

State of Colorado
Oil and Gas Conservation Commission

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



#6846

FOR OGCC USE ONLY

RECEIVED
2/10/2012

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.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

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

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

OGCC Operator Number: 100264

Name of Operator: XTO Energy Inc.

Address: 9127 South Jamacia Drive

City: Englewood State: CO Zip: 80112

Contact Name and Telephone:

Jessica Dooling

No: 970-675-4122

Fax: 970-675-4150

API Number: 05-103-11262

County: Rio Blanco

Facility Name: Piceance Creek Unit

Facility Number: 295843 Drilling Pit

Well Name: Piceance Creek Unit

Well Number: FRU 297-28C

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SENE, Sec 28, T2S, R97W, 6th PM Latitude: 39.848583 Longitude: -108.278232

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Drill Cuttings and Fluids

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.): non-cropland rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Redcreek-Rentsac complex, 5 to 30% slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): no water wells within 1/4 mile, nearest surface water is greater than 1/4 mile away

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

Impacted Media (check):

- ☒ Soils
☐ Vegetation
☐ Groundwater
☐ Surface Water

Extent of Impact:

Pit content: TPH, arsenic, barium

How Determined:

laboratory analysis

REMEDIALATION WORKPLAN

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

See Attachment I for details regarding initial action taken.

Describe how source is to be removed:

Freshwater pit synthetic liner and pit contents have been removed and transported to an off-site permitted disposal/recycling facility. Reserve pit synthetic liner was removed to an off-site permitted disposal/recycling facility. Reserve pit contents were mix/blended to below Table 910-1 concentrations and will be used onsite for fill.

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.:

Any remaining impacted soils will either be treated on-site or removed to a permitted disposal/recycling facility.

FORM
27
Rev 6/99State of Colorado
Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801, Denver, Colorado 80203
(303)894-2100 Fax: (303)894-2109Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: Reserve & Freshwater Pits
Well Name & No: Location ID # 336008
Facility Name & No: Pit Facility ID # 295843

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 200 feet below ground surface. Soil samples were/will be collected for laboratory analysis of subliner material to confirm no groundwater impact potential exists.

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 upon subliner testing beneath the Freshwater pit additional assessment and remediation may be necessary (see Table 1).

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

The Freshwater pit synthetic liner and identified impacted materials were removed from the site and transported to an off-site facility for recycling/disposal. The Reserve pit synthetic liner was removed from the site and transported to an off-site facility for recycling/disposal. Reserve pit contents were mix/blended with onsite spoils to below Table 910-1 parameters and will be used onsite for backfill. The Freshwater pit synthetic liner installed to store Reserve pit mix/blend material will be removed from the site and transported to an off-site facility for recycling/disposal. Pending additional assessment findings, remaining impacted soils will either be treated on-site or transported to an approved off-site facility for recycling/disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>09/20/11</u>	Date Site Investigation Completed: _____	Date Remediation Plan Submitted: _____
Remediation Start Date: <u>pending approval</u>	Anticipated Completion Date: <u>pending approval</u>	Actual Completion Date: <u>TBD</u>

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: Environmental CoordinatorDate: 2/10/2012

OGCC Approved: _____

Title: FOR Chris CanfieldDate: 02/17/2012

Please submit confirmation results for the freshwater pit along with the Notice of Completion.

ATTACHMENT I

FRU 297-28C Pit Closure Workplan, Form 27 Page 1

Describe initial action taken:

- i. Site consists of a Freshwater pit and a Reserve Pit (see Figure 1).
- ii. All freshwater pit contents and associated synthetic liners have been removed and transported to an off-site permitted disposal/recycling facility. The freshwater pit was relined for storage of mix/blend Reserve pit contents.
- iii. Reserve pit contents were mix/blend processed to meet Table 910-1 concentration levels, stored in the lined Freshwater pit and will be used on-site for backfill.
- iv. Reserve Pit sub-liner composite samples were collected and analyzed for full Table 910-1 parameters. (see Attachment II and Table 1).
- v. Freshwater pit sub-liner composite samples will be collected and analyzed for full Table 910-1 parameters.
- vi. Refer to Table 1 and Table 2 for a summary of laboratory results.
- vii. Elevated arsenic levels above Table 910-1 concentration were detected beneath the Reserve pit. Please refer to the associated sundry requesting consideration of background arsenic levels.

ATTACHMENT II

FRU 297-28C Pit Closure Workplan, Form 27 Page 2

REMEDIATION WORKPLAN

Describe Reclamation Plan:

1. Fresh Water Pit

- Freshwater pit contents were sampled for Table 910-1, results indicated that the material was in exceedance of Table 910-1 for TPH (88,583 mg/kg) and Arsenic (6.8 mg/kg). The Freshwater pit material and associated synthetic liners were removed and transported offsite for disposal at ECDC landfill.
- The Freshwater pit was relined for storage of mix/blend Reserve pit contents.
- Sub-liner samples will be collected and analyzed for Table 910-1 constituents following removal of stored Reserve pit mix/blend material.
- Backfilling of the Freshwater pit will not be completed until assessment indicates conditions compliant with Table 910-1 concentration levels.

2. Reserve Pit

- Reserve pit contents were sampled for Table 910-1, results indicated that the material was in exceedance of Table 910-1 for Barium (19,600 mg/kg) and other constituents (Arsenic, SAR etc.).
- Reserve pit post-solidification contents were sampled for Table 910-1, results indicated that the material was in exceedance of Table 910-1 for Barium (20,500 mg/kg) and other constituents (Arsenic and SAR). The contents were mix/blended into the Freshwater pit with onsite spoils to below Table 910-1 parameters (see Table 1 and Table 2).
- Reserve pit mix/blend material will be used onsite for backfill.
- The synthetic liner was removed and transported to an offsite permitted facility for disposal/recycling.
- A sub-liner sample was collected and analyzed for Table 910-1 parameters, results are below Table 910-1 concentrations with the exception of ph (10.17) and Arsenic (3.3 mg/kg).
- Elevated arsenic levels above the Table 910-1 concentration level were detected beneath the Reserve pit. Please refer to associated sundry requesting consideration of background arsenic levels.

- Please refer to Table 1 and Table 2 for a summary of laboratory results, analytical reports are attached.
- Any remaining elevated levels of SAR and pH detected beneath the pits or in material used for backfill will be covered with a minimum 3 feet of clean, native soils per COGCC guidance. No additional treatment of these soils will be required.
- On completion of required assessment and remedial activities, the pits will be backfilled. Material used to fill the pits will be derived from native on-site material or material transported to the site. Material used to fill the top three feet of each pit will be found on-site.
- Reclamation activities will be as specified in the Surface use Plan and BLM Conditions of Approval.

Table 1
Location: FRU 297-28C
Lab Summary

Last Update: 2/9/2012

Analytical Parameter	Freshwater Pit			Reserve pit				Background 1/26/11						2nd Backgrounds 11/15/11						COGCC	Background	
(with units)	FW Pit Contents 9/20/11	FW Pit Subliner	FW Pit Backfill	Reserve Pit Contents 9/20/11	Reserve Pit Contents 10/14/11 ⁵	Reserve Pit Mix/Blend (1/4/12 - 2/2/12)	RP Subliner 1/4/12	RP Backfill	B1A (-1.5)	B1B (-12)	B2A (-2)	B2B (-9.5)	B3A (-1.5)	B3B (-9.5)	TP-1 (-10)	TP-1 (-15)	TP-1 (-13)	TP-2 (-3)	TP-3 (-8)	TP-3 (-10)	Table 910-1 Allowable Levels	Maximum based on Background
Accutest Job #	D27858			D27857	D28640	Refer to Table 2 for Mix/Blend Results	D30796		D10555						D29515							
Sample Type (Composite/Discrete)	C			C	C ⁴		C		D	D	D	D	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)	83.2			ND	96.1		ND		-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	88,500			179	110		11.9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	88,583			179	206		11.9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	500	-
Toluene (mg/Kg)	0.205			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.170	-
Ethylbenzene (mg/Kg)	0.193			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	85	-
Xylenes (total) (mg/Kg)	4.050			ND	1,290		ND		-	-	-	-	-	-	-	-	-	-	-	-	100	-
Acenaphthene (mg/Kg)	0.532			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	175	-
Anthracene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(B)fluoranthene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	2.2	-
Chrysene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Dibenzo(A,H)anthracene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	22	-
Fluoranthene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Fluorene (mg/Kg)	1.720			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Indo(1,2,3-C,D)pyrene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Napthalene (mg/Kg)	0.414			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Pyrene (mg/Kg)	ND			ND	ND		ND		-	-	-	-	-	-	-	-	-	-	-	-	23	-
Electrical Conductivity (mmhos/cm)	0.362			1,800	1,650		0.649		0.481	0.478	0.719	2.060	0.170	3.420	-	-	-	-	-	-	1000	-
Sodium Adsorption Ratio (SAR)	4.55			38.2	29.1		7.25		1.73	5.62	2.39	10.7	0.512	13.9	-	-	-	-	-	-	<4 or 2X BG	-
pH	8.57			11.22	8.88		10.17		9.07	9.53	9.19	9.64	9.23	9.48	-	-	-	-	-	-	<12	-
Arsenic (mg/kg)	6.8			8.1	8.7		3.3		1.9	2.4	6.1	2.7	2.5	3.3	1.3	2.0	3.2	1.5	2.7	2.4	6-9	-
Barium (mg/kg)	5,140			19,600	20,500		691		-	-	-	-	-	-	-	-	-	-	-	-	0.39	6.7
Cadmium (mg/kg)	<1.6			<4.2	<3.9		<1.1		-	-	-	-	-	-	-	-	-	-	-	-	15000	-
Chromium (III) (mg/Kg)	41.9			28.3	15.7		37.1		-	-	-	-	-	-	-	-	-	-	-	-	70	-
Chromium (VI) (mg/Kg)	<0.59			<1.6	<1.5		0.57		-	-	-	-	-	-	-	-	-	-	-	-	120000	-
Copper (mg/kg)	37.0			30.8	20.9		5.6		-	-	-	-	-	-	-	-	-	-	-	-	23	-
Lead (inorganic) (mg/kg)	25.5			<21	<19		9.9		-	-	-	-	-	-	-	-	-	-	-	-	3100	-
Mercury (mg/kg)	0.60			<0.37	<0.38		<0.12		-	-	-	-	-	-	-	-	-	-	-	-	400	-
Nickel (mg/kg)	18.8			17.3	15.8		12.6		-	-	-	-	-	-	-	-	-	-	-	-	23	-
Selenium (mg/kg)	<39			<110	<96		<5.6		-	-	-	-	-	-	-	-	-	-	-	-	1600	-
Silver (mg/kg)	<4.7			<13	<12		<3.4		-	-	-	-	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	130			42.7	46.6		37		-	-	-	-	-	-	-	-	-	-	-	-	390	-
% Solids	65.5			24.8	27.3		87.6		80.7	85.4	85.2	89.1	89.4	87.0	89.0	87.4	87.3	89.1	92.4	94.8	23000	-
Notes:																						

Notes:

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

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

3) "-" indicates no analysis.

4) See site map for sample locations

5) Samples collected post solidification of pit contents.

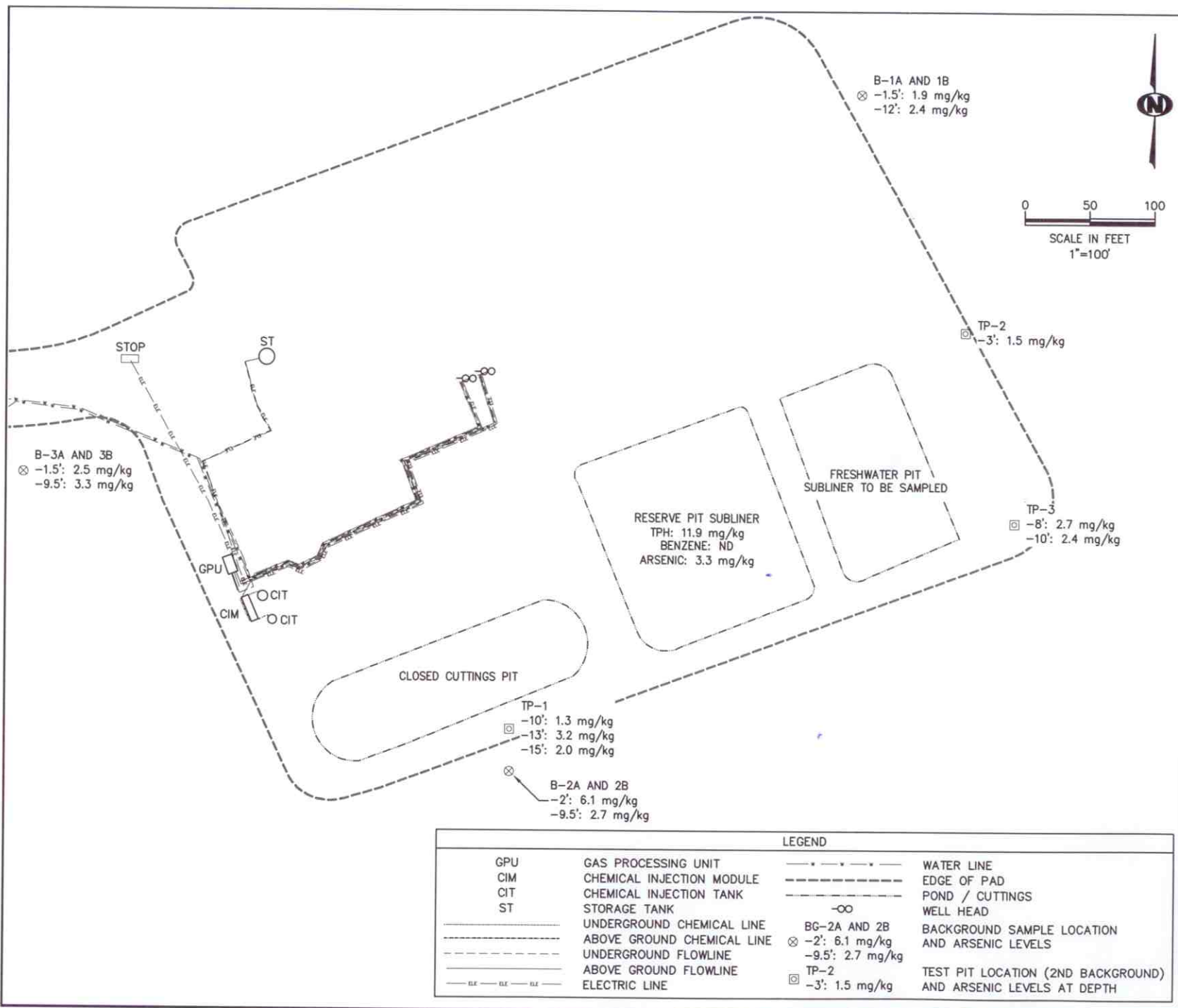
Table 2
Location: FRU 297-28C
Lab Summary - Reserve Pit Contents Mix/Blend Results

Last Update: 2/6/2012

Analytical Parameter (with units)	Reserve Pit											COGCC
	RP Mix Blend #1 1/4/12	RP Mix Blend #2 1/18/12	RP Mix Blend #3 1/18/12	RP Mix Blend #4 1/20/12	RP Mix Blend #5 1/20/12	RP Mix Blend #6 1/25/12	RP Mix Blend #7 1/25/12	RP Mix Blend #8 1/26/12	RP Mix Blend #9 1/26/12	RP Mix Blend #10 2/1/12	RP Mix Blend #11 2/1/12	Table 910-1 Allowable Levels
Accutest Job #	D30797	D31168	D31168	D31246	D31246	D31352	D31352	D31412	D31412	D31570	D31570	
Sample Type (Composite/Discrete)	C	C	C	C	C	C	C	C	C	C	C	-
TPH (GRO) (mg/Kg)	10	-	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	211	-	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	221	-	-	-	-	-	-	-	-	-	-	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(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	0.22
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	2.2
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	0.022
Chrysene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	22
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	0.022
Fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	1000
Fluorene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	1000
Indo(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	0.22
Napthalene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	23
Pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-	1000
Electrical Conductivity (mmhos/cm)	6.73	-	-	-	-	-	-	-	-	-	-	<4 or 2X BG
Sodium Adsorption Ratio (SAR)	7.84	-	-	-	-	-	-	-	-	-	-	<12
pH	10.95	-	-	-	-	-	-	-	-	10.91	10.83	6-9
Arsenic (mg/kg)	4.2	3.8	3.8	4.3	4.2	4.5	6.1	3.4	4.1	2.5	2.4	0.39
Barium (mg/kg)	3,870	6,040	4,910	5,890	5,670	5,700	7,010	5,510	3,730	5,310	5,640	15000
Cadmium (mg/kg)	<1.3	-	-	-	-	-	-	-	-	-	-	70
Chromium (III) (mg/Kg)	22.6	-	-	-	-	-	-	-	-	-	-	120000
Chromium (VI) (mg/Kg)	<0.52	-	-	-	-	-	-	-	-	-	-	23
Copper (mg/kg)	9.3	-	-	-	-	-	-	-	-	-	-	3100
Lead (inorganic) (mg/kg)	10.6	-	-	-	-	-	-	-	-	-	-	400
Mercury (mg/kg)	<0.14	-	-	-	-	-	-	-	-	-	-	23
Nickel (mg/kg)	10.9	-	-	-	-	-	-	-	-	-	-	1600
Selenium (mg/kg)	<6.7	-	-	-	-	-	-	-	-	-	-	390
Silver (mg/kg)	<4.0	-	-	-	-	-	-	-	-	-	-	390
Zinc (mg/kg)	35.6	-	-	-	-	-	-	-	-	-	-	23000
% Solids	75.1	78.5	81.2	81.1	79.3	79.3	76	77.5	80.1	86.9	80.9	-

Notes:

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



LEGEND			
GPU	GAS PROCESSING UNIT	— · — · — · —	WATER LINE
CIM	CHEMICAL INJECTION MODULE	-----	EDGE OF PAD
CIT	CHEMICAL INJECTION TANK	-----	POND / CUTTINGS
ST	STORAGE TANK	— ∞ —	WELL HEAD
-----	UNDERGROUND CHEMICAL LINE	⊗	BG-2A AND 2B
-----	ABOVE GROUND CHEMICAL LINE	⊗	-2': 6.1 mg/kg
-----	UNDERGROUND FLOWLINE	⊗	-9.5': 2.7 mg/kg
-----	ABOVE GROUND FLOWLINE	⊗	TP-2
-----	ELECTRIC LINE	⊗	-3': 1.5 mg/kg

DESIGNED:	CHECKED:	FIGURE	1
DK	JH		
DATE:	DATE:		
2/7/12	2/7/12		
FILE NAME:	FILE NAME:		
sample ars all	sample ars all		
PROJECT NO.	PROJECT NO.		
1108-08A	1108-08A		

NOTES:	DATE	REVISIONS

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

FIGURE 1
PICEANCE CREEK
FRU 297-28C
SAMPLE LOCATIONS WITH
ARSENIC LEVELS
PREPARED FOR XTO ENERGY