

FIELD SAMPLING REPORT
for
WILDER CONSTRUCTION
THE RED DEVIL MINE SITE
RED DEVIL, ALASKA

by
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1.0 Background and Objective

The purpose of the field sampling activities was to collect samples of various media that will provide representative samples in order to conduct a lab treatability study on the different waste streams.

2.0 Pre Characterization and Sampling Activities

2.1 Visual Inspection

Paul DeWitt visually inspected the site on October 16, 2001. Paul located points of concern and became familiarized with the site's layout and physical and chemical hazards. The terrain was also reviewed and there was an elevated layout of building/site locations.

The retort area is located about 150 yards from the main entry of the site and is also located on a hillside. There is a silo at the top of the hill with debris, slag, cinnabar ore, brick, and steel framing. There is a 30-foot drop-off from the silo to the foundation of the retort furnace and distilling chamber area. This drop-off is constructed of slate/rock containing both cinnabar and arsenic in its elemental form. The retort foundation is located about 40 feet from the base of the hillside. The foundation is approximately 160 feet long, with approximately one-third of the foundation having a width of 12 feet. The remaining portion of the foundation is about 30 feet. The 30-foot portion has an aboveground footer of about 36 inches. Both sides contain 2-foot concrete risers/platforms.

Located at the northwest corner of the retort building foundation is a pile of contaminated furnace slag/mixture. North of the retort building foundation is a debris pile (60 feet long, 25 to 30 feet wide, and about 12 feet high). This debris pile contains the remains of the retort furnace, wood structure/framing, steel framing/support beams, brick, piping, tin siding, and fiberboard/plywood.

Northeast of the retort foundation (at about 30 feet) are the remains of an old chemical storage building. East of the storage building is the old power plant (about 150 yards up the hill).

Northwest (about 100 yards from the retort foundation) is the settling pond area. Across from the settling pond (about 200 yards) is an old gravel storage pad with drums, motors, transformers, and old housing furniture and appliances. The Red Devil Creek is north of this area.

The main area contains an old warehouse, warehouse annex, shop pad (laboratory), hoist shack, dry room, shop building, and a debris pile (about 40 feet long, 20 feet wide and about 10 feet high) containing mostly wood, tin, rock, and some metal scraps. This area contains numerous areas that have slate/rock that has lifted above ground level.

To the southwest of the main entry is the mess hall and housing areas, which are, overgrown and are marked with yellow tape ("Caution Asbestos Do Not Enter"). The buildings (many of which are constructed into the hillside and on stilts) are falling down and decaying.

2.2 Sampling Plan/Layout

The site Conceptual Solid Waste Management Plan was first reviewed and areas of concern and areas of low to no sampling data information were identified.

The first area of sampling and material collection was the retort foundation area working outward to the surrounding areas.

3.0 XRF-Niton Readings

This section of the report discusses XRF (portable Niton) readings taken on various type materials at different locations. This information was then used to develop a strategic sampling plan. The data are presented in Table 1. A photograph showing the site location where the Niton readings were taken (yellow dots) and where the actual samples were taken (red dots) are presented in Figures 1 & 2.

A Niton 700 Series XRF instrument was used to take the readings. Three test samples of known results were used to calibrate the instrument.

3.1 Retort Building Slab/Areas

A series of Niton readings (Niton reading # 5 through # 12) were taken in and around the retort area in order to identify hot spots.

Starting with sample #5, a reading was taken of the surface soil at the southwest end of the retort building foundation.

Niton Reading #6 was taken at the southeast corner of the retort building foundation.

Niton Reading #7 was taken on the east side of the retort building foundation and south of the retort slag pile.

Niton Reading #8 was taken on the north end of the retort building foundation between the foundation and the retort debris pile.

Niton Reading #9 was taken on the west end and center of the retort building foundation.

Niton Readings #10 & #11 are readings of the dust generated by core drilling of the south end base of the retort building foundation. These samples were the request of both URS & BLM, for two reasons. During drilling operations, URS was monitoring air contamination and the monitor was showing very high readings for arsenic and mercury. In addition, BLM requested that a visible inspection be taken under the retort building foundation. Because of the high airborne readings, drilling operations were stopped and a visible inspection of the soil could not be obtained.

Niton Reading #11 was a retake of Reading #10. After reviewing the Niton results, URS and BLM did not know why we were getting high readings. URS requested that the drilling stop because of the airborne reading. BLM agreed and we were unable to visually inspect the soil under the retort building foundation.

Niton Reading #12 was taken about 18 feet east of the retort building foundation just north of the old chemical storage building.

3.2 Non-Soil XRF Niton Readings

A series of readings were taken of debris from around the site.

Niton Reading #13 was taken from a piece of wood on the middle west end of the retort foundation debris pile.

Niton Reading #14 was taken off the surface of a contaminated brick from under the old chemical building.

Niton Reading #15 was taken under the old chemical building.

Niton Reading #16 was taken from the wood debris pile east of the chemical storage building and just before the power building about 50 feet up the road and from the retort building foundation.

Niton Readings #17 & #18 are test samples for re-calibration of my instrument and Reading #18 was within calibration specs.

Niton Reading #19 was taken from the slag pile generated from the retort furnace operations located on the northeast side of the retort building foundation, middle of the pile and between the hillside and the foundation.

Niton Reading #23 was taken from the debris pile of a piece of steel framing. The steel was too big to cut off, so only a Niton reading was taken.

3.3 XRF Readings of Housing Areas

Note: Housing area was posted Asbestos, Entry points were limited. I entered areas where I could reach into the buildings without crossing over into any posted areas. Structures were also decaying and unstable.

Niton Reading #28 was taken from the west side of the inside wall of the Mess Hall / Bunkhouse

Niton Reading #29 was taken from the floor (in the middle) of the Mess Hall / Bunkhouse building.

Niton Reading #30 was taken from the inside wall at the West End of house #1.

Niton Reading #31 was taken from the floor just about 5 feet inside of door way at house #1

Niton Reading #32 & #33 was taken from the debris around the foundation of house #2

Niton Reading #34 was taken from the north side wall on the inside door way of house #3

Niton Reading #36 was taken from the north sidewalk on the inside and 5 feet to the right of the hallway in house #4.

Niton Reading #37 was taken from the floor covered with debris at the West End of house #4.

Niton Reading #38 was taken from the north end of the center wall at house #5.

Notes: Niton Readings from the housing areas were high in arsenic and low in lead. This is what the site plan was looking for.

4.0 Sampling

A list of the samples that were physically taken from the site is presented in Table 2. The site sample numbers (" Paul's Site Sample No.") are correlated to the MT²lab numbers. Additionally, each sample is correlated to a waste type and a Niton XRF reading, if one exists. At least one sample of each waste type was taken.

Sample #1 was of the drilling dust, which was obtained for analysis as requested by URS.

The first actual soil sample (Sample # 1A) was taken from the slag pile at the northeast end of the retort building foundation. (Niton Reading # 20)The waste stream was the retort furnace slag, URS also sampled the same area with a cross-reference number 21RDSslag-01

Soil sample #2 was taken under the old retort furnace and debris pile at the north end of the retort building foundation. (Niton Reading #21) URS also sampled the same area with a cross-reference number 21RDSslag-02

Sample #3 is of cinnabar and arsenic. This is a sample of the material located on the bank of the hillside. The hillside is about 30 feet high and 90 feet long.

Soil sample #4 was taken from the middle of the retort building foundation on the west side about 2 feet outward.

Soil sample #5 was taken from the inside of some of the piping used in the distilling operations. This is located at the north end of the debris pile (Niton Reading #22)

Sample #6 was slag taken from the retort furnace.

Soil sample #7 was taken 18 feet north of the debris pile and 5 feet south of mining marker number FS008.

Soil sample #8 was taken 27 feet north of the debris pile and 5 feet south of mining marker number FS008 on an old mining road up the hill towards the diesel storage tanks.

Soil sample #9 was taken at 10 feet north of mining marker number FS015.

Soil sample #10 was taken at 15 feet west of mining marker number FS080 or about 35 feet from the northwest corner of the retort building foundation.

Soil sample #11 was taken 50 feet from mining marker FS080 and about 100 yards above the settling pond.

Niton reading #24 was a test sample run of a known source.

Soil sample #12 and Niton reading #25 were taken on the east side of the old chemical storage building about 18 feet from mining marker number FS075.

Soil sample #13 and Niton Reading #26 were taken at the settling pond.

All sampling on and around the retort building foundation and the settling pond is complete. Samples from the mining operations side of the site, are listed below.

Soil sample #14 was taken at the base of the steps on the east side of the steps of the warehouse building foundation. (Niton Reading #27) was also taken at the warehouse foundation steps.

Soil sample #15 was taken in the middle of the shop building, dry room, hoist shack, and debris pile.

Soil sample #16 was taken at the base of the road entering the old power plant building.

Soil sample #17 was taken at the entry of the old drum/equipment storage area. The sample location was at the entry road of the retort operations side.



**FIGURE 2 West Portion of the Red Devil Site
 Photograph with Niton Reading Locations and Sampling
 Locations
 Yellow Dots = Niton Reading Locations
 Red Dots = Actual Sampling Locations**

Soil sample #18 was taken down gradient of the settling pond.

Soil sample #19 was taken under the debris pile and as close to the old retort furnace as possible.

Soil sample #20 was taken down gradient of the old mess hall/bunkhouse.

Soil sample #21 was taken from the south side of the foundation of house #3

Soil sample #22 was taken 25 feet west of house #5 in the middle between house #5 and house #1.

5.0 Chain-of-Custody Report

Attached to this report are the chain-of-custody sheets, which identify the MT² field sampling number, MT² laboratory tracking number, and description of sample.

6.0 Treatability Study Schedule

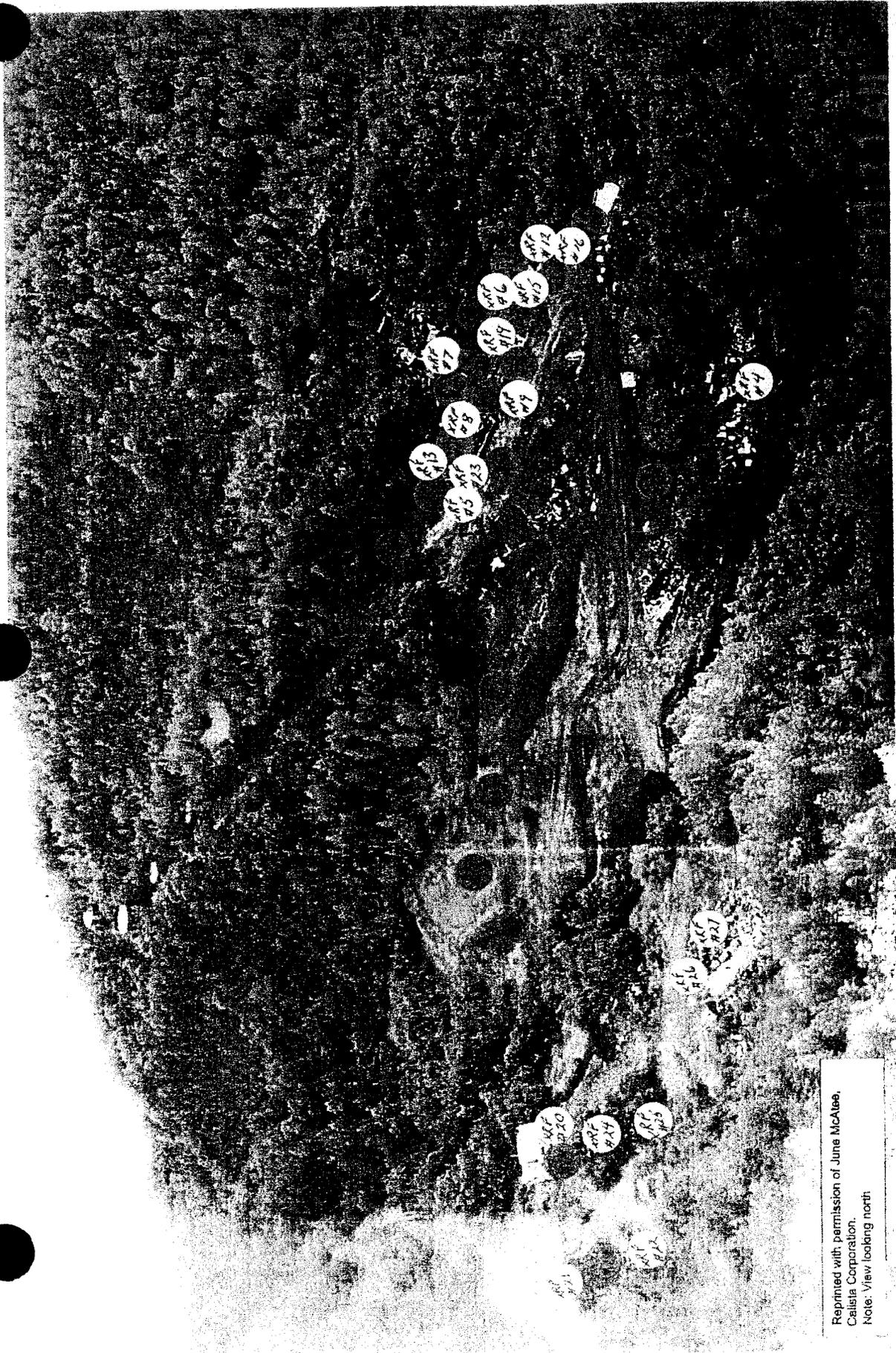
The task start and completion dates to finish the laboratory portion of phase II of the program is presented below.

Task	Start Date	Completion Date
Sample (26) Characterization (Pretreatment)	11/19/01	12/15/01
Lab Treatability Testing	12/10/01	2/29/02
Final Treatability Study Report	2/22/01	3/15/02

A short description of the lab treatability program is presented below:

- Determine the existence and concentration of Pb, As and Hg on the various samples using the Niton XRF. This will guide the subsequent lab treatability study.
- Prepare the samples; all must be reduced in size to less than $\frac{3}{8}$ inches for the TCLP. Run untreated TCLP's on all samples for appropriate metals.
- Add appropriate Ecobond additives and concentrations to each sample followed by a TCLP to determine if the additive rendered the sample non-hazardous. Several weight percent additions of Ecobond may be tested to arrive at the most technically and economically acceptable level.
- The most appropriate application form (solution, slurry, solid) for the various Ecobond reagents will be investigated.

This schedule does not address the preparation of the treatment/operations plan which will be completed following this phase.



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Note: View looking north.

**FIGURE 1 Main Red Devil Site Photograph with Niton Reading Locations and Sampling Locations
Yellow Dots = Niton Reading Locations
Red Dots = Actual Sampling Locations**

1
Niton Readings (XRF) of Site Locations and Site Samples
by MT²

Sample Type (2)	Niton Sample #	Concentration, Thousand ppm or mg./kg. (1)														
		As	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Rb	Se	Sr	Zn	Zr
Retort Area	5	7.2				10.2			0.3			0.04		0.45	0.37	0.02
Retort Area	6	7.7				16.6			0.28	0.01		0.08		0.6	0.4	0.03
Retort Area	7	4.1	2.2	2.3	1.1	12.2		5.9	1	0.04	1.6	0.1	0.6	0.09	3.6	0.03
Retort Area	8	18.2		1.2		15.5			11.1					0.23		
Retort Area	9	2				12						0.08		0.11	0.45	0.03
Retort Area	10	0.06				11						0.05		0.1		
Retort Area	11	0.08				11.1						0.04		0.01		0.02
Retort Area	12	0.21			0.2	0.3			0.02			0.01		0.01	0.06	
Non-Soil	13	1.3				6.1	2.4		0.82	0.01		0.03		0.04	0.4	
Non-Soil	14	0.53	3.1	0.64	64.3	10.6			0.06	0.02	0.04	0.06		0.05		0.15
Non-Soil	15	23.1		0.78		84.8			37.7		4.2	0.51	0.4	0.17	0.88	0.06
Non-Soil	16	1.8				19.6	0.17		0.24			0.04		0.07	0.25	
Non-Soil	19	4.5				21.5			0.11			0.09		0.31		0.06
Non-Soil	23	0.3	21		1.1	17.4		85		0.05						
Soil-Actual Sample(#1A)	20	8.7				24.2			3.7			0.17		0.25		
Soil-Actual Sample(# 2)	21	11.6				80.1					15.3			0.3		0.05
Soil-Actual Sample(# 5)	22	0.85				20.2	0.12			0.02		0.09		0.08		0.06
Soil-Actual Sample(# 12)	25					0.25									0.09	
Soil-Actual Sample(# 13)	26	1.8	12		0.81	14.1		65		0.07						
Soil-Actual Sample(# 14)	27					0.14									0.03	
Housing Areas	28	0.03	0.3			9.5	0.04							0.04		
Housing Areas	29					1.2										
Housing Areas	31	4.9				23.3	0.18					0.08		0.18		0.04
Housing Areas	32			2.4											12	
Housing Areas	33	2				18	0.95		0.16			0.06		0.13	0.2	0.06
Housing Areas	34	1.3				15.2			0.07	0.02		0.05		0.11		0.04
Housing Areas	35	0.2				20.8				0.07	30	0.08		0.05		0.05
Housing Areas	36	0.18				27.3				0.02	19	0.09		0.06		0.1
Housing Areas	37	0.34				12						0.05		0.08	0.06	0.05
Housing Areas	38	1				17.5			0.07	0.02	0.62	0.07		0.11	0.1	0.1
Average		4.00	7.72	1.46	13.50	18.37	0.64	51.97	3.97	0.03	10.11	0.09	0.50	0.15	1.35	0.06

Notes:

- (1.) All concentration values are in thousands of parts per million which is mg/kgs.
- (2.) The number in parenthesis for "Soil-Actual Sample" is the number of the actual sample taken from the site. The Niton reading number of these samples has a different Sample # than the actual sample #. Not all of the actual samples have Niton readings.
- (3.) Any missing Niton numbers are not really samples but are calibration readings and therefore not included.

Red Devil Site Sample Description

Pauls Site Sample No.	MT2 Sample No.	Waste Type	Sample Description	Niton #	Niton Assays, ppm		
					As	Hg	Pb
1	10-5	Retort Bldg. Foundation	Drilling dust from Foundation-Retort.Drilling by URS	10 & 11	81.3	n/a	n/a
1A	10-6	Retort Furnace Slag	Soil- like slag sample.NE end of retort. URS RDSlag-01	20	8700	3680	
2	10-7	Retort Building Debris	Soil from under retort bldg. Foundation+Debris north of foundation URS RD Slag-02	21	11600		
3	10-8	As-Hg Impacted Soil	Material from hillside, HgS ore & slag				
4	10-9	Pb-Impacted Building Debris	Wood, middle of debris pile	22			
5	10-10	Retort Building Debris	Scrapings from inside of cast iron piping in debris pile	23			
6	10-11	Retort Furnace Slag	Slag, purple color	24			
7	10-12	As-Hg Impacted Soil	Soil from As-Hg Impacted Soil				
8	10-13	As-Hg Impacted Soil	From Fuel Tanks, north				
9	10-14	As-Hg Impacted Soil	Soil, down gradient sample	12			
10	10-15	Pb-Impacted Building Debris	Soil debris pile along road to retort				
11	10-16	Pb-Impacted Soil	Soil midway from retort ops and settling pond				
12	10-17	Pb-Impacted Soil	Soil near old chemical storage bldg.				
13	10-18	Pb-Impacted Soil	Soil, center of sedimention pond	26			
14	10-19	Warehouse	Soil, for Warehouse, west side	27			
15	10-20	As-Hg Impacted Soil	Soil, near shop debris and shaft				
16	10-21	Pb-Impacted Soil	Soil, Pb impacted between old chemical /powerhouse bldgs.				
17	10-22	Retort Building Debris	Soil, slag and dump area, downgradient (PCB's?)				
18	10-23	As-Hg Impacted Soil	Soil, downgradient SE of pond				
19	10-24	Retort Building Debris	Soil, under fines old retort furnace				
20	10-25	Mess Hall Bunkhouse	Soil, downgradient messhall/bunk				
21	10-26	Houses	Soil, downgradient form House # 3				
22	10-27	Houses	Soil, incl. Roof/floor debris betw. Houses # 5, 1				
23	10-28	Refractory Bricks	Stored Brick from retort bldg. foundation				
24	10-29	Refractory Bricks	Furnace brick from pile under chemical bldg., green				
25	10-30	Refractory Bricks	Furnace brick downgradinet of retort				
Ore	10-31	Ore	Ore sample, orange from bank above retort /silo				

Waste Type	Number of Samples
Retort Building Debris	4
Retort Bldg. Foundation	1
Retort Furnace Slag	2
As-Hg Impacted Soil	6
Refractory Bricks	3
Pb-Impacted Building Debris	2
Pb-Impacted Soil	4
Mess Hall Bunkhouse	1
Houses	2
Warehouse	1
Total Number of Samples	26

Metals Treatment Technologies
12441 W. 49th Ave., Suite 3
Wheat Ridge, CO 80031

LABORATORY USE ONLY

Work Order: _____
Comments: _____

CHAIN OF CUSTODY RECORD

Client: Wilder Construction
RED DEVIL MINE

Contact: _____
Phone: _____ Fax: _____

Quote #: _____
Client P.O. #: _____
Client Project #: _____
Sampled By: _____
Please Specify Guideline (if applicable) _____

Page 1 of 4

Invoice to (if other than above):

Analysis Required: Characterization

TAT (Turnaround Time)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

* some exceptions apply, please contact lab

STANDARD

RUSH Specify Date _____
Time _____

Pauli #

Sample #	Client Sample I.D.	Date Sampled	Sample Matrix	No. of Containers	Comments/Contamination/ Site History
1	Dust from Retort Bldg concrete 10-5	10/1/16	Dust		Dust from retort
2	MT ² 10-6	10/1/16	slag/soil		Retort Furnance Slag
3	MT ² 10-7	10/1/16	Soil		Retort Bldg Debris
4	MT ² 10-8	10/1/16	Soil/Slag		Arsenic-Hg Impacted Soil
5	MT ² 10-9	10/1/16	inside piping		Lead Impacted Bldg Debris
6	MT ² 10-10	10/1/16	wood		Retort Bldg Debris
7	MT ² 10-11	10/1/16	slag		Retort Furnance Slag
8	MT ² 10-12	10/1/16	soil		Arsenic-Hg Impacted Soil

Released by Signature	Location	Date & Time	Delivery Method	Received by Signature	Company	Date & Time	Condition
<u>[Signature]</u>	Red Devil	10/16, 10/17	Fedex	<u>[Signature]</u>	MT ²	10/24/01-AM	Good

at site
Retort Bldg

