
FLUORIDE	22		EPA300.0 1.2	MG/KG	Prep Date: 7/1/2018 1	PrepBy: HMA 7/2/2018 01:38
Mercury						
MERCURY	0.076		SW7471 0.035	MG/KG	Prep Date: 6/25/2018 1	PrepBy: KJM 6/25/2018 17:03
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.87 (+/- 0.29)	LT	SOP 783 0.22	pCi/g	Prep Date: 7/5/2018 NA	PrepBy: LOW 7/10/2018 10:48

Client: HDR
 Project: Valmont 3A & 3B (CCR)
 Sample ID: TP 1-4
 Legal Location:
 Collection Date: 6/20/2018 14:32

Date: 13-Jul-18
 Work Order: 1806468
 Lab ID: 1806468-3
 Matrix: SOLID
 Percent Moisture: 18.5

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.24 (+/- 0.73)	TI	SOP 713 0.85	pCi/g	Prep Date: 7/3/2018 NA	PrepBy: NMP 7/9/2018 13:47
ICPMS Metals						
ARSENIC	6400		SW6020 240	UG/KG	Prep Date: 6/29/2018 10	PrepBy: JML 7/5/2018 17:19
BORON	ND		18000	UG/KG	10	7/5/2018 17:19
BARIUM	1700000		5900	UG/KG	100	7/10/2018 15:25
BERYLLIUM	640		59	UG/KG	10	7/5/2018 17:19
CADMIUM	ND		240	UG/KG	10	7/5/2018 17:19
COBALT	8900		590	UG/KG	10	7/5/2018 17:19
CHROMIUM	15000		1200	UG/KG	10	7/5/2018 17:19
LITHIUM	20000		2400	UG/KG	10	7/5/2018 17:19
MOLYBDENUM	1600		240	UG/KG	10	7/5/2018 17:19
LEAD	16000		240	UG/KG	10	7/5/2018 17:19
ANTIMONY	ND		120	UG/KG	10	7/5/2018 17:19
SELENIUM	1400		1200	UG/KG	10	7/5/2018 17:19
THALLIUM	220		12	UG/KG	10	7/5/2018 17:19
Ion Chromatography						
FLUORIDE	35		EPA300.0 1.2	MG/KG	Prep Date: 7/1/2018 1	PrepBy: HMA 7/2/2018 02:26
Mercury						
MERCURY	ND		SW7471 0.037	MG/KG	Prep Date: 7/9/2018 1	PrepBy: KJM 7/10/2018 12:45
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	1.03 (+/- 0.33)		SOP 783 0.23	pCi/g	Prep Date: 7/5/2018 NA	PrepBy: LOW 7/10/2018 10:48

Client: HDR
Project: Valmont 3A & 3B (CCR)
Sample ID: TP 1-4
Legal Location:
Collection Date: 6/20/2018 14:32

Date: 13-Jul-18
Work Order: 1806468
Lab ID: 1806468-3
Matrix: SOLID
Percent Moisture: 18.5

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
 U or ND - Result is less than the sample specific MDC.
 Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
 Y2 - Chemical Yield outside default limits.
 W - DER is greater than Warning Limit of 1.42
 * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
 # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
 G - Sample density differs by more than 15% of LCS density.
 D - DER is greater than Control Limit
 M - Requested MDC not met.
 LT - Result is less than requested MDC but greater than achieved MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
 L - LCS Recovery below lower control limit.
 H - LCS Recovery above upper control limit.
 P - LCS, Matrix Spike Recovery within control limits.
 N - Matrix Spike Recovery outside control limits
 NC - Not Calculated for duplicate results less than 5 times MDC
 B - Analyte concentration greater than MDC.
 B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.
 S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.
 G - A pattern resembling gasoline was detected in this sample.
 D - A pattern resembling diesel was detected in this sample.
 M - A pattern resembling motor oil was detected in this sample.
 C - A pattern resembling crude oil was detected in this sample.
 4 - A pattern resembling JP-4 was detected in this sample.
 5 - A pattern resembling JP-5 was detected in this sample.
 H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
 L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
 Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Client: HDR
 Work Order: 1806468
 Project: Valmont 3A & 3B (CCR)

Date: 7/13/2018 11:28

QC BATCH REPORT

Batch ID: **RE180705-3-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

DUP	Sample ID: 1806468-2				Units: pCi/g		Analysis Date: 7/10/2018 10:48				
Client ID: TP 1-6		Run ID: RE180705-3B				Prep Date: 7/5/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.06 (+/- 0.33)	0.15						0.87	0.4	2.1	

LCS	Sample ID: RE180705-3				Units: pCi/g		Analysis Date: 7/10/2018 10:48				
Client ID:	Run ID: RE180705-3B				Prep Date: 7/5/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	21.2 (+/- 3.9)	0.1	23.94		88.3	57-126					P

MB	Sample ID: RE180705-3				Units: pCi/g			Analysis Date: 7/10/2018 10:48				
Client ID:	Run ID: RE180705-3B				Prep Date: 7/5/2018			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-226	ND	0.144									U	

MS	Sample ID: 1806468-3				Units: pCi/g		Analysis Date: 7/10/2018 10:48				
Client ID: TP 1-4			Run ID: RE180705-3B			Prep Date: 7/5/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	35.2 (+/- 6.5)	0.2	28.75	1.03	119	57-126					P

The following samples were analyzed in this batch:

1806468-1	1806468-2	1806468-3
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Client: HDR
Work Order: 1806468
Project: Valmont 3A & 3B (CCR)

QC BATCH REPORT

Batch ID: **GS180703-1-5** Instrument ID: **GAMMA** Method: **Gamma Spectroscopy Results**

DUP	Sample ID: 1806468-1				Units: pCi/g		Analysis Date: 7/9/2018 13:23				
Client ID: TP 1-3			Run ID: GS180703-1A			Prep Date: 7/3/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	1.08 (+/- 0.49)	0.83						1.26	0.2	2.1	TI

LCS	Sample ID: GS180703-1				Units: pCi/g		Analysis Date: 7/9/2018 14:35				
Client ID:	Run ID: GS180703-1A				Prep Date: 7/3/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Am-241	980 (+/- 120)	10	1011		97.1	85-115					P
Co-60	406 (+/- 48)	1	424.9		95.7	85-115					P
Cs-137	385 (+/- 45)	2	386.5		99.6	85-115					P

MB	Sample ID: GS180703-1E				Units: pCi/g			Analysis Date: 7/9/2018 14:33			
Client ID:	Run ID: GS180703-1A				Prep Date: 7/3/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	ND	0.23									U

The following samples were analyzed in this batch:

1806468-1	1806468-2	1806468-3
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Client: HDR
Work Order: 1806468
Project: Valmont 3A & 3B (CCR)

QC BATCH REPORT

Batch ID: **HG180625-2-1** Instrument ID **CETAC7500** Method: **SW7471**

LCS	Sample ID: HG180625-2			Units: MG/KG			Analysis Date: 6/25/2018 16:10				
Client ID:	Run ID: HG180625-3A1			Prep Date: 6/25/2018			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MERCURY	0.187	0.0333	0.167		112	80-120				20	

MB		Sample ID: HG180625-2			Units: MG/KG		Analysis Date: 6/25/2018 16:08		
Client ID:		Run ID: HG180625-3A1			Prep Date: 6/25/2018			DF: 1	
Analyte		Result	ReportLimit						
MERCURY		ND	0.033						

The following samples were analyzed in this batch:

1806468-1	1806468-2
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Client: HDR
Work Order: 1806468
Project: Valmont 3A & 3B (CCR)

QC BATCH REPORT

Batch ID: **HG180709-4-1** Instrument ID: **CETAC7500** Method: **SW7471**

LCS		Sample ID: HG180709-4		Units: MG/KG			Analysis Date: 7/10/2018 12:43				
Client ID:		Run ID: HG180710-1A1				Prep Date: 7/9/2018			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MERCURY	0.176	0.0333	0.167		105	80-120				20	

MB		Sample ID: HG180709-4		Units: MG/KG			Analysis Date: 7/10/2018 12:40				
Client ID:		Run ID: HG180710-1A1				Prep Date: 7/9/2018			DF: 1		
Analyte	Result	ReportLimit									Qual
MERCURY	ND	0.033									

The following samples were analyzed in this batch:

1806468-3

Client: HDR
 Work Order: 1806468
 Project: Valmont 3A & 3B (CCR)

QC BATCH REPORT

Batch ID: **IP180629-4-3** Instrument ID **ICPMS2** Method: **SW6020**

LCS		Sample ID: IM180629-4		Units: UG/KG		Analysis Date: 7/5/2018 16:16					
Client ID:		Run ID: IM180705-11A1		Prep Date: 6/29/2018		DF: 10					
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
ANTIMONY	2880	100	3000		96	80-120				20	
ARSENIC	10400	200	10000		104	80-120				20	
BARIUM	9280	500	10000		93	80-120				20	
BERYLLIUM	4900	50	5000		98	80-120				20	
BORON	106000	15000	100000		106	80-120				20	
CADMIUM	3040	200	3000		101	80-120				20	
CHROMIUM	47700	1000	50000		95	80-120				20	
COBALT	9800	500	10000		98	80-120				20	
LEAD	5080	200	5000		102	80-120				20	
LITHIUM	98200	2000	100000		98	80-120				20	
MOLYBDENUM	9740	200	10000		97	80-120				20	
SELENIUM	10800	1000	10000		108	80-120				20	
THALLIUM	212	10	200		106	80-120				20	

MB		Sample ID: IP180629-4		Units: UG/KG		Analysis Date: 7/5/2018 16:13	
Client ID:		Run ID: IM180705-11A1		Prep Date: 6/29/2018		DF: 10	
Analyte		Result	ReportLimit	Qual			
ANTIMONY		ND	100				
ARSENIC		ND	200				
BARIUM		ND	500				
BERYLLIUM		ND	50				
BORON		ND	15000				
CADMIUM		ND	200				
CHROMIUM		ND	1000				
COBALT		ND	500				
LEAD		ND	200				
LITHIUM		ND	2000				
MOLYBDENUM		ND	200				
SELENIUM		ND	1000				
THALLIUM		ND	10				

The following samples were analyzed in this batch:

1806468-1	1806468-2	1806468-3
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Client: HDR
Work Order: 1806468
Project: Valmont 3A & 3B (CCR)

QC BATCH REPORT

Batch ID: **IC180701-2-1** Instrument ID **IC3** Method: **EPA300.0**

LCS		Sample ID: IC180701-2		Units: MG/KG			Analysis Date: 7/2/2018 00:03				
Client ID:		Run ID: IC180630-1A1				Prep Date: 7/1/2018			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
FLUORIDE	19.4	1	20		97	85-115				30	

MB		Sample ID: IC180701-2		Units: MG/KG			Analysis Date: 7/1/2018 23:48				
Client ID:		Run ID: IC180630-1A1				Prep Date: 7/1/2018			DF: 1		
Analyte	Result	ReportLimit									Qual
FLUORIDE	ND	1									

The following samples were analyzed in this batch:

1806468-1	1806468-2	1806468-3
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TECHNICAL BULLETIN ADDENDUM

The library used for analysis defines the gamma emission(s) to be used for analysis of each nuclide. If multiple gamma emissions are used for quantification, then a 'NET' quantification emission (or peak) must be defined in the library. This designation provides for the calculation of nuclide activity concentrations and detection limits in the case of non-presence of the nuclide. When the nuclide is not present, or the software is unable to resolve a peak at the library defined 'NET' energy, the software evaluates the 'NET' region of interest ('NET' peak energy ± 2 keV) by performing a summation of the net counts above the background level. This 'NET' quantification can result in net negative, zero, or positive activity results, and is highly dependent on the spectral distribution in the region of interest of the 'NET' peak. In cases where only the 'NET' peak is found, and the software performs a net quantification, the nuclide result will be flagged with an 'NQ' qualifier on the final reports. This indicates that the nuclide is not detected or supported at any level above the reported MDC. Results are submitted without further qualification.

All nuclides specified in the library of analysis for gamma spectroscopy are evaluated for positive OR tentative identification on the following criteria:

- The individual abundances for the gamma emissions specified for each nuclide are summed to obtain a total nuclide abundance.
- From the total nuclide abundance, a positive identification criterion is set as 75% of this total nuclide abundance.
- For all nuclide peaks that are not net quantified, those peak abundances are summed. The total non-net quantified peak sum is compared to the calculated 75% abundance criterion. If this sum is greater than the 75% criterion, the nuclide is considered to be positively identified at the reported concentration. If the sum is less than the 75% criterion, the nuclide is tentatively identified at the reported concentration. These results will be flagged with a 'TI' qualifier on the final reports to indicate that the 75% abundance criterion was not met.



Friday, June 29, 2018

Matt Rohr
HDR
419 Canyon Blvd. Suite 316
Fort Collins, CO 80524

Re: ALS Workorder: 1806298
Project Name: Xcel Valmont Ponds 3A & 3B-CCR
Project Number: CCR

Dear Rohr:

Two soil samples were received from HDR, on 6/14/2018. The samples were scheduled for the following analyses:

Gamma Spectroscopy

Inorganics

Metals

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1806298

Metals:

The samples were analyzed following SW-846, 3rd Edition procedures. Analysis by ICPMS followed method 6020A and the current revision of SOP 827. Mercury analysis by CVAA followed method 7471A and the current revision of SOP 812.

All acceptance criteria were met.

Inorganics:

The samples were analyzed following EMSL procedures for the current revision of the following SOP and method:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Fluoride	300.0 Revision 2.1	1113

All acceptance criteria were met.

Gamma Spectroscopy:

The sample was analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713.

Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

All remaining acceptance criteria were met.

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1806298

Client Name: HDR

Client Project Name: Xcel Valmont Ponds 3A & 3B-CCR

Client Project Number: CCR

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
TP 2-2	1806298-1		SOIL	14-Jun-18	13:15
TP 2-3	1806298-2		SOIL	14-Jun-18	13:19



2225 Commerce Drive, Fort Collins, Colorado 80524
 TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

~~Chain-of-Custody~~ ~~Expenditure~~

ALS WORKORDER #

188298

[illegible]



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: HDR

Workorder No: 1806298

Project Manager: lwo

Initials: CDJ Date: 6-14-18

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<u>NO</u>
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO
3. Are Custody seals on sample containers intact?	<u>NONE</u>	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<u>YES</u>	NO
5. Are the COC and bottle labels complete and legible?		<u>YES</u>	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO
7. Were airbills / shipping documents present and/or removable?	<u>DROP OFF</u>	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<u>N/A</u>	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<u>N/A</u>	YES	NO
10. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO
11. Were all samples placed in the proper containers for the requested analyses?		<u>YES</u>	NO
12. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<u>YES</u>	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	<u>N/A</u>	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	<u>N/A</u>	YES	NO
16. Were the samples shipped on ice?		YES	<u>NO</u>
17. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4 RAD ONLY	YES	<u>NO</u>
Cooler #: <u>1</u>			
Temperature (°C): <u>4mB</u>			
No. of custody seals on cooler: <u>0</u>			
External µR/hr reading: <u>NA</u>			
Background µR/hr reading: <u>NA</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <u>NA</u> (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: lwo 6/15/18

Client: HDR
Project: CCR Xcel Valmont Ponds 3A & 3B-CCR
Sample ID: TP 2-2
Legal Location:
Collection Date: 6/14/2018 13:15

Date: 29-Jun-18
Work Order: 1806298
Lab ID: 1806298-1
Matrix: SOIL
Percent Moisture: 15.0

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.6 (+/- 1.1)	M3,G,TI	SOP 713 1.5	pCi/g	Prep Date: 6/18/2018 NA	PrepBy: NMP 6/19/2018 11:50
ICPMS Metals						
			SW6020		Prep Date: 6/15/2018	PrepBy: JML
ARSENIC	9000		230	UG/KG	10	6/18/2018 15:17
BORON	ND		17000	UG/KG	10	6/18/2018 15:17
BARIUM	190000		570	UG/KG	10	6/18/2018 15:17
BERYLLIUM	790		57	UG/KG	10	6/18/2018 15:17
CADMIUM	ND		230	UG/KG	10	6/18/2018 15:17
COBALT	8500		570	UG/KG	10	6/18/2018 15:17
CHROMIUM	17000		1100	UG/KG	10	6/18/2018 15:17
LITHIUM	23000		2300	UG/KG	10	6/18/2018 15:17
MOLYBDENUM	1400		230	UG/KG	10	6/18/2018 15:17
LEAD	21000		230	UG/KG	10	6/18/2018 15:17
ANTIMONY	270		110	UG/KG	10	6/18/2018 15:17
SELENIUM	4000		1100	UG/KG	10	6/18/2018 15:17
THALLIUM	310		11	UG/KG	10	6/18/2018 15:17
Ion Chromatography						
			EPA300.0		Prep Date: 6/15/2018	PrepBy: HMA
FLUORIDE	11		1.1	MG/KG	1	6/15/2018 12:24
Mercury						
			SW7471		Prep Date: 6/18/2018	PrepBy: KJM
MERCURY	0.058		0.038	MG/KG	1	6/19/2018 16:15
Radium-226 by Radon Emanation - Method 903.1						
			SOP 783		Prep Date: 6/21/2018	PrepBy: LOW
Ra-226	0.9 (+/- 0.28)	LT	0.16	pCi/g	NA	6/28/2018 12:03

Client: HDR
Project: CCR Xcel Valmont Ponds 3A & 3B-CCR
Sample ID: TP 2-3
Legal Location:
Collection Date: 6/14/2018 13:19

Date: 29-Jun-18
Work Order: 1806298
Lab ID: 1806298-2
Matrix: SOIL
Percent Moisture: 16.1

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.08 (+/- 0.44)	G	SOP 713 0.9	pCi/g	Prep Date: 6/18/2018 NA	PrepBy: NMP 6/19/2018 12:31
ICPMS Metals						
ARSENIC	12000		SW6020 220	UG/KG	Prep Date: 6/15/2018 10	PrepBy: JML 6/18/2018 15:32
BORON	ND		16000	UG/KG	10	6/18/2018 15:32
BARIUM	54000		550	UG/KG	10	6/18/2018 15:32
BERYLLIUM	780		55	UG/KG	10	6/18/2018 15:32
CADMIUM	ND		220	UG/KG	10	6/18/2018 15:32
COBALT	11000		550	UG/KG	10	6/18/2018 15:32
CHROMIUM	15000		1100	UG/KG	10	6/18/2018 15:32
LITHIUM	22000		2200	UG/KG	10	6/18/2018 15:32
MOLYBDENUM	1500		220	UG/KG	10	6/18/2018 15:32
LEAD	25000		220	UG/KG	10	6/18/2018 15:32
ANTIMONY	270		110	UG/KG	10	6/18/2018 15:32
SELENIUM	1900		1100	UG/KG	10	6/18/2018 15:32
THALLIUM	270		11	UG/KG	10	6/18/2018 15:32
Ion Chromatography						
FLUORIDE	19		EPA300.0 1.2	MG/KG	Prep Date: 6/15/2018 1	PrepBy: HMA 6/15/2018 13:41
Mercury						
MERCURY	0.05		SW7471 0.037	MG/KG	Prep Date: 6/18/2018 1	PrepBy: KJM 6/19/2018 16:17
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.79 (+/- 0.26)	LT	SOP 783 0.16	pCi/g	Prep Date: 6/21/2018 NA	PrepBy: LOW 6/28/2018 12:03

Client: HDR
Project: CCR Xcel Valmont Ponds 3A & 3B-CCR
Sample ID: TP 2-3
Legal Location:
Collection Date: 6/14/2018 13:19

Date: 29-Jun-18
Work Order: 1806298
Lab ID: 1806298-2
Matrix: SOIL
Percent Moisture: 16.1

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
U or ND - Result is less than the sample specific MDC.	L - LCS Recovery below lower control limit.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	H - LCS Recovery above upper control limit.
Y2 - Chemical Yield outside default limits.	P - LCS, Matrix Spike Recovery within control limits.
W - DER is greater than Warning Limit of 1.42	N - Matrix Spike Recovery outside control limits
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	NC - Not Calculated for duplicate results less than 5 times MDC
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	B - Analyte concentration greater than MDC.
G - Sample density differs by more than 15% of LCS density.	B3 - Analyte concentration greater than MDC but less than Requested MDC.
D - DER is greater than Control Limit	
M - Requested MDC not met.	
LT - Result is less than requested MDC but greater than achieved MDC.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.
 S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.
 G - A pattern resembling gasoline was detected in this sample.
 D - A pattern resembling diesel was detected in this sample.
 M - A pattern resembling motor oil was detected in this sample.
 C - A pattern resembling crude oil was detected in this sample.
 4 - A pattern resembling JP-4 was detected in this sample.
 5 - A pattern resembling JP-5 was detected in this sample.
 H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
 L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
 Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Client: HDR
 Work Order: 1806298
 Project: CCR Xcel Valmont Ponds 3A & 3B-CCR

Date: 6/29/2018 4:51:

QC BATCH REPORT

Batch ID: **RE180621-2-3** Instrument ID: **Alpha Scin** Method: **Radium-226 by Radon Emanation**

DUP	Sample ID: 1806298-2				Units: pCi/g		Analysis Date: 6/28/2018 12:03				
Client ID: TP 2-3			Run ID: RE180621-2B			Prep Date: 6/21/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.92 (+/- 0.29)	0.22						0.79	0.3	2.1	LT

LCS	Sample ID: RE180621-2				Units: pCi/g		Analysis Date: 6/28/2018 12:03				
Client ID:	Run ID: RE180621-2B				Prep Date: 6/21/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	25.5 (+/- 4.7)	0.2	23.94		107	57-126					P

MB	Sample ID: RE180621-2				Units: pCi/g			Analysis Date: 6/28/2018 12:03				
Client ID:	Run ID: RE180621-2B				Prep Date: 6/21/2018			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-226	ND	0.165									U	

MS	Sample ID: 1806298-1				Units: pCi/g			Analysis Date: 6/28/2018 12:03			
Client ID: TP 2-2		Run ID: RE180621-2B				Prep Date: 6/21/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	28.1 (+/- 5.1)	0.3	27.68	0.9	98.3	57-126					P

The following samples were analyzed in this batch:

1806298-1	1806298-2
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Client: HDR
Work Order: 1806298
Project: CCR Xcel Valmont Ponds 3A & 3B-CCR

QC BATCH REPORT

Batch ID: **GS180618-3-1** Instrument ID **GAMMA** Method: **Gamma Spectroscopy Results**

LCS Sample ID: **GS180618-3** Units: **pCi/g** Analysis Date: **6/19/2018 13:05**

Client ID: Run ID: **GS180618-3A** Prep Date: **6/18/2018** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Am-241	1050 (+/- 120)	0	1011		103	85-115					P
Co-60	432 (+/- 51)	1	428		101	85-115					P
Cs-137	394 (+/- 46)	2	386.9		102	85-115					P

MB Sample ID: **GS180618-3** Units: **pCi/g** Analysis Date: **6/19/2018 14:13**

Client ID: Run ID: **GS180618-3A** Prep Date: **6/18/2018** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	ND	0.135									U

The following samples were analyzed in this batch:

1806298-1	1806298-2
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Client: HDR
Work Order: 1806298
Project: CCR Xcel Valmont Ponds 3A & 3B-CCR

QC BATCH REPORT

Batch ID: **HG180618-3-1** Instrument ID **CETAC7500** Method: **SW7471**

LCS	Sample ID: HG180618-3			Units: MG/KG			Analysis Date: 6/19/2018 15:24				
Client ID:	Run ID: HG180619-4A1			Prep Date: 6/18/2018			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MERCURY	0.17	0.0333	0.167		102	80-120				20	

MB		Sample ID: HG180618-3		Units: MG/KG		Analysis Date: 6/19/2018 15:22	
Client ID:		Run ID: HG180619-4A1		Prep Date: 6/18/2018		DF: 1	
Analyte		Result	ReportLimit				
MERCURY		ND	0.033				

The following samples were analyzed in this batch:

1806298-1	1806298-2
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Client: HDR
 Work Order: 1806298
 Project: CCR Xcel Valmont Ponds 3A & 3B-CCR

QC BATCH REPORT

Batch ID: **IP180615-6-3** Instrument ID **ICPMS2** Method: **SW6020**

LCS	Sample ID: IM180615-6			Units: UG/KG		Analysis Date: 6/18/2018 14:09					
Client ID:	Run ID: IM180618-10A7					Prep Date: 6/15/2018			DF: 10		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
ANTIMONY	3020	100	3000		101	80-120				20	
ARSENIC	10400	200	10000		104	80-120				20	
BARIUM	10000	500	10000		100	80-120				20	
BERYLLIUM	5380	50	5000		108	80-120				20	
BORON	101000	15000	100000		101	80-120				20	
CADMIUM	3290	200	3000		110	80-120				20	
CHROMIUM	48200	1000	50000		96	80-120				20	
COBALT	10300	500	10000		103	80-120				20	
LEAD	5270	200	5000		105	80-120				20	
LITHIUM	103000	2000	100000		103	80-120				20	
MOLYBDENUM	9690	200	10000		97	80-120				20	
SELENIUM	11700	1000	10000		117	80-120				20	
THALLIUM	191	10	200		96	80-120				20	

MB		Sample ID: IP180615-6		Units: UG/KG		Analysis Date: 6/18/2018 14:06	
Client ID:		Run ID: IM180618-10A7		Prep Date: 6/15/2018		DF: 10	
Analyte	Result	ReportLimit					Qual
ANTIMONY	ND	100					
ARSENIC	ND	200					
BARIUM	ND	500					
BERYLLIUM	ND	50					
BORON	ND	15000					
CADMIUM	ND	200					
CHROMIUM	ND	1000					
COBALT	ND	500					
LEAD	ND	200					
LITHIUM	ND	2000					
MOLYBDENUM	ND	200					
SELENIUM	ND	1000					
THALLIUM	ND	10					

The following samples were analyzed in this batch:

1806298-1	1806298-2
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Client: HDR
 Work Order: 1806298
 Project: CCR Xcel Valmont Ponds 3A & 3B-CCR

QC BATCH REPORT

Batch ID: **IC180615-2-1** Instrument ID **IC3** Method: **EPA300.0**

LCS	Sample ID: IC180615-2	Units: MG/KG				Analysis Date: 6/15/2018 11:54						
Client ID:	Run ID: IC180615-1A1				Prep Date: 6/15/2018				DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual	
FLUORIDE	21.2	1	20		106	85-115				30		

MB	Sample ID: IC180615-2			Units: MG/KG	Analysis Date: 6/15/2018 11:39		
Client ID:	Run ID: IC180615-1A1			Prep Date: 6/15/2018		DF: 1	
Analyte	Result	ReportLimit	Qual				
FLUORIDE	ND	1					

MS	Sample ID: 1806298-1	Units: MG/KG				Analysis Date: 6/15/2018 13:11						
Client ID: TP 2-2	Run ID: IC180615-1A1				Prep Date: 6/15/2018				DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual	
FLUORIDE	31	1.14	22.8		11	86	85-115			30		

MSD	Sample ID: 1806298-1	Units: MG/KG				Analysis Date: 6/15/2018 13:26						
Client ID: TP 2-2	Run ID: IC180615-1A1				Prep Date: 6/15/2018				DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual	
FLUORIDE	31.5	1.16	23.2		11	85	85-115		31	2	30	

The following samples were analyzed in this batch:

1806298-1	1806298-2
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TECHNICAL BULLETIN ADDENDUM

The library used for analysis defines the gamma emission(s) to be used for analysis of each nuclide. If multiple gamma emissions are used for quantification, then a 'NET' quantification emission (or peak) must be defined in the library. This designation provides for the calculation of nuclide activity concentrations and detection limits in the case of non-presence of the nuclide. When the nuclide is not present, or the software is unable to resolve a peak at the library defined 'NET' energy, the software evaluates the 'NET' region of interest ('NET' peak energy ± 2 keV) by performing a summation of the net counts above the background level. This 'NET' quantification can result in net negative, zero, or positive activity results, and is highly dependent on the spectral distribution in the region of interest of the 'NET' peak. In cases where only the 'NET' peak is found, and the software performs a net quantification, the nuclide result will be flagged with an 'NQ' qualifier on the final reports. This indicates that the nuclide is not detected or supported at any level above the reported MDC. Results are submitted without further qualification.

All nuclides specified in the library of analysis for gamma spectroscopy are evaluated for positive OR tentative identification on the following criteria:

- The individual abundances for the gamma emissions specified for each nuclide are summed to obtain a total nuclide abundance.
- From the total nuclide abundance, a positive identification criterion is set as 75% of this total nuclide abundance.
- For all nuclide peaks that are not net quantified, those peak abundances are summed. The total non-net quantified peak sum is compared to the calculated 75% abundance criterion. If this sum is greater than the 75% criterion, the nuclide is considered to be positively identified at the reported concentration. If the sum is less than the 75% criterion, the nuclide is tentatively identified at the reported concentration. These results will be flagged with a 'TI' qualifier on the final reports to indicate that the 75% abundance criterion was not met.



Thursday, June 21, 2018

Matt Rohr
HDR
419 Canyon Blvd. Suite 316
Fort Collins, CO 80524

Re: ALS Workorder: 1806129
Project Name: Xcel Valmont Ponds 3A & 3B
Project Number:

Dear Rohr:

Six solid samples were received from HDR, on 6/7/2018. The samples were scheduled for the following analyses:

Gamma Spectroscopy

Inorganics

Metals

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1806129

Metals:

The samples were analyzed following SW-846, 3rd Edition procedures. Analysis by ICPMS followed method 6020A and the current revision of SOP 827. Mercury analysis by CVAA followed method 7471A and the current revision of SOP 812.

All acceptance criteria were met.

Inorganics:

The samples were analyzed following EMSL procedures for the current revision of the following SOP and method:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Fluoride	300.0 Revision 2.1	1113

A matrix spike (MS) and matrix spike duplicate (MSD) were prepared and analyzed with this batch. All guidance criteria for precision and accuracy were met with the following exceptions:

<u>Analyte</u>	<u>Sample ID</u>
Fluoride	1806129-1MS & MSD

The native sample result is flagged for fluoride. The laboratory control sample indicates that the procedure was in control.

All remaining acceptance criteria were met.

Gamma Spectroscopy:

The samples were analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713.

Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

All remaining acceptance criteria were met.

**Radium-226:**

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1806129

Client Name: HDR

Client Project Name: Xcel Valmont Ponds 3A & 3B

Client Project Number:

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
TP 1-1	1806129-1		SOLID	07-Jun-18	13:12
TP 1-5	1806129-2		SOLID	07-Jun-18	13:10
TP 1-2	1806129-3		SOLID	07-Jun-18	13:05
TP 2-4	1806129-4		SOLID	07-Jun-18	13:20
TP 2-1	1806129-5		SOLID	07-Jun-18	13:23
TP 2-5	1806129-6		SOLID	07-Jun-18	13:26



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: HDR Eng.

Workorder No: 1806129

Project Manager: Ko

Initials: ND

Date: 6/7/18

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<input checked="" type="radio"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="radio"/> NONE	YES	NO
3. Are Custody seals on sample containers intact?	<input checked="" type="radio"/> NONE	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<input checked="" type="radio"/> YES	NO
5. Are the COC and bottle labels complete and legible?		<input checked="" type="radio"/> YES	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	NO
7. Were airbills / shipping documents present and/or removable?	<input checked="" type="radio"/> DROP OFF	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<input checked="" type="radio"/> N/A	YES	NO
9. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	YES	NO
10. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	NO
11. Were all samples placed in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	NO
12. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	<input checked="" type="radio"/> N/A	YES	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	<input checked="" type="radio"/> N/A	YES	NO
16. Were the samples shipped on ice?		<input checked="" type="radio"/> YES	NO
17. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 <input checked="" type="radio"/> #3 #4	RAD ONLY	<input checked="" type="radio"/> YES <input checked="" type="radio"/> NO
Cooler #: <u>1</u>			
Temperature (°C): <u>17.2</u>			
No. of custody seals on cooler: <u>N/A</u>			
External µR/hr reading: <u>N/A</u>			
Background µR/hr reading: <u>10</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 6/9/18

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 1-1	Lab ID:	1806129-1
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:12	Percent Moisture:	18.1

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	0.9 (+/- 0.39)	LT	SOP 713 0.76	pCi/g	NA	Prep Date: 6/12/2018 PrepBy: MRL 6/18/2018 07:48
ICPMS Metals						
			SW6020			Prep Date: 6/12/2018 PrepBy: JML
ARSENIC	8000		230	UG/KG	10	6/14/2018 18:27
BORON	ND		18000	UG/KG	10	6/14/2018 18:27
BARIUM	1500000		2900	UG/KG	50	6/15/2018 15:36
BERYLLIUM	740		59	UG/KG	10	6/14/2018 18:27
CADMIUM	ND		230	UG/KG	10	6/14/2018 18:27
COBALT	11000		590	UG/KG	10	6/14/2018 18:27
CHROMIUM	16000		1200	UG/KG	10	6/14/2018 18:27
LITHIUM	20000		2300	UG/KG	10	6/14/2018 18:27
MOLYBDENUM	1800		230	UG/KG	10	6/14/2018 18:27
LEAD	17000		230	UG/KG	10	6/14/2018 18:27
ANTIMONY	240		120	UG/KG	10	6/14/2018 18:27
SELENIUM	1500		1200	UG/KG	10	6/14/2018 18:27
THALLIUM	210		12	UG/KG	10	6/14/2018 18:27
Ion Chromatography						
FLUORIDE	41	N	EPA300.0 1.2	MG/KG	1	Prep Date: 6/11/2018 PrepBy: HMA 6/11/2018 18:17
Mercury						
MERCURY	ND		SW7471 0.037	MG/KG	1	Prep Date: 6/12/2018 PrepBy: KJM 6/12/2018 17:48
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.88 (+/- 0.29)	LT	SOP 783 0.19	pCi/g	NA	Prep Date: 6/15/2018 PrepBy: LOW 6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 1-5	Lab ID:	1806129-2
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:10	Percent Moisture:	19.4

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.47 (+/- 0.4)	G	SOP 713 0.71	pCi/g	Prep Date: 6/12/2018 NA	PrepBy: MRL 6/18/2018 07:49
ICPMS Metals						
			SW6020		Prep Date: 6/12/2018	PrepBy: JML
ARSENIC	12000		250	UG/KG	10	6/14/2018 18:30
BORON	ND		19000	UG/KG	10	6/14/2018 18:30
BARIUM	94000		620	UG/KG	10	6/14/2018 18:30
BERYLLIUM	870		62	UG/KG	10	6/14/2018 18:30
CADMIUM	ND		250	UG/KG	10	6/14/2018 18:30
COBALT	10000		620	UG/KG	10	6/14/2018 18:30
CHROMIUM	17000		1200	UG/KG	10	6/14/2018 18:30
LITHIUM	23000		2500	UG/KG	10	6/14/2018 18:30
MOLYBDENUM	1600		250	UG/KG	10	6/14/2018 18:30
LEAD	23000		250	UG/KG	10	6/14/2018 18:30
ANTIMONY	350		120	UG/KG	10	6/14/2018 18:30
SELENIUM	2000		1200	UG/KG	10	6/14/2018 18:30
THALLIUM	230		12	UG/KG	10	6/14/2018 18:30
Ion Chromatography						
			EPA300.0		Prep Date: 6/11/2018	PrepBy: HMA
FLUORIDE	28		1.2	MG/KG	1	6/11/2018 19:31
Mercury						
			SW7471		Prep Date: 6/12/2018	PrepBy: KJM
MERCURY	0.043		0.037	MG/KG	1	6/12/2018 17:50
Radium-226 by Radon Emanation - Method 903.1						
			SOP 783		Prep Date: 6/15/2018	PrepBy: LOW
Ra-226	1.03 (+/- 0.31)		0.18	pCi/g	NA	6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 1-2	Lab ID:	1806129-3
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:05	Percent Moisture:	15.6

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	ND (+/- 0.65)	U	SOP 713 0.96	pCi/g	Prep Date: 6/12/2018 NA	PrepBy: MRL 6/18/2018 07:49
ICPMS Metals						
			SW6020		Prep Date: 6/12/2018	PrepBy: JML
ARSENIC	6400		240	UG/KG	10	6/14/2018 18:33
BORON	ND		18000	UG/KG	10	6/14/2018 18:33
BARIUM	46000		590	UG/KG	10	6/14/2018 18:33
BERYLLIUM	620		59	UG/KG	10	6/14/2018 18:33
CADMIUM	ND		240	UG/KG	10	6/14/2018 18:33
COBALT	8500		590	UG/KG	10	6/14/2018 18:33
CHROMIUM	16000		1200	UG/KG	10	6/14/2018 18:33
LITHIUM	19000		2400	UG/KG	10	6/14/2018 18:33
MOLYBDENUM	1500		240	UG/KG	10	6/14/2018 18:33
LEAD	15000		240	UG/KG	10	6/14/2018 18:33
ANTIMONY	200		120	UG/KG	10	6/14/2018 18:33
SELENIUM	1500		1200	UG/KG	10	6/14/2018 18:33
THALLIUM	190		12	UG/KG	10	6/14/2018 18:33
Ion Chromatography						
FLUORIDE	16		EPA300.0 1.1	MG/KG	Prep Date: 6/11/2018 1	PrepBy: HMA 6/11/2018 19:46
Mercury						
MERCURY	ND		SW7471 0.039	MG/KG	Prep Date: 6/12/2018 1	PrepBy: KJM 6/12/2018 17:52
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.57 (+/- 0.26)	LT	SOP 783 0.26	pCi/g	Prep Date: 6/15/2018 NA	PrepBy: LOW 6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 2-4	Lab ID:	1806129-4
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:20	Percent Moisture:	18.6

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.18 (+/- 0.75)	M3,TI	SOP 713 1.02	pCi/g	Prep Date: 6/12/2018 NA	PrepBy: MRL 6/18/2018 07:49
ICPMS Metals						
			SW6020		Prep Date: 6/12/2018	PrepBy: JML
ARSENIC	8900		250	UG/KG	10	6/14/2018 18:36
BORON	29000		18000	UG/KG	10	6/14/2018 18:36
BARIUM	170000		610	UG/KG	10	6/14/2018 18:36
BERYLLIUM	740		61	UG/KG	10	6/14/2018 18:36
CADMIUM	ND		250	UG/KG	10	6/14/2018 18:36
COBALT	11000		610	UG/KG	10	6/14/2018 18:36
CHROMIUM	19000		1200	UG/KG	10	6/14/2018 18:36
LITHIUM	20000		2500	UG/KG	10	6/14/2018 18:36
MOLYBDENUM	2800		250	UG/KG	10	6/14/2018 18:36
LEAD	18000		250	UG/KG	10	6/14/2018 18:36
ANTIMONY	290		120	UG/KG	10	6/14/2018 18:36
SELENIUM	2000		1200	UG/KG	10	6/14/2018 18:36
THALLIUM	220		12	UG/KG	10	6/14/2018 18:36
Ion Chromatography						
FLUORIDE	21		EPA300.0 1.2	MG/KG	Prep Date: 6/11/2018 1	PrepBy: HMA 6/11/2018 20:00
Mercury						
MERCURY	0.054		SW7471 0.037	MG/KG	Prep Date: 6/12/2018 1	PrepBy: KJM 6/12/2018 17:54
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.84 (+/- 0.27)	LT	SOP 783 0.18	pCi/g	Prep Date: 6/15/2018 NA	PrepBy: LOW 6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 2-1	Lab ID:	1806129-5
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:23	Percent Moisture:	17.8

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.29 (+/- 0.34)		SOP 713	0.52 pCi/g	NA	Prep Date: 6/12/2018 PrepBy: MRL 6/18/2018 08:26
ICPMS Metals						
ARSENIC	6800		SW6020	220 UG/KG	10	Prep Date: 6/12/2018 PrepBy: JML 6/14/2018 18:39
BORON	ND			17000 UG/KG	10	6/14/2018 18:39
BARIUM	120000			560 UG/KG	10	6/14/2018 18:39
BERYLLIUM	620			56 UG/KG	10	6/14/2018 18:39
CADMIUM	ND			220 UG/KG	10	6/14/2018 18:39
COBALT	8200			560 UG/KG	10	6/14/2018 18:39
CHROMIUM	18000			1100 UG/KG	10	6/14/2018 18:39
LITHIUM	19000			2200 UG/KG	10	6/14/2018 18:39
MOLYBDENUM	1900			220 UG/KG	10	6/14/2018 18:39
LEAD	16000			220 UG/KG	10	6/14/2018 18:39
ANTIMONY	210			110 UG/KG	10	6/14/2018 18:39
SELENIUM	1400			1100 UG/KG	10	6/14/2018 18:39
THALLIUM	200			11 UG/KG	10	6/14/2018 18:39
Ion Chromatography						
FLUORIDE	16		EPA300.0	1.2 MG/KG	1	Prep Date: 6/11/2018 PrepBy: HMA 6/11/2018 20:15
Mercury						
MERCURY	0.049		SW7471	0.04 MG/KG	1	Prep Date: 6/12/2018 PrepBy: KJM 6/13/2018 11:00
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.65 (+/- 0.23)	LT	SOP 783	0.17 pCi/g	NA	Prep Date: 6/15/2018 PrepBy: LOW 6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 2-5	Lab ID:	1806129-6
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:26	Percent Moisture:	15.2

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Gamma Spectroscopy Results						
Ra-228	1.2 (+/- 0.41)	G	SOP 713 0.83	pCi/g	Prep Date: 6/12/2018 NA	PrepBy: MRL 6/18/2018 08:26
ICPMS Metals						
			SW6020		Prep Date: 6/12/2018	PrepBy: JML
ARSENIC	9300		230	UG/KG	10	6/14/2018 18:42
BORON	ND		17000	UG/KG	10	6/14/2018 18:42
BARIUM	34000		580	UG/KG	10	6/14/2018 18:42
BERYLLIUM	680		58	UG/KG	10	6/14/2018 18:42
CADMIUM	ND		230	UG/KG	10	6/14/2018 18:42
COBALT	9200		580	UG/KG	10	6/14/2018 18:42
CHROMIUM	16000		1200	UG/KG	10	6/14/2018 18:42
LITHIUM	21000		2300	UG/KG	10	6/14/2018 18:42
MOLYBDENUM	2500		230	UG/KG	10	6/14/2018 18:42
LEAD	18000		230	UG/KG	10	6/14/2018 18:42
ANTIMONY	250		120	UG/KG	10	6/14/2018 18:42
SELENIUM	1400		1200	UG/KG	10	6/14/2018 18:42
THALLIUM	230		12	UG/KG	10	6/14/2018 18:42
Ion Chromatography						
			EPA300.0		Prep Date: 6/11/2018	PrepBy: HMA
FLUORIDE	36		1.2	MG/KG	1	6/11/2018 20:30
Mercury						
			SW7471		Prep Date: 6/12/2018	PrepBy: KJM
MERCURY	0.041		0.034	MG/KG	1	6/13/2018 11:02
Radium-226 by Radon Emanation - Method 903.1						
			SOP 783		Prep Date: 6/15/2018	PrepBy: LOW
Ra-226	0.8 (+/- 0.27)	LT	0.18	pCi/g	NA	6/21/2018 12:46

Client:	HDR	Date:	21-Jun-18
Project:	Xcel Valmont Ponds 3A & 3B	Work Order:	1806129
Sample ID:	TP 2-5	Lab ID:	1806129-6
Legal Location:		Matrix:	SOLID
Collection Date:	6/7/2018 13:26	Percent Moisture:	15.2

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
U or ND - Result is less than the sample specific MDC.	L - LCS Recovery below lower control limit.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	H - LCS Recovery above upper control limit.
Y2 - Chemical Yield outside default limits.	P - LCS, Matrix Spike Recovery within control limits.
W - DER is greater than Warning Limit of 1.42	N - Matrix Spike Recovery outside control limits
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	NC - Not Calculated for duplicate results less than 5 times MDC
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	B - Analyte concentration greater than MDC.
G - Sample density differs by more than 15% of LCS density.	B3 - Analyte concentration greater than MDC but less than Requested MDC.
D - DER is greater than Control Limit	
M - Requested MDC not met.	
LT - Result is less than requested MDC but greater than achieved MDC.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:

- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

ALS -- Fort Collins

Date: 6/21/2018 3:57:

Client: HDR

QC BATCH REPORT

Work Order: 1806129

Project: Xcel Valmont Ponds 3A & 3B

Batch ID: RE180615-2-1

Instrument ID Alpha Scin

Method: Radium-226 by Radon Emanation

DUP	Sample ID: 1806129-6				Units: pCi/g		Analysis Date: 6/21/2018 12:46				
Client ID: TP 2-5			Run ID: RE180615-2A			Prep Date: 6/15/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.91 (+/- 0.29)	0.14						0.8	0.3	2.1	LT

LCS	Sample ID: RE180615-2				Units: pCi/g		Analysis Date: 6/21/2018 13:26				
Client ID:	Run ID: RE180615-2A				Prep Date: 6/15/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	18.8 (+/- 3.7)	0.5	23.94		78.6	57-126					P

MB	Sample ID: RE180615-2				Units: pCi/g			Analysis Date: 6/21/2018 12:46				
Client ID:	Run ID: RE180615-2A							Prep Date: 6/15/2018		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual	
Ra-226	ND	0.22									U	

MS	Sample ID: 1806129-1				Units: pCi/g			Analysis Date: 6/21/2018 12:46			
Client ID: TP 1-1			Run ID: RE180615-2A			Prep Date: 6/15/2018			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	21.5 (+/- 4)	0.2	23.43	0.88	87.8	57-126					P

The following samples were analyzed in this batch:

1806129-1	1806129-2	1806129-3
1806129-4	1806129-5	1806129-6

Client: HDR
 Work Order: 1806129
 Project: Xcel Valmont Ponds 3A & 3B

QC BATCH REPORT

Batch ID: **GS180614-3-1** Instrument ID: **GAMMA** Method: **Gamma Spectroscopy Results**

DUP	Sample ID: 1806129-1			Units: pCi/g			Analysis Date: 6/18/2018 07:48				
Client ID: TP 1-1		Run ID: GS180614-3A			Prep Date: 6/12/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	1.1 (+/- 0.49)	0.98						0.9	0.3	2.1	G,TI

LCS	Sample ID: GS180614-3			Units: pCi/g		Analysis Date: 6/18/2018 08:26					
Client ID:	Run ID: GS180614-3A			Prep Date: 6/12/2018			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Am-241	1090 (+/- 130)	0	1011		108	85-115					P
Co-60	452 (+/- 53)	1	428.1		106	85-115					P
Cs-137	416 (+/- 49)	2	387		107	85-115					P

MB	Sample ID: GS180614-3				Units: pCi/g		Analysis Date: 6/18/2018 08:36				
Client ID:	Run ID: GS180614-3A				Prep Date: 6/12/2018			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-228	ND	0.58									U

The following samples were analyzed in this batch:

1806129-1	1806129-2	1806129-3
1806129-4	1806129-5	1806129-6

Client: HDR
Work Order: 1806129
Project: Xcel Valmont Ponds 3A & 3B

QC BATCH REPORT

Batch ID: **HG180612-2-1** Instrument ID **CETAC7500** Method: **SW7471**

LCS		Sample ID: HG180612-2		Units: MG/KG			Analysis Date: 6/12/2018 16:54				
Client ID:		Run ID: HG180612-2A1				Prep Date: 6/12/2018			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MERCURY	0.17	0.0333	0.167		102	80-120				20	

MB		Sample ID: HG180612-2		Units: MG/KG			Analysis Date: 6/12/2018 16:52				
Client ID:		Run ID: HG180612-2A1				Prep Date: 6/12/2018			DF: 1		
Analyte	Result	ReportLimit									Qual
MERCURY	ND	0.033									

The following samples were analyzed in this batch:

1806129-1	1806129-2	1806129-3
1806129-4		

Client: HDR
Work Order: 1806129
Project: Xcel Valmont Ponds 3A & 3B

QC BATCH REPORT

Batch ID: **HG180612-3-1** Instrument ID **CETAC7500** Method: **SW7471**

LCS		Sample ID: HG180612-3		Units: MG/KG			Analysis Date: 6/13/2018 10:09				
Client ID:		Run ID: HG180613-1A1				Prep Date: 6/12/2018			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MERCURY	0.17	0.0333	0.167		102	80-120				20	

MB		Sample ID: HG180612-3		Units: MG/KG			Analysis Date: 6/13/2018 10:06				
Client ID:		Run ID: HG180613-1A1				Prep Date: 6/12/2018			DF: 1		
Analyte	Result	ReportLimit									Qual
MERCURY	ND	0.033									

The following samples were analyzed in this batch:

1806129-5	1806129-6
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Client: HDR
 Work Order: 1806129
 Project: Xcel Valmont Ponds 3A & 3B

QC BATCH REPORT

Batch ID: **IP180612-5-2** Instrument ID **ICPMS2** Method: **SW6020**

LCS		Sample ID: IM180612-5			Units: UG/KG		Analysis Date: 6/14/2018 16:49				
Client ID:		Run ID: IM180614-10A7				Prep Date: 6/12/2018			DF: 10		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
ANTIMONY	3020	100	3000		101	80-120				20	
ARSENIC	10300	200	10000		103	80-120				20	
BARIUM	9780	500	10000		98	80-120				20	
BERYLLIUM	5400	50	5000		108	80-120				20	
BORON	98100	15000	100000		98	80-120				20	
CADMIUM	3230	200	3000		108	80-120				20	
CHROMIUM	52200	1000	50000		104	80-120				20	
COBALT	10500	500	10000		105	80-120				20	
LEAD	4930	200	5000		99	80-120				20	
LITHIUM	104000	2000	100000		104	80-120				20	
MOLYBDENUM	9920	200	10000		99	80-120				20	
SELENIUM	10500	1000	10000		105	80-120				20	
THALLIUM	217	10	200		109	80-120				20	

MB		Sample ID: IP180612-5		Units: UG/KG		Analysis Date: 6/14/2018 16:46	
Client ID:		Run ID: IM180614-10A7		Prep Date: 6/12/2018		DF: 10	
Analyte	Result	ReportLimit					Qual
ANTIMONY	ND	100					
ARSENIC	ND	200					
BARIUM	ND	500					
BERYLLIUM	ND	50					
BORON	ND	15000					
CADMIUM	ND	200					
CHROMIUM	ND	1000					
COBALT	ND	500					
LEAD	ND	200					
LITHIUM	ND	2000					
MOLYBDENUM	ND	200					
SELENIUM	ND	1000					
THALLIUM	ND	10					

The following samples were analyzed in this batch:

1806129-1	1806129-2	1806129-3
1806129-4	1806129-5	1806129-6

Client: HDR
 Work Order: 1806129
 Project: Xcel Valmont Ponds 3A & 3B

QC BATCH REPORT

Batch ID: **IC180611-2-1** Instrument ID **IC3** Method: **EPA300.0**

LCS	Sample ID: IC180611-2				Units: MG/KG		Analysis Date: 6/11/2018 17:47				
Client ID:	Run ID: IC180611-1A1				Prep Date: 6/11/2018			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
FLUORIDE	22.1	1	20		111	85-115				30	

MB	Sample ID: IC180611-2			Units: MG/KG	Analysis Date: 6/11/2018 17:32		
Client ID:	Run ID: IC180611-1A1			Prep Date: 6/11/2018		DF: 1	
Analyte	Result	ReportLimit	Qual				
FLUORIDE	ND	1					

MS		Sample ID: 1806129-1				Units: MG/KG		Analysis Date: 6/11/2018 18:32			
Client ID: TP 1-1		Run ID: IC180611-1A1				Prep Date: 6/11/2018		DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
FLUORIDE	58.8	1.2	23.9	41	74	85-115				30	N

MSD	Sample ID: 1806129-1				Units: MG/KG			Analysis Date: 6/11/2018 18:46			
Client ID: TP 1-1			Run ID: IC180611-1A1			Prep Date: 6/11/2018			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
FLUORIDE	59.4	1.21	24.2	41	76	85-115		58.8	1	30	N

The following samples were analyzed in this batch:

1806129-1	1806129-2	1806129-3
1806129-4	1806129-5	1806129-6

TECHNICAL BULLETIN ADDENDUM

The library used for analysis defines the gamma emission(s) to be used for analysis of each nuclide. If multiple gamma emissions are used for quantification, then a 'NET' quantification emission (or peak) must be defined in the library. This designation provides for the calculation of nuclide activity concentrations and detection limits in the case of non-presence of the nuclide. When the nuclide is not present, or the software is unable to resolve a peak at the library defined 'NET' energy, the software evaluates the 'NET' region of interest ('NET' peak energy ± 2 keV) by performing a summation of the net counts above the background level. This 'NET' quantification can result in net negative, zero, or positive activity results, and is highly dependent on the spectral distribution in the region of interest of the 'NET' peak. In cases where only the 'NET' peak is found, and the software performs a net quantification, the nuclide result will be flagged with an 'NQ' qualifier on the final reports. This indicates that the nuclide is not detected or supported at any level above the reported MDC. Results are submitted without further qualification.

All nuclides specified in the library of analysis for gamma spectroscopy are evaluated for positive OR tentative identification on the following criteria:

- The individual abundances for the gamma emissions specified for each nuclide are summed to obtain a total nuclide abundance.
- From the total nuclide abundance, a positive identification criterion is set as 75% of this total nuclide abundance.
- For all nuclide peaks that are not net quantified, those peak abundances are summed. The total non-net quantified peak sum is compared to the calculated 75% abundance criterion. If this sum is greater than the 75% criterion, the nuclide is considered to be positively identified at the reported concentration. If the sum is less than the 75% criterion, the nuclide is tentatively identified at the reported concentration. These results will be flagged with a 'TI' qualifier on the final reports to indicate that the 75% abundance criterion was not met.