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Wellington Prep Plant- Refuse Analysis

1 message

Steve Christensen < stevechristensen@utah.gov> Wed, Apr 30, 2014 at 5:36 PM
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Cc: Don Verbica <dverbica@utah.gov>, Daron Haddock <daronhaddock@utah.gov>, OGMCOAL DNR <ogmcoal@utah.gov>

Otis,

Thanks for taking the time to talk with me this afternoon. As we discussed, I've attached Eric Peterson's report/analysis of the refuse material located at the Wellington Prep Plant in Carbon County.

We look forward to discussing this issue with you on May 7th. As I indicated on the phone, it's important that we're (i.e. DEQ and DOGM) all in agreement with the assessment of this refuse material as there are many, many more sites with material similar to this.

Thanks again for your help. Unless I hear differently, we'll plan on seeing you May 7th at 10:30 a.m at your office.

Regards,
Steve

--
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Investigation of the Chemical Characteristics of Material in The Coarse Refuse Pile at the Price River Terminal, LLC Wellington Prep Plant, Carbon County, Utah

31 March 2014

Price River Terminal, LLC
Wellington, Utah

PETERSEN HYDROLOGIC, LLC
CONSULTANTS IN HYDROGEOLOGY

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31 March 2014

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Wellington, Utah

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1.0 Introduction

The Price River Terminal Wellington Prep Plant is located about one mile southeast of the town of Wellington, Utah (Figure 1). The facility is situated near the Union Pacific (formerly Denver and Rio Grande Western Railroad) line adjacent to the Price River. Price River Terminal, LLC (PRT) proposes to utilize on-site material contained within the Coarse Refuse Pile as base/fill material for the construction of additional lengths of railroad track at the Wellington Prep Plant site.

The purpose of this investigation is to evaluate the chemical characteristics of the material present in the Coarse Refuse Pile. The specific objectives are to determine 1) whether the material in the pile would be considered hazardous waste based on RCRA-8 analytical parameters and 2) whether the use of this material as base/fill for the proposed railroad tracks would be likely to cause contamination of groundwaters or surface waters.

2.0 Overview of Operations at the Wellington Prep Plant

The Wellington Prep Plant was constructed by United States Steel Corporation in 1958 for the purpose of cleaning and processing coal. The facility received coal shipments from several mines in Utah and Colorado for processing. Historically, as part of the cleaning process, a cleaned coal product and a reject product was produced. The cleaned coal was shipped by rail to the Geneva Steel Works near Orem, Utah. The reject material was retained at the site. The coarse fraction of the reject material from the cleaning process was trucked to the facility's Coarse Refuse Pile (Figure 2).

In February 1986 the Wellington Prep Plant facility was acquired by Kaiser Coal Corp (although the plant was never activated by Kaiser). The facility was purchased by Genwal Coal Company in 1989, which operated the facility as a coal loadout beginning in late 1989. Subsequently, the ownership was transferred to Castle Valley Resources, then to Nevada Electric Investment Company (NEICO) in 1994. A portion of the facility was leased by Covol Technologies, Inc. from 1997-1999 to mine coal fines from the slurry ponds located east of the Price River. Most of the Wellington Prep Plant facilities were demolished in 1997 and further reclamation activities were conducted from 2002-2004. The site was acquired by its current owners Price River Terminal, LLC (PRT) in November, 2013.

The Wellington Prep Plant site had been idle in recent years until it was acquired by PRT in 2013. Currently, PRT is performing crude oil transfer activities (truck to rail) at the site. PRT is also performing reclamation activities at the site. As part of the future development planned for the site, PRT plans to construct additional lengths of railroad track at the facility. PRT has proposed to utilize the material contained in the existing Coarse Refuse Pile as base/fill material for the proposed new railroad tracks at the site.

3.0 Methods of Study

- Existing information regarding the characteristics of the Coarse Refuse Pile was obtained and reviewed.
- We coordinated with personnel from the Utah Division of Solid and Hazardous Waste and the Utah Division of Oil, Gas and Mining regarding investigative methodologies and applicable regulatory issues.
- The Coarse Refuse Pile was traversed and observed on 3 February 2014. During this site visit, six locations distributed over the pile's extent were selected for chemical sampling (Figure 3). The geographic locations of the sampling points were determined in the field using a hand-held GPS (Table 1).

- On 4 February 2014, a total of 13 composite samples of material from the Coarse Refuse Pile were collected for chemical analysis from the six sampling locations. The sample collection procedure was as follows:

  1. At each sampling location, material was excavated from the pile using a track-hoe (Photograph 5). Using the track-hoe, a bucket load of material extracted from the entire indicated depth interval was removed from the excavation and placed on the adjacent ground surface (Photograph 6). Each sampled interval encompassed a vertical interval of 6 feet.
  2. The excavated material from the bucket dump was then inspected in the field (Photograph 7) and a general determination of the dominant lithologic composition and material size distribution of the material was made by Erik Petersen, P.G. and Bob Long, CPSS.
  3. Based on the determination of lithologic compositions and estimated material size and type distributions, a representative composite sample was assembled from the material in the bucket dump. The materials included in the composite samples included materials from the different lithologic types and particle sizes in roughly the same proportions as those visually identified overall in the bucket dump. Using this technique, a composite sample could be assembled such that it would be statistically representative of the materials present in the sampled interval in the pile. The composite sample volumes were approximately 2.5 gallons per sample.
  4. The samples were placed in sealed plastic buckets (Photograph 8) and delivered to Inter-Mountain Labs of Sheridan, Wyoming for analysis.
  5. Laboratory analytical parameters for the analysis of the Coarse Refuse Pile samples were selected based on EPA RCRA-8 metals hazardous waste classification criteria. Additional parameters were selected to assist in the evaluation of the potential for impacts to groundwater and surface-water systems.

4.0 Presentation of Data

Coarse Refuse Pile sampling locations are provided in Table 1. The results of laboratory analyses of the Coarse Refuse Pile samples are presented in Table 2. Sampling locations are shown on Figure 3. A summary of the RCRA metals potential hazardous waste classification determination is presented in Table 3. Laboratory reporting sheets are provided in Appendix A. Information pertaining to the EPA TCLP method is provided in Appendix B.

5.0 Coarse Refuse Pile Physical Characteristics

The long axis of the Coarse Refuse Pile trends in a northwest to southeast direction and is about 1,400 feet in length (Figure 2). The width is variable and ranges from about 300 to 400 feet. The footprint of the pile encompasses approximately 10.0 acres. The surface topography of the Coarse Refuse Pile is somewhat irregular. The height of the pile has not been measured, but based on visual observations it was estimated to be in the range of about 20 to 40 feet in most locations.

Where exposed at the pile surface, the material consists predominantly of light to medium gray or brown siltstone with lesser amounts of claystone, shale, sandstone, and coal. The rocks in the Coarse Refuse Pile appear to be similar to rocks commonly associated with Cretaceous coal deposits in Utah and Colorado (roof rock, floor rock, and coal seam splits). It is such material that would likely have been present in the coal shipments brought to the prep plant facility for cleaning. Fine-grained materials consisting predominantly of silt, clay, and fine-grained sand particles are also present in the voids between the rocks in the Coarse Refuse Pile (See photographs section). Field estimates of the relative percentages of rock pieces and soil-sized particles present in the excavated bucket dumps indicated that the materials were dominated by the rock fraction. The average proportion estimated for the 13 sampled intervals was 70% rock and 30% fine-grained sediments. The estimated rock percentage for the 13 sampled intervals ranged from about 50% to 85%. Very minor amounts (<<1%) of other miscellaneous materials including pieces of concrete blocks, metal pieces, and various other debris were also observed in

some locations. When such materials were encountered in the sampled intervals, pieces of these materials were included in the composite sample for chemical analysis.

When the material was excavated from the Coarse Refuse Pile for sampling, the composition of the buried material was found to be similar to that observed at the surface, except the excavated rocks and sediments were found to be generally dark gray or black in color. The dark color of the excavated material results primarily from the presence of coal fines and/or dark sediments coating individual rock pieces. The material excavated from the pile was dry (or damp) in all instances. No liquid water or other liquids were encountered in any of the sampled materials.

It is noted that a sample for physical and chemical analysis was collected from the Coarse Refuse Pile during the early 1980s (U.S. Steel Corporation, 1983). The results of that analysis indicate that the sample was comprised of 83.5% gravel sized pieces, 12.5% silt, 2.5% sand, 1.5% clay, and <0.01% coal. Field observations indicated that the material consisted predominantly of 2- to 4-inch shale pieces.

6.0 Coarse Refuse Pile Chemical Characteristics

It should be emphasized here that the material in the Coarse Refuse Pile is not intended for use as soil growth medium, or reclamation material. Rather, its intended use is as base/fill material for placement beneath or adjacent to a proposed railroad track line. Typically, it is desirable that vegetative growth does not occur along a railroad track. Accordingly, the analysis presented herein is intended to determine whether the material in the Coarse Refuse Pile should be considered as hazardous waste (which would limit is potential for use) or whether its use could result in contamination of adjacent groundwater or surface-water systems. The information presented here does not constitute an engineering analysis regarding the physical or structural suitability of the material for its proposed use in the track construction.

As indicated in Table 1, samples of coarse refuse were analyzed at the laboratory for acid/base accounting, leachate chemical characteristics, and total metals analysis. These are discussed below.

6.1 *Acid/Base Accounting*

The acid/base accounting was performed to determine whether waters that come into contact with the sampled coarse refuse material will have the tendency to become acidic or alkaline. The total sulfur content of all samples is low (≤0.63%). For each of the individual samples analyzed, the neutralization potential exceeds the acid potential by at least 3.28 times. The average neutralization potential value for all samples is more than 8 times the acid potential. Experience indicates that where the neutralization potential is more than three times the acid potential there is a lower risk of acid drainage to develop and further kinetic testing of the material is not required (EPA, 1994). These factors indicate that acid rock drainage should not be a concern for the coarse refuse material.

6.2 Leachate Chemical Characteristics

As part of the laboratory analysis of the 13 samples from the Coarse Refuse Pile, concentrations of the leachable chemical analysis of leachate water was performed (Table 1).

The pH values determined in the laboratory analyses for the 13 samples are all alkaline, with an average value of 8.0 (ranging from 7.5 to 9.2).

The specific conductance values averaged 2.95 dS/m and ranged from 0.89 to 4.38 dS/m (note that 1 dS/m = 1000 µS/cm). By comparison, the groundwaters monitored during December 2013 at 7 monitoring wells at the Wellington Prep Plant west of the Price River ranged from 3.15 to 16.4 dS/m, averaging 9.59 dS/m. Water in the Price River monitored during 2013 ranged from 1.10 to 2.67 dS/m (UDOGM, 2014). The amount of precipitation surface-water runoff that could drain from the proposed new lengths of railroad track area (a low-lying desert area) into the Price River represents an extremely small percentage of the total runoff that drains into the Price River over its more than 1,000 square miles of drainage area. Consequently, any potential impacts to water quality in the Price River that could occur as a result of the runoff of precipitation waters

that have interacted with the base/fill material beneath the new tracks into the Price River (at the anticipated salinity levels) would be exceedingly small.

The Sodium Adsorption Ratio (SAR) is one measure of the suitability of water for use in agricultural irrigation. It is a unitless parameter that is determined based on the calcium, magnesium, and sodium concentrations of the water. An elevated SAR is indicative of elevated sodium concentrations relative to calcium and magnesium. SARs determined for the 13 Coarse Refuse Pile samples ranged from 6.4 to 27.2 and averaged 14.5. As indicated above, the material present in the Coarse Refuse Pile is not proposed for use as a soil or growth medium.

Water extractable boron concentrations measured in the 13 samples range from 1.23 to 2.87 mg/L, averaging 1.77 mg/L. Water extractable selenium concentrations range from 0.04 to 0.23 mg/L, averaging 0.08 mg/L.

6.3 Total Metals Characteristics

The thirteen samples from the Coarse Refuse Pile were analyzed for the total metals concentrations for the eight RCRA metals. These metals include arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury (Table 2). These specific metals were selected for laboratory analysis because of their potential to be sources of groundwater or surface-water contamination and to facilitate a TCLP analysis to determine whether the solid material in the pile would be classified as hazardous waste according to the standard EPA procedure for the RCRA-8 metals.

It should be noted that the reported total metals concentrations listed below are indicative of the total recoverable quantity of the metal that is present in the bulk composition of the sample (i.e. the amount that can be extracted from the sample under strong acid digestion). This is not a direct measurement of the quantity of the metal that would leach from the material under typical environmental conditions.

The results of the total metals laboratory analyses are summarized below:

Metal	**Average value (mg/kg)**	**Maximum value (mg/kg)**	**Minimum value (mg/kg)**
Arsenic (total)	9.8	18.3	5.2
Barium (total)	320	422	275
Cadmium (total)	0.68	0.99	0.48
Chromium (total)	5.21	7.80	2.40
Lead (total)	27	129	13.7
Selenium (total)	<2.25	2.9	<2.2
Silver (total)	<0.5	<0.5	<0.5
Mercury (total)	<0.2	<0.2	<0.2

Based on the information presented above, it is considered unlikely that the use of material from the Coarse Refuse Pile as a base/fill material beneath the proposed railroad tracks would cause significant impacts to the water quality of groundwater or surface-water systems. It is anticipated that precipitation waters that may potentially drain from the placed base/fill material will not be acidic (acid rock drainage will not occur). Near neutral to moderately alkaline drainage would be anticipated. The salinity (specific conductance) of precipitation water that could potentially drain from the track area after interacting with the base/fill will likely be similar to that already present in the region of the prep plant site. Based on the measured concentrations of metals in the proposed base/fill material, discharge of water with elevated concentrations of these metals is not considered likely.

6.4 RCRA-8 Toxicity Characteristic Leaching Procedure (TCLP)

The EPA has established a specific Toxicity Characteristics Leaching Procedure (TCLP) to evaluate the potential for toxic substances to leach from various materials. Specifically, the TCLP procedure as described in EPA Method 1311 is designed to determine the mobility of organic and inorganic analytes present in liquid, solid, and multiphasic wastes.

For this investigation, the 13 composite samples were analyzed at the laboratory for the RCRA-8 metals in "total metals" form rather than leachable forms as outlined in Method 1311. It is a common practice to perform total metals analysis in the initial stages of a TCLP investigation as an initial screening technique to determine whether further TCLP analysis is required. (Generally, the laboratory analysis for total metals is a simpler technique than is the full TCLP extraction process as detailed in EPA Method 1311).

As stated in Section 1.2 of EPA Method 1311:

> *"If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run."*

In order to determine whether the total metals concentrations are "at such low concentrations that the appropriate regulatory levels could not possibly be exceeded", it is a common practice to utilize a technique of dividing the measured total metals concentrations results by 20 and then comparing these calculated values with the regulatory standard. For 100% solid materials (no liquid phase), if the values obtained by dividing the laboratory total metals results by 20 are lower than the applicable regulatory standards, then the results that would be obtained from the TCLP analysis (if that analysis were to be performed) could not possibly exceed the applicable regulatory standards. The reason for this is that the TCLP procedure as outlined in Method 1311 specifies that as part of the analytical procedure the material being tested is diluted 1:20 with water. Thus, assuming that all of the metal present in the sample was completely soluble in the water, then the maximum possible concentration of that metal in the aqueous sample could be at most one twentieth of the value of the total metals concentration. Thus, for any solid constituent, if the "total" constituent result divided by 20 is lower than the applicable standard, then it is not mathematically possible for that constituent to exceed the regulatory standard. Note that the total metals laboratory analyses are generally reported in a milligrams per kilogram unit, while the regulatory standards from the TCLP procedure are generally expressed in milligrams per liter units. As noted above, the milligrams per liter units for the regulatory standards are utilized because the TCLP analysis results in an aqueous solution in which the leached metals

constituents are dissolved (See Appendix B for additional information). As specified in Section 1.2 of EPA Method 1311, if the total constituent results are so low that the applicable regulatory limits could not possibly be obtained using the TCLP method, the full TCLP analysis need not be run.

The results of the TCLP investigation (screening) for the Coarse Refuse Pile samples are presented in Table 3. It is immediately apparent from Table 3 that the results of the total metals concentration values for all of the RCRA-8 metals divided by 20 are generally many times lower than the regulatory limits. Taken as a whole, the average TCLP total-metals-divided-by-20 values are at least 3.7 times lower than the regulatory standards for all of the RCRA-8 metals investigated. As discussed above, these factors indicate that if that if the full TLCP analysis were to be run on these samples, the TLCP results could not exceed the regulatory limits. Accordingly, the full TCLP analysis has not been run on these samples. This information clearly indicates that taken as a whole the material is not considered as hazardous waste based on the RCRA-8 metals analysis. Similarly, when the material sampled at each of the six monitoring locations are considered individually, the TCLP total-metals-divided-by-20 values are several times below the regulatory limits for all of the RCRA-8 metals, indicating that the material is not hazardous waste.

It is noteworthy that of all the 104 total metals analyses performed in this investigation, there was only one analytical result from one sampled interval for one of the RCRA-8 metals that was not at least 3.75 times lower than the associated regulatory limit based on the TCLP total-metals-divided-by-20 screening test. The total lead value for sampling location CR-05 from the interval 0-6 feet when divided by 20 was 6.45 mg/kg, which marginally exceeds the 5.0 mg/L limit. As indicated previously, this screening value represents the maximum possible lead concentration that could be present in a TCLP analysis for this sample. For this to occur, it would be necessary that most or all of the lead present in the sampled material would be highly soluble. This occurrence would be considered unlikely. Additionally, it should be emphasized that the lead values for all of the other 12 sampled intervals throughout the Coarse Refuse Pile are at least 3.7 times lower than the 5.0 mg/L limit, suggesting that the presence of lead in the single sample is an anomalous occurrence.

6.5 Bevill Amendment

It should be noted that waste generated from coal cleaning and washing may be classified as Special Wastes and as such may be exempted from being classified as hazardous waste by the U.S. EPA (EPA, 2014). Commonly known as the Bevill Amendment, solid wastes exempted include:

> *(7) Solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal, phosphate rock, and overburden from the mining of uranium ore), … Beneficiation of ores and minerals is restricted to the following activities; crushing, grinding; washing; dissolution; crystallization; filtration; sorting; sizing; drying …*

The material that is present in the Coarse Refuse Pile is material that is derived from beneficiation of coal that reportedly included crushing, washing, and sorting. This information suggests that the material in the Coarse Refuse Pile would not be considered hazardous waste based on the criteria provided from the EPA.

7.0 Conclusions

- Based on the chemical characteristics of the material sampled from the Coarse Refuse Pile, the material is not considered as hazardous waste. This finding is based on the analysis of RCRA-8 metals according to directions provided in EPA Method 1311 and on the totality of the results of the chemical analysis of the material.
- Based on a Special Waste exemption (the Bevill Amendment), the material in the Coarse Refuse Pile would likely not be classified as hazardous waste because it is directly associated with the beneficiation of coal.
- The maximum depths of the sampled intervals in this investigation extended to depths of 12 or 18 feet below the pile surface. The characteristics of the material present at deeper depths in the Coarse Refuse Pile were not directly investigated. However, it seems likely

that generally similar chemical characteristics would be present in the deeper portions of the pile. This conclusion is based on the assumption that the Cretaceous coal shipped to the facility for processing likely remained generally similar over time. To verify this conclusion, chemical sampling of the material present in deeper portions of the pile could be performed when the deeper materials are ready to be removed from the pile (assuming that the material would be removed from the pile in a top to bottom sequence).

- There are no identified constituents in the sampled Coarse Refuse Pile material that would suggest that significant contamination of groundwaters or surface-water resources would be likely as a result of the use of this material for railroad track base/fill material. The acid/base accounting analysis suggests that acid rock drainage will not occur from the material. The laboratory measurements suggest that the salinity (specific conductance) of water interacting with the coarse refuse material would be generally similar to that of the shallow groundwater currently present in the area.

8.0 Referenced Cited

EPA, Method 1311, accessed March 2014, available on-line at: http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/1311.pdf

EPA, 2014, Information of the Bevill Amendment, accessed March 2014, available on-line at www.epa.gov/osw/nonhaz/industrial/special/index.htm.

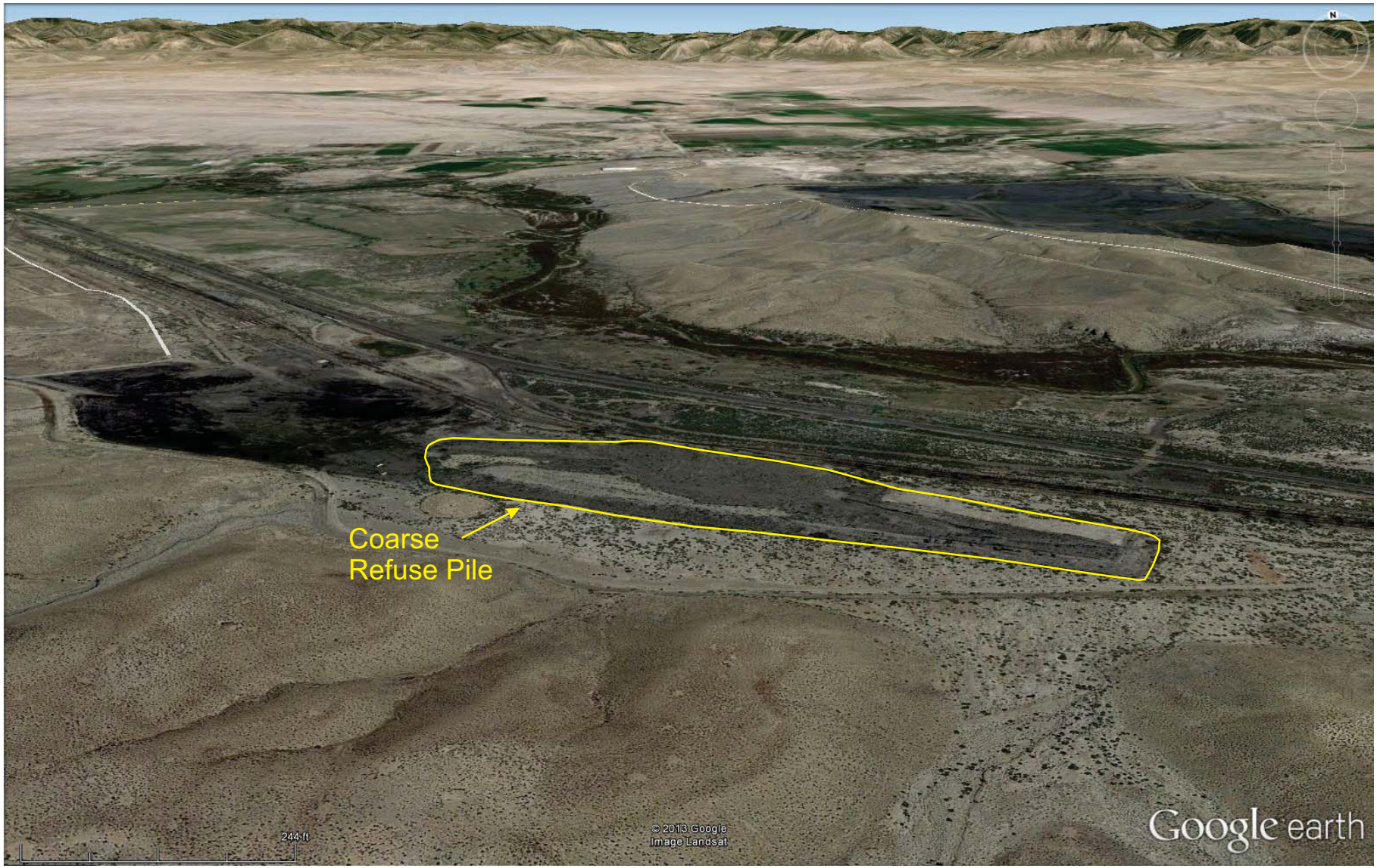
EPA, 2009, Identification and listing of hazardous waste 40 CFR 261.4(b): Exclusions: Solid wastes which are not hazardous wastes, Version 1.

U.S. Steel Corporation, 1983, Hydrologic Resources Probable Hydrologic Consequences and Hydrologic Monitoring associated with the Wellington Prep. Plant, prepared for U.S. Steel Corporation by Engineering-Science, Denver, Colorado.

1 mile

North

Figure 1 Location of the Wellington Prep Plant site.



North

Figure 2 Location of the Coarse Refuse Pile at the Wellington Prep Plant site (oblique image view).

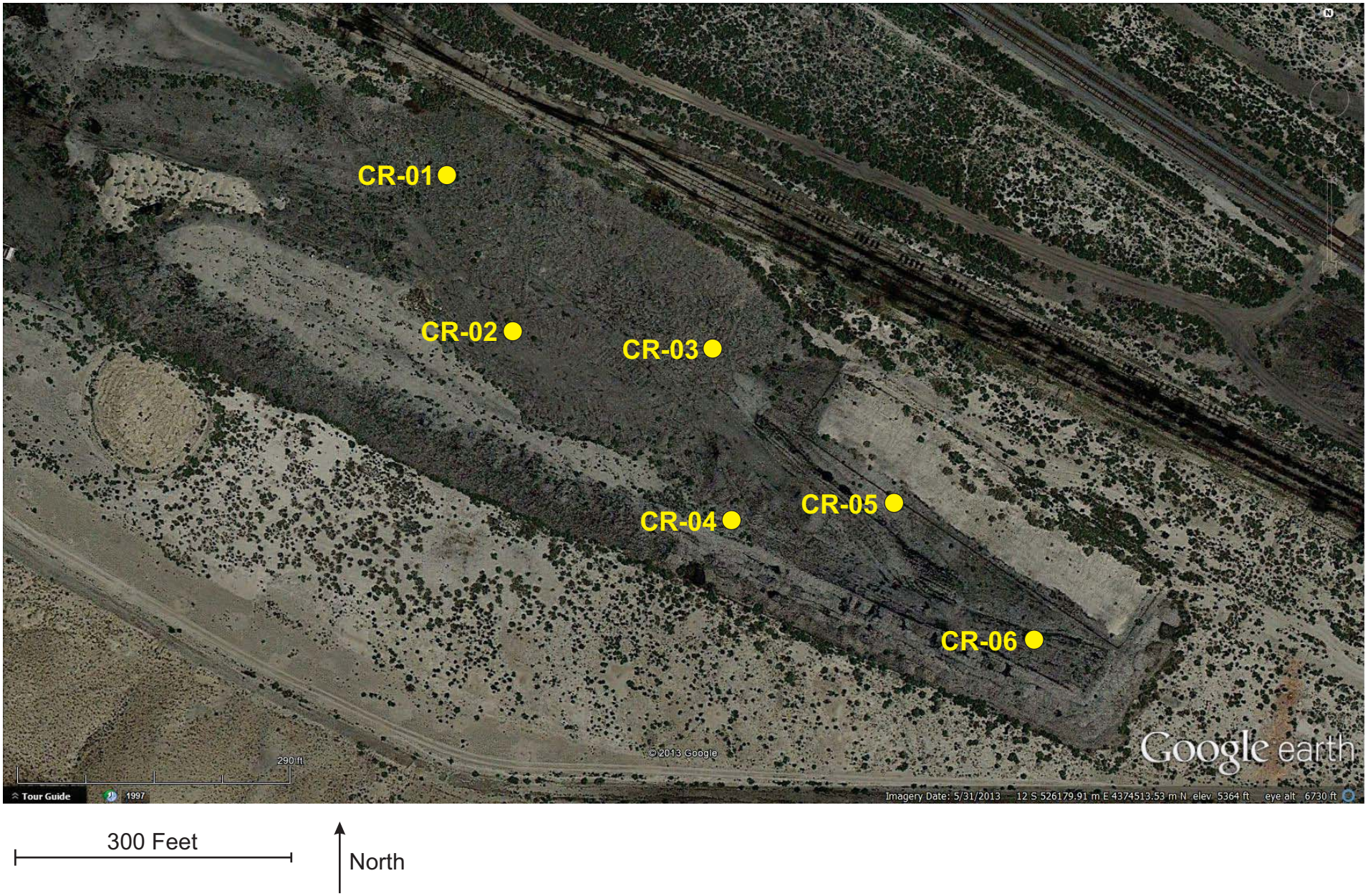


Figure 3 Sampling locations at the Coarse Refuse Pile.

Table 1 Price River Terminal, Wellington Prep Plant Coarse Refuse Pile sample locations.

Sample location	Latidude (degrees)	Longitude (degrees)	UTM Northing NAD 83 (meters)	UTM Easting NAD 83 (meters)
CR-01	39.52047748	-110.6963947	4374580	526097
CR-02	39.51999620	-110.6961201	4374527	526121
CR-03	39.51999192	-110.6953239	4374527	526189
CR-04	39.51940603	-110.6952194	4374462	526198
CR-05	39.51943159	-110.6945021	4374465	526260
CR-06	39.51900914	-110.6940237	4374418	526301

Table 2 Price River Terminal, Wellington Prep Plant Coarse refuse pile laboratory analytical results.

Sample station	Date	Begin depth (ft)	End depth (ft)	pH s.u.	Specific Conductance dS/m	PE Calcium meq/L	PE Magnesium meq/L	PE Sodium meq/L	SAR	Water extr. Boron ppm	Water extr. Selenium ppm	Total Sulfur %	T.S. AB t/1000t	Neutral. Potential t/1000t	T.S. ABP t/1000t	Total Arsenic mg/Kg	Total Barium mg/Kg	Total Cadmium mg/Kg	Total Chromium mg/Kg	Total Lead mg/Kg	Total Selenium mg/Kg	Total Silver mg/Kg	Total Mercury mg/Kg
CR-01	2/4/2014	0	6	7.6	4.38	18.6	17.2	49.6	11.7	1.40	0.08	0.30	9.38	42.4	33.0	9.4	422	0.91	7.80	26.6	<2.2	<0.5	<0.2
CR-01	2/4/2014	6	12	7.5	4.20	20.6	19.1	43.9	9.85	1.76	0.07	0.63	19.6	93.2	73.6	13.6	286	0.71	6.40	16.4	<2.2	<0.5	<0.2
CR-02	2/4/2014	0	6	7.6	3.71	21.3	21.5	29.8	6.43	2.40	0.08	0.38	11.9	89.0	77.1	8.3	320	0.68	6.70	17.5	<2.2	<0.5	<0.2
CR-02	2/4/2014	6	12	8.1	3.11	4.31	5.06	39.3	18.2	1.62	0.05	0.26	8.06	134	126	7.8	321	0.55	5.30	19.7	<2.2	<0.5	<0.2
CR-02	2/4/2014	12	18	7.7	2.75	9.75	9.66	22.2	7.12	1.55	0.04	0.51	15.9	52.2	36.3	8.1	275	0.48	4.50	14.4	<2.2	<0.5	<0.2
CR-03	2/4/2014	0	6	8.0	2.32	6.34	7.90	20.1	7.54	1.49	0.04	0.27	8.44	59.1	50.6	7.8	294	0.63	4.80	19.7	<2.2	<0.5	<0.2
CR-03	2/4/2014	6	12	9.2	3.65	23.6	9.91	33.9	8.27	1.23	0.05	0.26	8.03	124	116	5.2	302	0.65	6.60	16.7	<2.2	<0.5	<0.2
CR-04	2/4/2014	0	6	8.2	1.93	1.11	1.15	24.1	22.6	1.83	0.04	0.29	9.14	68.8	59.6	18.3	312	0.73	3.30	13.7	<2.2	<0.5	<0.2
CR-04	2/4/2014	6	12	7.5	3.22	7.89	9.90	39.4	13.2	1.35	0.07	0.35	10.8	51.0	40.3	9.2	279	0.67	5.10	19.4	<2.2	<0.5	<0.2
CR-05	2/4/2014	0	6	7.9	3.63	12.1	9.24	42.6	13.1	2.87	0.23	0.26	8.23	86.0	77.7	12.9	331	0.99	5.20	129	<2.2	<0.5	<0.2
CR-05	2/4/2014	6	12	8.0	3.61	2.83	3.43	48.1	27.2	1.69	0.17	0.21	6.61	58.4	51.7	7.7	312	0.65	5.30	20.9	<2.2	<0.5	<0.2
CR-06	2/4/2014	0	6	8.4	0.89	0.31	0.32	11.7	20.8	2.11	0.05	0.17	5.43	42.3	36.9	11.4	369	0.58	2.40	18.5	2.9	<0.5	<0.2
CR-06	2/4/2014	6	12	8.5	0.98	0.38	0.35	13.5	22.3	1.75	0.04	0.22	6.73	80.4	73.7	7.1	338	0.65	4.30	18.6	<2.2	<0.5	<0.2

Table 3 Price River Terminal Wellington Prep Plant, Coarse refuse pile RCRA - 8 metals sample results.

Arsenic

SampleID	Begin Depth (ft)	End Depth (ft)	Total Arsenic mg/Kg	Total Arsenic divided by 20 mg/Kg	Arsenic EPA Limit (mg/L)	Exceeds Arsenic Divide by 20 screen?
CR-01	0	6	9.4	0.47	5.0	No
CR-01	6	12	13.6	0.68	5.0	No
CR-02	0	6	8.3	0.42	5.0	No
CR-02	6	12	7.8	0.39	5.0	No
CR-02	12	18	8.1	0.41	5.0	No
CR-03	0	6	7.8	0.39	5.0	No
CR-03	6	12	5.2	0.26	5.0	No
CR-04	0	6	18.3	0.92	5.0	No
CR-04	6	12	9.2	0.46	5.0	No
CR-05	0	6	12.9	0.65	5.0	No
CR-05	6	12	7.7	0.39	5.0	No
CR-06	0	6	11.4	0.57	5.0	No
CR-06	6	12	7.1	0.36	5.0	No
Average			***9.75***	***0.49***	***5.0***	***No***

Barium

SampleID	Begin Depth (ft)	End Depth (ft)	Total Barium mg/Kg	Total Barium divided by 20 mg/Kg	Barium EPA Limit (mg/L)	Exceeds Barium Divide by 20 screen?
CR-01	0	6	422	21.10	100.0	No
CR-01	6	12	286	14.30	100.0	No
CR-02	0	6	320	16.00	100.0	No
CR-02	6	12	321	16.05	100.0	No
CR-02	12	18	275	13.75	100.0	No
CR-03	0	6	294	14.70	100.0	No
CR-03	6	12	302	15.10	100.0	No
CR-04	0	6	312	15.60	100.0	No
CR-04	6	12	279	13.95	100.0	No
CR-05	0	6	331	16.55	100.0	No
CR-05	6	12	312	15.60	100.0	No
CR-06	0	6	369	18.45	100.0	No
CR-06	6	12	338	16.90	100.0	No
Average			***320***	***16.0***	***100.0***	***No***

Cadmium

SampleID	Begin Depth (ft)	End Depth (ft)	Total Cadmium mg/Kg	Total Cadmium divided by 20 mg/Kg	Cadmium EPA Limit (mg/L)	Exceeds Cadmium Divide by 20 screen?
CR-01	0	6	0.91	0.05	1.0	No
CR-01	6	12	0.71	0.04	1.0	No
CR-02	0	6	0.68	0.03	1.0	No
CR-02	6	12	0.55	0.03	1.0	No
CR-02	12	18	0.48	0.02	1.0	No
CR-03	0	6	0.63	0.03	1.0	No
CR-03	6	12	0.65	0.03	1.0	No
CR-04	0	6	0.73	0.04	1.0	No
CR-04	6	12	0.67	0.03	1.0	No
CR-05	0	6	0.99	0.05	1.0	No
CR-05	6	12	0.65	0.03	1.0	No
CR-06	0	6	0.58	0.03	1.0	No
CR-06	6	12	0.65	0.03	1.0	No
Average			***0.68***	***0.03***	***1.0***	***No***

Chromium

SampleID	Begin Depth (ft)	End Depth (ft)	Total Chromium mg/Kg	Total Chromium divided by 20 mg/Kg	Chromium EPA Limit (mg/L)	Exceeds Chromium Divide by 20 screen?
CR-01	0	6	7.8	0.39	5.0	No
CR-01	6	12	6.4	0.32	5.0	No
CR-02	0	6	6.7	0.34	5.0	No
CR-02	6	12	5.3	0.27	5.0	No
CR-02	12	18	4.5	0.23	5.0	No
CR-03	0	6	4.8	0.24	5.0	No
CR-03	6	12	6.6	0.33	5.0	No
CR-04	0	6	3.3	0.17	5.0	No
CR-04	6	12	5.1	0.26	5.0	No
CR-05	0	6	5.2	0.26	5.0	No
CR-05	6	12	5.3	0.27	5.0	No
CR-06	0	6	2.4	0.12	5.0	No
CR-06	6	12	4.3	0.22	5.0	No
Average			***5.2***	***0.26***	***5.0***	***No***

Lead

SampleID	Begin Depth (ft)	End Depth (ft)	Total Lead mg/Kg	Total Lead divided by 20 mg/Kg	Lead EPA Limit (mg/L)	Exceeds Lead Divide by 20 screen?
CR-01	0	6	26.6	1.33	5.0	No
CR-01	6	12	16.4	0.82	5.0	No
CR-02	0	6	17.5	0.88	5.0	No
CR-02	6	12	19.7	0.99	5.0	No
CR-02	12	18	14.4	0.72	5.0	No
CR-03	0	6	19.7	0.99	5.0	No
CR-03	6	12	16.7	0.84	5.0	No
CR-04	0	6	13.7	0.69	5.0	No
CR-04	6	12	19.4	0.97	5.0	No
CR-05	0	6	129	6.45	5.0	Yes
CR-05	6	12	20.9	1.05	5.0	No
CR-06	0	6	18.5	0.93	5.0	No
CR-06	6	12	18.6	0.93	5.0	No
Average			***27.0***	***1.35***	***5.0***	***No***

Mercury

SampleID	Begin Depth (ft)	End Depth (ft)	Total Mercury mg/Kg	Total Mercury divided by 20 mg/Kg	Mercury EPA Limit (mg/L)	Exceeds Mercury Divide by 20 screen?
CR-01	0	6	<0.2	0.01	0.2	No
CR-01	6	12	<0.2	0.01	0.2	No
CR-02	0	6	<0.2	0.01	0.2	No
CR-02	6	12	<0.2	0.01	0.2	No
CR-02	12	18	<0.2	0.01	0.2	No
CR-03	0	6	<0.2	0.01	0.2	No
CR-03	6	12	<0.2	0.01	0.2	No
CR-04	0	6	<0.2	0.01	0.2	No
CR-04	6	12	<0.2	0.01	0.2	No
CR-05	0	6	<0.2	0.01	0.2	No
CR-05	6	12	<0.2	0.01	0.2	No
CR-06	0	6	<0.2	0.01	0.2	No
CR-06	6	12	<0.2	0.01	0.2	No
Average			***<0.2***	***0.01***	***0.2***	***No***

Selenium

SampleID	Begin Depth (ft)	End Depth (ft)	Total Selenium mg/Kg	Total Selenium divided by 20 mg/Kg	Selenium EPA Limit (mg/L)	Exceeds Selenium Divide by 20 screen?
CR-01	0	6	<2.2	0.11	1.0	No
CR-01	6	12	<2.2	0.11	1.0	No
CR-02	0	6	<2.2	0.11	1.0	No
CR-02	6	12	<2.2	0.11	1.0	No
CR-02	12	18	<2.2	0.11	1.0	No
CR-03	0	6	<2.2	0.11	1.0	No
CR-03	6	12	<2.2	0.11	1.0	No
CR-04	0	6	<2.2	0.11	1.0	No
CR-04	6	12	<2.2	0.11	1.0	No
CR-05	0	6	<2.2	0.11	1.0	No
CR-05	6	12	<2.2	0.11	1.0	No
CR-06	0	6	2.9	0.145	1.0	No
CR-06	6	12	<2.2	0.11	1.0	No
Average			***<2.25***	***0.11***	***1.0***	***No***

Silver

SampleID	Begin Depth (ft)	End Depth (ft)	Total Silver mg/Kg	Total Silver divided by 20 mg/Kg	Silver EPA Limit (mg/L)	Exceeds Silver Divide by 20 screen?
CR-01	0	6	<0.5	0.025	5.0	No
CR-01	6	12	<0.5	0.025	5.0	No
CR-02	0	6	<0.5	0.025	5.0	No
CR-02	6	12	<0.5	0.025	5.0	No
CR-02	12	18	<0.5	0.025	5.0	No
CR-03	0	6	<0.5	0.025	5.0	No
CR-03	6	12	<0.5	0.025	5.0	No
CR-04	0	6	<0.5	0.025	5.0	No
CR-04	6	12	<0.5	0.025	5.0	No
CR-05	0	6	<0.5	0.025	5.0	No
CR-05	6	12	<0.5	0.025	5.0	No
CR-06	0	6	<0.5	0.025	5.0	No
CR-06	6	12	<0.5	0.025	5.0	No
Average			***<0.5***	***0.03***	***5.0***	***No***

Photographs Section

Photograph 1 View from top of Coarse Refuse Pile (looking northwest).

Photograph 2 View of eastern slope of Coarse Refuse Pile (looking west). Note railroad tracks in foreground.

Photograph 3 View of northern edge of the Coarse Refuse Pile (looking north). Note railroad tracks in background.

Photograph 4 View from top of Coarse Refuse Pile (looking southeast). Railroad tracks are apparent in left of photograph.

Photograph 5 View of track hoe excavating material from top of Coarse Refuse Pile at CR-06 (looking west).

Photograph 6 View of bucket dump of excavated material at CR-06.

Photograph 7 View of bucket dump of excavated material at CR-05.

Photograph 8 Buckets containing sampled material for shipment to laboratory.

Appendix A

Laboratory Reporting Sheets

Inter-Mountain Labs
Sheridan, Wyoming

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Soil Analysis Report

Price River Terminal
3215 West 4th Street
Fort Worth, TX 76107

Report ID: S1402066002
(Replaces S1402066001)
Date Reported: 3/5/2014
Work Order: S1402066

Project: Coarse Refuse Pile
Date Received: 2/10/2014

Lab ID	Sample ID	Depths Feet	pH s.u.	Electrical Conductivity dS/m	PE Calcium meq/L	PE Magnesium meq/L	PE Sodium meq/L	SAR	Boron ppm	Selenium ppm
S1402066-001	14CR01	0-6	7.6	4.38	18.6	17.2	49.6	11.7	1.40	0.08
S1402066-002	14CR01	6-12	7.5	4.20	20.6	19.1	43.9	9.85	1.76	0.07
S1402066-003	14CR02	0-6	7.6	3.71	21.3	21.5	29.8	6.43	2.40	0.08
S1402066-004	14CR02	6-12	8.1	3.11	4.31	5.06	39.3	18.2	1.62	0.05
S1402066-005	14CR02	12-18	7.7	2.75	9.75	9.66	22.2	7.12	1.55	0.04
S1402066-006	14CR03	0-6	8.0	2.32	6.34	7.90	20.1	7.54	1.49	0.04
S1402066-007	14CR03	6-12	9.2	3.65	23.6	9.91	33.9	8.27	1.23	0.05
S1402066-008	14CR04	0-6	8.2	1.93	1.11	1.15	24.1	22.6	1.83	0.04
S1402066-009	14CR04	6-12	7.5	3.22	7.89	9.90	39.4	13.2	1.35	0.07
S1402066-010	14CR05	0-6	7.9	3.63	12.1	9.24	42.6	13.1	2.87	0.23
S1402066-011	14CR05	6-12	8.0	3.61	2.83	3.43	48.1	27.2	1.69	0.17
S1402066-012	14CR06	0-6	8.4	0.89	0.31	0.32	11.7	20.8	2.11	0.05
S1402066-013	14CR06	6-12	8.5	0.98	0.38	0.35	13.5	22.3	1.75	0.04

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Soil Analysis Report

Price River Terminal

3215 West 4th Street
Fort Worth, TX 76107

Report ID: S1402066002
(Replaces S1402066001)

Project: Coarse Refuse Pile

Date Received: 2/10/2014

Date Reported: 3/5/2014

Work Order: S1402066

Lab ID	Sample ID	Depths Feet	Total Sulfur %	T.S. AB t/1000t	Neutral. Potential t/1000t	T.S. ABP t/1000t
S1402066-001	14CR01	0-6	0.30	9.38	42.4	33.0
S1402066-002	14CR01	6-12	0.63	19.6	93.2	73.6
S1402066-003	14CR02	0-6	0.38	11.9	89.0	77.1
S1402066-004	14CR02	6-12	0.26	8.06	134	126
S1402066-005	14CR02	12-18	0.51	15.9	52.2	36.3
S1402066-006	14CR03	0-6	0.27	8.44	59.1	50.6
S1402066-007	14CR03	6-12	0.26	8.03	124	116
S1402066-008	14CR04	0-6	0.29	9.14	68.8	59.6
S1402066-009	14CR04	6-12	0.35	10.8	51.0	40.3
S1402066-010	14CR05	0-6	0.26	8.23	86.0	77.7
S1402066-011	14CR05	6-12	0.21	6.61	58.4	51.7
S1402066-012	14CR06	0-6	0.17	5.43	42.3	36.9
S1402066-013	14CR06	6-12	0.22	6.73	80.4	73.7

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor

Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
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Soil Analysis Report

Price River Terminal

3215 West 4th Street
Fort Worth, TX 76107

Report ID: S1402066002
(Replaces S1402066001)

Project: Coarse Refuse Pile

Date Received: 2/10/2014

Date Reported: 3/5/2014

Work Order: S1402066

Lab ID	Sample ID	Depths Feet	Total Arsenic mg/Kg	Total Barium mg/Kg	Total Cadmium mg/Kg	Total Chromium mg/Kg	Total Lead mg/Kg	Total Selenium mg/Kg	Total Silver mg/Kg	Total Mercury mg/Kg
S1402066-001	14CR01	0-6	9.4	422	0.91	7.8	26.6	<2.2	<0.5	<0.2
S1402066-002	14CR01	6-12	13.6	286	0.71	6.4	16.4	<2.2	<0.5	<0.2
S1402066-003	14CR02	0-6	8.3	320	0.68	6.7	17.5	<2.2	<0.5	<0.2
S1402066-004	14CR02	6-12	7.8	321	0.55	5.3	19.7	<2.2	<0.5	<0.2
S1402066-005	14CR02	12-18	8.1	275	0.48	4.5	14.4	<2.2	<0.5	<0.2
S1402066-006	14CR03	0-6	7.8	294	0.63	4.8	19.7	<2.2	<0.5	<0.2
S1402066-007	14CR03	6-12	5.2	302	0.65	6.6	16.7	<2.2	<0.5	<0.2
S1402066-008	14CR04	0-6	18.3	312	0.73	3.3	13.7	<2.2	<0.5	<0.2
S1402066-009	14CR04	6-12	9.2	279	0.67	5.1	19.4	<2.2	<0.5	<0.2
S1402066-010	14CR05	0-6	12.9	331	0.99	5.2	129	<2.2	<0.5	<0.2
S1402066-011	14CR05	6-12	7.7	312	0.65	5.3	20.9	<2.2	<0.5	<0.2
S1402066-012	14CR06	0-6	11.4	369	0.58	2.4	18.5	2.9	<0.5	<0.2
S1402066-013	14CR06	6-12	7.1	338	0.65	4.3	18.6	<2.2	<0.5	<0.2

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor

Karen Secor, Soil Lab Supervisor

Appendix B

TCLP Analysis

Total Constituent Analysis Instead of TCLP Analysis

From:
http://www.epa.gov/osw/hazard/testmethods/faq/faq_tclp.htm

Total Constituent Analysis Instead of TCLP Analysis

Question: Is it acceptable to perform a total constituent analysis instead of a TCLP analysis and then divide the total concentration by 20 to determine if a waste is non-hazardous, as is implied in Section 1.2 of Method 1311, TCLP?

Answer: Section 1.2 of the TCLP *does* allow for a total constituent analysis in lieu of the TCLP extraction. If a waste is 100% solid, as defined by the TCLP method, then the results of the total constituent analysis may be divided by twenty to convert the total results into the maximum leachable concentration. This factor is derived from the 20:1 liquid-to-solid ratio employed in the TCLP. If a waste has filterable liquid, then the concentration of the analyte in each phase (liquid and solid) must be determined. The following equation may be used to calculate this value:

$$\frac{[A \times B] + [C \times D]}{B + [20\ (L/kg) \times D]} = E$$

Where:

A = Concentration of the analyte in liquid portion of the sample (mg/L)
B = Volume of the liquid portion of the sample (L).
C = Concentration of the analyte in solid portion of the sample (mg/kg)
D = Weight of the solid portion of the sample (kg)
E = Maximum theoretical concentration in leachate (mg/L)

The value obtained (E) can be used to show that the maximum theoretical concentration in a leachate from the waste could not exceed the concentration specified in the toxicity characteristic (TC) (40 CFR 261.24).

In addition, if the total constituent analysis results themselves are below the TC limits without dividing by 20, then the same argument holds true, i.e., the maximum theoretical concentration in the leachate could not exceed the TC limits.