

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

Spill Complaint
Inspection NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

Spill or Release Plug & Abandon Central Facility Closure Site/Facility Closure Other (describe): _____

OGCC Operator Number: _____

Name of Operator: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Name and Telephone: _____

No: _____

Fax: _____

API Number: _____

County: _____

Facility Name: _____

Facility Number: _____

Well Name: _____

Well Number: _____

Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ Latitude: _____ Longitude: _____

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): _____

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): _____

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: _____

Potential receptors (water wells within 1/4 mi, surface waters, etc.): _____

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check): Extent of Impact: How Determined:

Soils _____ _____

Vegetation _____ _____

Groundwater _____ _____

Surface Water _____ _____

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

Describe how source is to be removed:

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:



Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No: _____

Page 2

REMEDIATION WORKPLAN (Cont.)

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Available information indicates that the uppermost groundwater bearing zone is greater than 100 feet below the ground surface. Soil samples were collected for laboratory analysis of subliner material to confirm no groundwater impact potential exists (see Table 1).

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

Please see Attachment II

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☐ Y ☒ N If yes, describe:

Based on subliner sample results no additional assessment will be necessary beneath the Freshwater, Reserve, Cuttings Pit #1 or Cuttings Pit #2 (see Table 1).

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Synthetic liners from all pits have been removed and transported offsite to Wray Gulch Landfill near Meeker, CO. Reserve Pit, Cuttings Pit #1 and Cuttings Pit #2 contents were mix/blend processed on site, sampled to ensure Table 910-1 compliance and used onsite for backfill (see Tables 3, 4 and 5).

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 11/7/11 Date Site Investigation Completed: 11/18/13 Date Remediation Plan Submitted: 10/16/13
Remediation Start Date: 10/8/13 Anticipated Completion Date: 1/29/14 Actual Completion Date: 1/29/14

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Jessica Dooling

Signed: _____

Title: Piceance EHS Supervisor

Date: 3/1/2016

OGCC Approved: _____ Title: _____ Date: _____

ATTACHMENT I

FRU 197-31A Pit Closure Workplan, Form 27 Page 1

Background Arsenic:

The site consists of a Freshwater, Reserve and Cuttings #1 and #2 Pits (see Figure 1).

See Form 27 (Rem #8083, Doc #2146995) COGCC approved on 11/19/2013 which established a background Arsenic level of 6.8 mg/kg (see Table 1 and Figure 1) and additional discussion.

ATTACHMENT II

FRU 197-31A Pit Closure Workplan, Form 27 Pages 1 and 2

Describe initial action taken:

The site consists of Freshwater, Reserve and Cuttings Pits #1 and #2 (see Figure 1).

1. Freshwater Pit

- Freshwater Pit contents (de minimis) and associated synthetic liners were removed and transported offsite to Wray Gulch Landfill near Meeker, CO.
- Freshwater Pit subliner composite samples were collected and analyzed for Table 910-1 parameters. Results were below Table 910-1 concentration levels with the exception of pH (9.51) and Arsenic (3.6 mg/kg) (see Table 1 and Figure 1).

2. Reserve Pit

- Reserve Pit contents were solidified and sampled for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for EC (23.500 mmhos/cm), SAR (226), pH (12.28), Arsenic (4.3 mg/kg) and Barium (17600 mg/kg).
- Reserve Pit subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.98) and Arsenic (3.2 mg/kg).

3. Cuttings Pit #1

- Cuttings Pit #1 contents were solidified and samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for TPH (892 mg/kg), EC (17.400 mmhos/cm), SAR (63.6), pH (9.92) and Arsenic (13.1 mg/kg).
- Cuttings Pit #1 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results were below Table 910-1 concentration levels with the exception of SAR (31.3), pH (10.18) and Arsenic (5.0 mg/kg).

4. Cuttings Pit #2

- Cuttings Pit #2 contents were solidified and samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1

concentration levels for TPH (820 mg/kg), EC (13.900 mmhos/cm), SAR (199), pH (11.23) and Arsenic (10.7 mg/kg).

- Cuttings Pit #1 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results were below Table 910-1 concentration levels with the exception of SAR (12.8), pH (10.25) and Arsenic (7.0 mg/kg).
- Reserve Pit, Cuttings Pit #1 and Cuttings Pit #2 contents were removed, mix/blend processed, sampled to ensure Table 910-1 compliance and used onsite for backfill (see Tables 3, 4 and 5).
- All associated Reserve, Cuttings Pit #1 and Cuttings Pit #2 synthetic liners were removed and transported offsite to Wray Gulch Landfill near Meeker, CO. Disposal manifests available on request.
- Refer to Tables 1 through 5 (5 total) for a summary of the laboratory results and Figure 1 for layout of the pits and sample locations.
- Elevated Arsenic levels above Table 910-1 concentration were detected in all Pit contents and beneath the Freshwater, Reserve, Cuttings Pit #1 and Cuttings Pit #2. Please refer to Form 27 Attachment I (REM #8083, Doc #2146995) COGCC approved on 11/19/2013 establishing an acceptable Background Arsenic concentration of 6.8 mg/kg and additional discussion.
- Soil samples were collected by SMA (formerly KRW) following proper sampling and shipping protocol and submitted to Accutest Laboratories in Wheat Ridge, Colorado. QAQC of the laboratory results indicated no outstanding anomalies. The laboratory test results are summarized in the attached tables. Complete laboratory reports are available on request.
- Any remaining elevated levels of Electrical Conductivity, SAR and pH detected beneath the pits or in material used for backfill were covered with a minimum 3 feet of clean, native soils per COGCC guidance. No additional treatment of these soils was required.
- Reclamation activities were performed in accordance with applicable COGCC 900, 1000 Series rules and as specified in the Surface Use Plan and BLM Conditions of Approval.

Table 1
Location: FRU 197-31A
Lab Summary

Last update 10/10/2013

Analytical Parameter	Freshwater Pit		Reserve Pit		Cuttings #1		Cuttings #2		Background					Background					COGCC Table 910-1 Concentration Levels	Maximum based on Background
(with units)	FW Contents	FW Subliner	RP Contents	RP Subliner	Cut #1 Contents	Cut #1 Subliner	Cut #2 Contents	Cut #2 Subliner	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5		
Accutest Job #	Pit Contents De Minimis	D51044 (9/25/13)	D51124 (9/30/13)	D51041 (9/25/13)	D51123 (9/30/13)	D51203 (9/30/13)	D51122 (9/30/13)	D51202 (9/30/13)	D29260 (11/7/11)					D29743 (11/22/11)					-	-
Sample type (Composite/Discrete)		C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)		ND	27.0	ND	29.3	ND	30.1	ND	-	-	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)		321	259	ND	863	26.7	790	23.7	-	-	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)		321	286	ND	892	26.7	820	23.7	-	-	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)		ND	ND	ND	0.0993	ND	0.445	ND	-	-	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)		ND	ND	ND	0.117	ND	0.205	ND	-	-	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)		ND	ND	ND	ND	ND	0.591	ND	-	-	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)		0.0068	0.0102	ND	0.0365	ND	0.0310	ND	-	-	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)		ND	0.0114	ND	0.0148	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)		ND	0.0739	ND	0.266	ND	0.383	ND	-	-	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)		ND	0.0160	ND	0.0238	ND	0.0208	ND	-	-	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)		0.197	23.500	0.433	17.400	1.610	13.900	0.821	-	-	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)		4.93	226	11.2	63.6	31.3	199	12.8	-	-	-	-	-	-	-	-	-	-	12	-
pH		9.51	12.28	9.98	9.92	10.18	11.23	10.25	-	-	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)		3.6	4.3	3.2	13.1	5.0	10.7	7.0	4.1	5.6	2.9	3.3	3.9	6.2	3.7	4.3	4.2	2.5	0.39	6.8
Barium (mg/kg)		556	17600	1970	4070	361	2780	227	-	-	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)		<1.2	<1.7	<1.2	<1.3	<1.1	<1.2	<1.2	-	-	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)		50.7	26.9	47.1	19.9	41.0	23.5	41.1	-	-	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)		7.7	16.7	8.9	33.9	8.5	30.0	7.0	-	-	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)		8.0	11.5	9.5	24.2	9.2	17.7	8.1	-	-	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)		<0.10	<0.14	<0.10	<0.11	<0.097	<0.11	<0.095	-	-	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)		16.1	12.2	15.4	16.6	14.8	14.5	13.1	-	-	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)		<6.0	<8.3	<5.9	<6.4	<5.4	<6.1	<5.8	-	-	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)		<3.6	<5.0	<3.6	<3.9	<3.3	<3.6	<3.5	-	-	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)		39.1	33.8	40.6	57.0	36.8	50.9	34.8	-	-	-	-	-	-	-	-	-	-	23000	-
% Solids		82.0	60.9	83.6	77.9	88.5	80.6	85.2	86.0	83.9	81.3	86.2	86.0	98.0	90.5	86.0	88.9	97.9	-	-

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.
- 4) See site map for sample locations.

Table 2
Location: FRU 197-31A
Lab Summary - Arsenic Summary

Last update 10/16/2013

Analytical Parameter (with units)	Cuttings #1						Cuttings #2						Background					Background					COGCC Table 910-1 Concentration Levels	Maximum based on Background
	Cut #1 Contents	Cut 1 AS-1	Cut 1 AS-2	Cut 1 AS-3	Cut 1 AS-4	Cut 1 AS-5	Cut #2 Contents	Cut 2 AS-1	Cut 2 AS-2	Cut 2 AS-3	Cut 2 AS-4	Cut 2 AS-5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5		
Accutest Job #	D51123 (9/30/13)	D51422 (10/8/13)					D51122 (9/30/13)	D51423 (10/8/13)					D29260 (11/7/11)					D29743 (11/22/11)					-	-
Sample type (Composite/Discrete)	C	D	D	D	D	D	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)	29.3	-	-	-	-	-	30.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	863	-	-	-	-	-	790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	892	-	-	-	-	-	820	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	0.0993	-	-	-	-	-	0.445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	0.117	-	-	-	-	-	0.205	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	ND	-	-	-	-	-	0.591	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)	0.0365	-	-	-	-	-	0.0310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	0.0148	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	0.266	-	-	-	-	-	0.383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	0.0238	-	-	-	-	-	0.0208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	17.400	-	-	-	-	-	13.900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	63.6	-	-	-	-	-	199	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
pH	9.92	-	-	-	-	-	11.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	13.1	17.3	13.7	14.5	15.4	14.3	10.7	11.9	10.9	13.2	12.5	69.3	4.1	5.6	2.9	3.3	3.9	6.2	3.7	4.3	4.2	2.5	0.39	6.8
Barium (mg/kg)	4070	-	-	-	-	-	2780	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)	<1.3	-	-	-	-	-	<1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	19.9	-	-	-	-	-	23.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	<1.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)	33.9	-	-	-	-	-	30.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	24.2	-	-	-	-	-	17.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)	<0.11	-	-	-	-	-	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)	16.6	-	-	-	-	-	14.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	<6.4	-	-	-	-	-	<6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)	<3.9	-	-	-	-	-	<3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	57.0	-	-	-	-	-	50.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23000	-
% Solids	77.9	82.3	81.6	75.6	77.5	75.4	80.6	79.2	79.0	74.8	71.2	74.5	86.0	83.9	81.3	86.2	86.0	98.0	90.5	86.0	88.9	97.9	-	-

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.
- 4) See site map for sample locations.

Table 3
Location: FRU 197-31A
Lab Summary - RP Mix/Blend Summary

Last update 11/25/2013

Analytical Parameter	Reserve Pit	RP Mix/Blend								COGCC	Maximum based on Background
(with units)	RP Contents	RP MB Day 1	RP MB Day 2	RP MB Day 3	RP MB Day 4	RP MB Day 5	RP MB Day 6	RP MB Day 7	RP MB Day 8	Table 910-1 Concentration Levels	
Accutest Job #	D51124 (9/30/13)	D52380 (11/07/13)	D52402 (11/08/13)	D52482 (11/11/13)		D52538 (11/13/13)	D52607 (11/14/13)	D52634 (11/15/13)	D52703 (11/18/13)	-	-
Sample type (Composite/Discrete)	C	C	C	C	C	C	C	C	C	-	-
TPH (GRO) (mg/Kg)	27.0	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	259	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	286	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	ND	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	ND	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	ND	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)	0.0102	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	0.0114	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	0.0739	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	0.0160	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	23.500	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	226	-	-	-	-	-	-	-	-	12	-
pH	12.28	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	4.3	-	-	-	-	-	-	-	-	0.39	6.8
Barium (mg/kg)	17600	7210	7250	5640	7060	7030	7370	5960	8490	15000	-
Cadmium (mg/kg)	<1.7	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	26.9	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	<1.0	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)	16.7	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	11.5	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)	<0.14	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)	12.2	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	<8.3	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)	<5.0	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	33.8	-	-	-	-	-	-	-	-	23000	-
% Solids	60.9	76.0	77.3	78.5	74.5	77.6	74.5	76.1	75.8	-	-

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.

Table 4
Location: FRU 197-31A
Lab Summary - Cuttings #1 Mix/Blend Summary

Last update 10/25/2013

Analytical Parameter	Cuttings #1	Cuttings #1 Mix/blend Trials		Cuttings #1 Mix/Blend				COGCC	Maximum based on Background
(with units)	Cut #1 Contents	MB Trial 1:1	MB Trial 2:1	MB Day 1	MB Day 2	MB Day 3	MB Day 4	Table 910-1 Concentration Levels	
Accutest Job # & Sample Date	D51123 (9/30/13)	D51425 (10/8/13)		D51669 (10/16/13)		D51725 (10/17/13)	D51734 (10/18/13)	-	-
Sample type (Composite/Discrete)	C	C	C	C	C	C	C	-	-
TPH (GRO) (mg/Kg)	29.3	ND	ND	ND	ND	22.1	ND	-	-
TPH (DRO) (mg/Kg)	863	282	231	284	230	264	351	-	-
TPH (GRO + DRO) (mg/Kg)	892	282	231	284	230	286	351	500	-
Benzene (mg/Kg)	ND	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	0.0993	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	0.117	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	ND	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	ND	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	ND	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)	0.0365	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	0.0148	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	ND	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	0.266	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	0.0238	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	17.400	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	63.6	-	-	-	-	-	-	12	-
pH	9.92	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	13.1	-	-	-	-	-	-	0.39	6.8
Barium (mg/kg)	4070	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)	<1.3	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	19.9	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	<1.0	-	-	-	-	-	-	23	-
Copper (mg/kg)	33.9	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	24.2	-	-	-	-	-	-	400	-
Mercury (mg/kg)	<0.11	-	-	-	-	-	-	23	-
Nickel (mg/kg)	16.6	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	<6.4	-	-	-	-	-	-	390	-
Silver (mg/kg)	<3.9	-	-	-	-	-	-	390	-
Zinc (mg/kg)	57.0	-	-	-	-	-	-	23000	-
% Solids	77.9	85.9	84.5	81.4	83.7	83.1	85.2	-	-

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.

Table 5
Location: FRU 197-31A
Lab Summary - Cuttings #2 Mix/Blend Summary

Last update 11/15/2013

Analytical Parameter	Cuttings #2	Cuttings #2 Mix/blend Trials		Cuttings #2 Mix/blend										COGCC	Maximum based on Background
(with units)	CUT #2 Contents	MB Trial 1:1	MB Trial 2:1	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Table 910-1 Concentration Levels	
Accutest Job #	D51122 (9/30/13)	D51424 (10/8/13)		D51866 (10/23/13)	D51921 (10/25/13)		D51960 (10/28/13)	D52001 (10/29/13)	D52053 (10/30/13)	D52125 10/31/13		D52238 (11/5/13)	D52309 (11/6/13)	-	-
Sample type (Composite/Discrete)	C	C	C	C	C	C	C	C	C	C	C	C	C	-	-
TPH (GRO) (mg/Kg)	30.1	9.42	ND	ND	11.3	9.04	8.05	12.5	9.42	8.33	ND	21.3	6.75	-	-
TPH (DRO) (mg/Kg)	790	270	183	154	261	179	168	208	231	128	123	151	98.3	-	-
TPH (GRO + DRO) (mg/Kg)	820	279	183	154	272	188	176	221	240	136	123	172	105.1	500	-
Benzene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	0.445	-	-	-	-	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	0.205	-	-	-	-	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	0.591	-	-	-	-	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)	0.0310	-	-	-	-	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	0.383	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	0.0208	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	13.900	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	199	-	-	-	-	-	-	-	-	-	-	-	-	12	-
pH	11.23	-	-	-	-	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	10.7	-	-	-	-	-	-	-	-	-	-	-	-	0.39	6.8
Barium (mg/kg)	2780	-	-	-	-	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)	<1.2	-	-	-	-	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	23.5	-	-	-	-	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)	30.0	-	-	-	-	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	17.7	-	-	-	-	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)	14.5	-	-	-	-	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	<6.1	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)	<3.6	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	50.9	-	-	-	-	-	-	-	-	-	-	-	-	23000	-
% Solids	80.6	81.2	83.8	74.3	84.9	85.8	85.8	85.2	83.6	84.5	84.4	83.8	84.8	-	-

Notes:

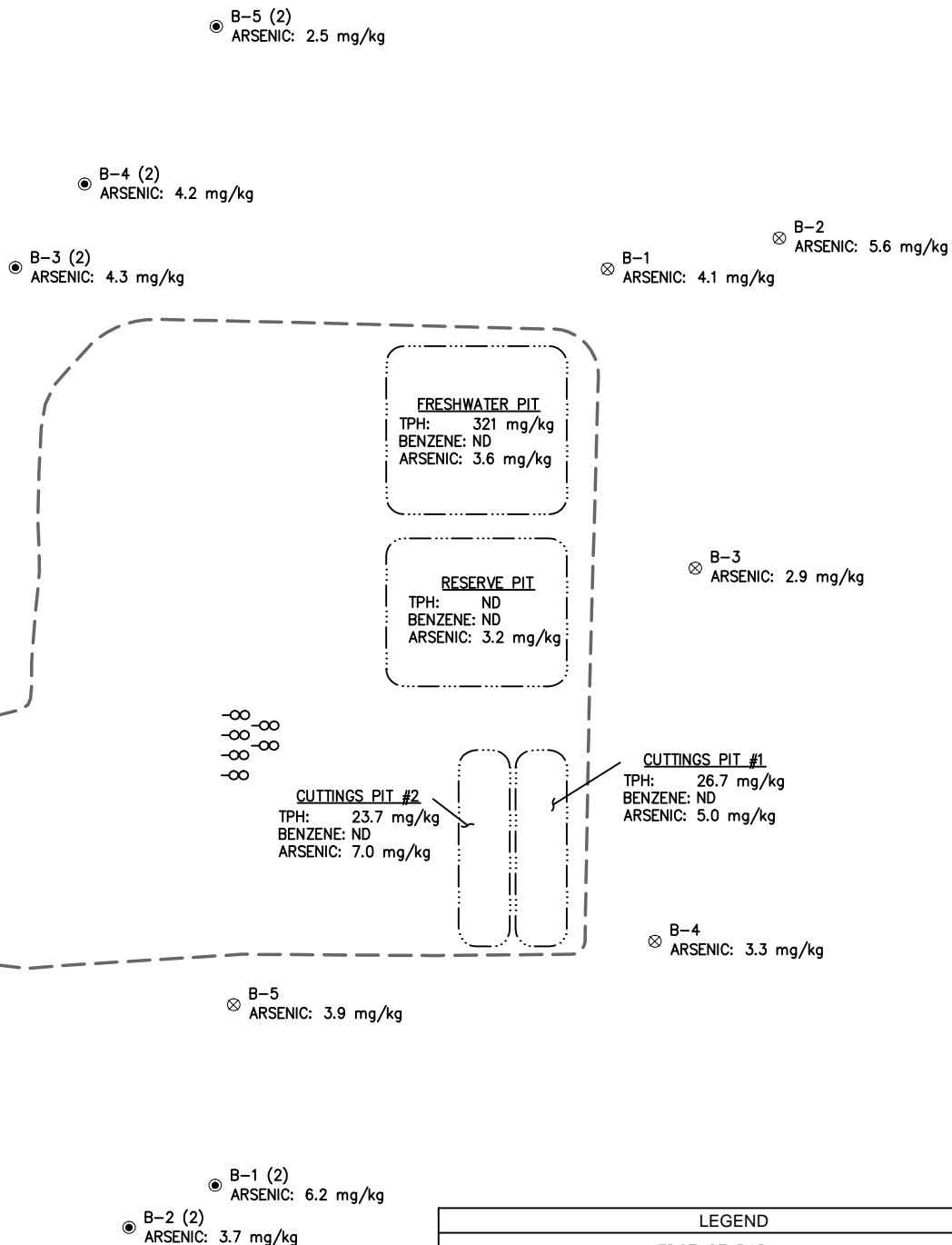
1) ND = not detectable to the laboratory detection limit.

2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.

3) "-" indicates no analysis.



0 75 150
SCALE IN FEET
1"=150'



NOTES:

1. ND INDICATES NOT DETECTED WITHIN LABORATORY DETECTION LIMITS.
2. RESULTS SHOWN ARE SUBLINER CONFIRMATION SAMPLES UNLESS OTHERWISE NOTED.

LEGEND	
---	EDGE OF PAD
- - - -	TOP OF PIT
-00	WELL HEAD
⊗ B-0	BACKGROUND SAMPLE LOCATION COLLECTED 11-07-11 WITH ARSENIC RESULTS
⊙ B-0 (2)	BACKGROUND SAMPLE LOCATION COLLECTED 11/22/11 WITH ARSENIC RESULTS

GPS: KRW	CHECKED: DK	FIGURE 1	DATE	REVISIONS
DATE: 10/16/13	DRAWN: DRF			
FILE NAME: samples ars	SHEET NO. 1 of 1			
PROJECT NO. 1111-02A	SCALE: 1" = 150'			

KRW CONSULTING, INC.
8000 W. 14TH AVENUE, SUITE 200
LAKEWOOD, COLORADO
(303) 239-9011

FIGURE 1
PICEANCE CREEK
FRU 197-31A
SAMPLE LOCATIONS MAP
WITH SELECT RESULTS
PREPARED FOR XTO ENERGY

COMPLETED PIT CLOSURE



Photograph #1 – south side of pad looking north



Photograph #2 – north side of pad looking south



Freedom Unit 197-31A
NWNE, Sec 31 ,T1S, R97W, NAD 83, 6th PM
Lat. 39.92392
Long: -108.32188

SITE
PHOTOGRAPHS
Photos Taken:
1/29/2014