

APPENDIX C

Data Reviews

MEMORANDUM

TO: Jenifer Patureau, PM

FROM: Amy Gray

DATE: 7/13/12

SUBJECT: Laramie Yttrium Plant (36549132/ TDD# 1107-08) SDG # 91314 Data Review

Purpose: This memo is a response to your request for a review of the data associated with the Laramie Yttrium Plant Project (36549132/TDD#1107-08).

Analyses: VOCs, SVOCs, GROs, & DROs

Summary: The data are acceptable for their intended use with associated qualifiers applied by the laboratory. Bias in the data due to matrix interference and other issues is summarized below.

Discussion: Thirty-three soil and nine water samples and a trip blank collected between June 4 and June 6, 2012 were submitted to CT Laboratories in Baraboo, WI for the analyses reported below. The samples were shipped on June 8 and received by the laboratory on June 9, 2012. The samples were received intact and at a temperature within method specified acceptance limits. Exceptions are noted below. The COCs did not have sample collection times on them, but were added to the COCs by the laboratory upon login using the sample times listed on the sample containers. Only issues where the results may have been affected are discussed below with an explanation of the qualifiers assigned by the laboratory. No new qualifiers were applied. A general review of the data was conducted including a review of the quality control data and explanation of the laboratory qualifiers in addition to a review of the sample target analyte peak integrations.

Volatile Organic Compounds (VOCs) – EPA Method 8260B

Water Samples

Initial Calibration:

The lowest calibration standard (50 µg/L) was dropped from the initial calibration curve for water samples included in analytical run # 85257 to maintain linearity.

Calibration Verifications:

Initial Calibration Verification 1 (ICV1) had a high percent recovery for bromomethane which was not detected in any of the associated samples.

Matrix Spikes:

Both the MS and MDS had low percent recoveries of hexachlorobutadiene. As a result the parent sample (173428) was qualified “M” by the laboratory. The Relative Percent Difference (RPD) for 1,2,4-Trimethylbenzene and hexachlorobutadiene. The parent sample (173428) was qualified “Y” by the laboratory.

Soil Samples

Matrix Spikes:

The RPD for o-Xylene in the spikes was too great. As a result the original sample LYSSWC01 was qualified “Y” by the laboratory.

Gasoline Range Organics (GROs) – EPA Method 8015

Water and Soil Samples

Manual Integrations:

Manual integrations were done on several of the samples because the data system split the peak incorrectly or integrated a false peak as a rider peak. Commonly at low concentrations where the signal to noise ratio is low a single peak is incorrectly split into multiple peaks or integrated as a group of peaks resulting in a biased area count and corresponding concentration.

All other project and method specific QC criteria were met for the target compounds.

Semivolatile Organic Compounds (SVOCs) – EPA Method 8270C

Water Samples

Continuing Calibration Verification:

CCV94 had a low percent recovery for benzidine and was qualified “Z” by the laboratory.

Blanks

Target analyte Bis(2-ethylhexyl)phthalate was detected in method blank (180764) and was confirmed by re-analysis. Detections for Bis(2-ethylhexyl)phthalate in all associated samples were qualified “B” by the laboratory.

Laboratory Control Sample (LCS):

LCSW /180765 had a low percent recovery of Pyridine which was confirmed by reanalysis. Pyridine was qualified “Q” in the associated samples by the laboratory.

Matrix Spikes:

Sample LYMW04 was used as the water MS/MSD. Low recoveries were observed in the matrix spike for Benzidine, 3,3'-Dichlorobenzidine, 4-Chloroaniline, Aniline, and Benzoic Acid. In the matrix spike duplicate low percent recoveries were observed for 3,3'-Dichlorobenzidine, Phenol, and Benzoic acid. High spike recoveries were observed in both the matrix spike and matrix spike duplicate for Acetophenone. Parent sample LYMW04 was qualified “M” by the laboratory for target analytes with spike recoveries outside QC limits. The RPD for the spiked amounts of 4-Chloroaniline was high and qualified “Y” by the laboratory as a result.

Soil Samples

Matrix Spikes:

There were two (Matrix Spike/Matrix Spike Duplicate) MS/MSDs associated with the soil samples included in this review. The first matrix spikes associated with analytical run #85520 were performed on sample LYSOA04. Spike recoveries outside QC limits that were detected in the samples are in italics. Matrix spike recoveries were low for 3,3'-Dichlorobenzidine, *Benzidine*, Aniline, 4-Chloroaniline, *2,4-Dinitrophenol*, *Pyridine*, and 4-Nitrophenol. The matrix spike duplicate recoveries were low for the same target analytes in addition to *Phenanthrene* and *Pyrene*. Both the matrix spike and the matrix spike duplicate had a high percent recovery for 4,6-Dinitro-2-methylphenol. The relative percent difference (RPD) was also too high for 4,6-Dinitrophenol. The recoveries were confirmed by reanalysis and sample LYSOA04 was qualified "V" by the laboratory. The same matrix interference is likely to exist in all like samples and results for these target analytes should be considered estimated for all similar samples.

The second MS/MSD associated with analytical run # 85521 was performed on soil sample LYSOC05. Spike recoveries outside QC limits that were detected in the samples are in italics. Matrix spike recoveries were low for nine target analytes including *2,4-Dinitrophenol*, 3,3'-Dichlorobenzidine, 4,6-Dinitro-2-methylphenol, 4-Chloroaniline, 4-Nitrophenol, Aniline, Benzidine, Pyridine, 3-Nitroaniline. Matrix spike recoveries were high for 4 target analytes including *Benzo(a)anthracene*, *Dibenzo(a,h)anthracene*, *Phenanthrene*, and *Pyrene*. Recoveries were confirmed by re-analysis and were qualified "M" on sample LYSOC05 by the laboratory.

Low recoveries were observed for 15 target analytes in the matrix spike duplicate including *2,4-Dinitrophenol*, 3,3'-Dichlorobenzidine, 4,6-Dinitro-2-methylphenol, 4-Chloroaniline, 4-Nitrophenol, Aniline, Benzidine, *Benzo(g,h,i)perylene*, *Carbazole*, *Dibenzo(a,h)anthracene*, *Indeno(1,2,3-cd)perylene*, N-Nitroso-di-n-propylamine, *Phenanthrene*, *Pyridine*. Recoveries were confirmed by re-analysis and were qualified "M" on sample LYSOC05 by the laboratory.

The RPD for N-Nitroso-di-n-propylamine, 4-nitroaniline, and carbazole were qualified "Y" by the laboratory in parent sample LYSOC05.

Dilutions, Sample Prep, and Surrogate Recoveries:

The extract for sample LYSOC05 could only be concentrated to a volume of 5 mL. Sample LYSOA01 was analyzed at a 1:5 dilution and all other samples were analyzed at a 1:10 dilution due to matrix interference. As a result the samples were qualified "V" by the laboratory. Many of the surrogates were diluted out and were therefore qualified "D" by the laboratory.

Manual Integrations

Several peaks were manually integrated due to coelution of peaks.

Diesel Range Organics (DROs) – EPA Method 8015

Water

All method and project specified quality control criteria were met.

Soil

Matrix Spike and Dilutions:

Soil Sample LYSSWC01 was used as the MS/MSD and was analyzed at a 1:5 dilution due to the presence of a diesel pattern above the calibration range. A low percent recovery was observed for DRO and as a result DRO in parent soil sample LYSSWC01 was qualified "M."

Action: None. Qualifiers applied by the laboratory were used.

cc: File/ UOS

URS OPERATING SERVICES, INC.
START3 - REGION 8

MEMORANDUM

TO: Jenifer Patureau

FROM: Kim Ohlson

DATE: July 9, 2012

SUBJECT: Laramie Yttrium Plant Data Review

<i>Purpose:</i>	This memo is a response to your request for a review of the data associated with the Laramie Yttrium Plant.
<i>Summary:</i>	The data are acceptable with further qualification for their intended use.
<i>Discussion:</i>	<p>All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.</p> <p>All samples related to SDG #91468 were analyzed at CT laboratories between 6/18/2012 and 6/21/2012. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable. All quality control criteria were met, except for the following anomalies were observed:</p> <p><u>Blank Contamination:</u> The soil method blank contained positive contamination for metals. Aluminum, calcium, iron, magnesium, manganese, potassium, selenium, and zinc were positive blank contaminants and potentially biased the aluminum, calcium, iron, magnesium, manganese, potassium, selenium, and zinc results in several samples to be high.</p> <p><u>Continuing Calibration Check Issues:</u> Several continuing calibration check recoveries were outside of the QC limits. The following metal recoveries were greater than the QC limits and biased several of the following metal results high: aluminum, cadmium, nickel, selenium, silver and zinc.</p> <p><u>Matrix Spike Issues:</u> There were multiple problems associated with the soil matrix spike. Manganese recovery was above the QC limit. There was a post spike analyzed for manganese and the recovery was acceptable. The mercury matrix spike and post spike recoveries were below the QC limits. The matrix spike duplicate recovery was within QC limits. The relative percent differences were outside of the QC limits for aluminum, calcium, iron, manganese, and mercury. These problems may indicate matrix interference for aluminum, calcium, iron, manganese, and mercury. Sample results associated with these metals should be considered an estimated value.</p> <p><u>Serial Dilution Issue:</u> Antimony, arsenic, manganese, and zinc percent differences between the original sample and the five fold serial dilution sample</p>

	result was greater than 10%. This may indicate matrix interference for antimony, arsenic, manganese, and zinc; and the sample results should be considered an estimated value.
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Action:

Data are to be used with “J” qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist. Sample results for aluminum, cadmium, calcium, iron, magnesium, manganese, nickel, potassium, selenium, silver, and zinc are potentially biased high based on blank contamination and/or continuing calibration check issues. Sample results for aluminum, antimony, arsenic, calcium, iron, manganese, mercury, and zinc are considered estimated values based on matrix spike and/or serial dilution issues.

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<i>Summary:</i>	The data are acceptable with further qualification for their intended use.
<i>Discussion:</i>	<p>All laboratory data were reviewed by a UOS chemist and found to be acceptable for the use intended.</p> <p>All samples related to SDG #91314 were analyzed at CT Laboratories between 6/12/2012 and 6/14/2012. The data were reviewed for completeness and compliance with EPA-SW846 requirements and found to be acceptable. All quality control criteria were met, except for the following anomalies were observed:</p> <p>METALS ANALYSIS</p> <p><u>Blank Contamination:</u> Several continuing calibration blanks and the method blank for water samples contained both positive and negative contamination for metals. Barium, cadmium, magnesium, potassium, and selenium were positive blank contaminants and potentially biased the barium, cadmium, magnesium, potassium, and selenium results in several samples to be high. The antimony, arsenic, chromium, lead, and silver concentrations in several samples are biased low because of negative blank contamination.</p> <p>The method blank for the TCLP metal sample contained both positive and negative contamination. Arsenic, barium, cadmium, chromium, selenium, and silver were positive blank contaminants and potentially biased the results for arsenic, barium, cadmium, chromium, selenium, and silver in the TCLP sample to be high. The lead concentration in the TCLP sample is biased low because of negative blank contamination.</p> <p><u>Check Sample Interferences:</u> Thallium appeared to have low recovery in the interference check sample and resulted in a low bias for the thallium results for the water samples.</p> <p><u>Matrix Spike Issues:</u> There were multiple problems associated with the water matrix spike. Copper, magnesium, and zinc percent recoveries were above the QC limit for spike sample LYMW04. There was a post spike analyzed for</p>

copper, magnesium, and zinc and the recoveries for copper and magnesium were also above the QC limit. The zinc post digestion recovery was within the QC limits. The mercury recovery for TCLP sample LYSSWC01 was below the QC limits in Run# 85285. These problems may indicate matrix interference for copper, magnesium and mercury. The sample results associated with these metals should be considered an estimated value.

Serial Dilution Issue: Aluminum, barium, calcium, chromium, copper, iron, magnesium, vanadium, and zinc percent difference between the original sample and the five fold serial dilution sample result was greater than 10%. This may indicate matrix interference for aluminum, barium, calcium, chromium, copper, iron, magnesium, vanadium, and zinc and the associated sample results should be considered an estimated value.

TOTAL ORGANIC CARBON ANALYSIS

No issues were identified and data is acceptable.

Action:

Data are to be used with qualifiers attached by laboratory and the suggestions mentioned above from the UOS chemist. Water sample results for barium, cadmium, magnesium, potassium, and selenium are potentially biased high based on blank contamination. Water sample results for arsenic, chromium, lead, silver, and thallium are potentially biased low based on blank contamination and/or check sample interference. Water sample results for aluminum, barium, calcium, chromium, copper, iron, magnesium, vanadium, and zinc are considered estimated values based on matrix spike and/or serial dilution issues. The TCLP results for arsenic, barium, cadmium, chromium, selenium, and silver are potentially biased high and the lead results are biased low based on blank contamination. The mercury results in the TCLP sample should be considered to be an estimate based on matrix spike issues.