

State of Colorado  
**Oil and Gas Conservation Commission**

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



**#7736**

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.

**CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED**

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

OGCC Operator Number: _____	Contact Name and Telephone: _____
Name of Operator: _____	_____
Address: _____	No: _____
City: _____ State: _____ Zip: _____	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	_____	_____

**REMEDIALTION 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.:**

\_\_\_\_\_



REMEDIATION WORKPLAN (Cont.)

Tracking Number: \_\_\_\_\_

Name of Operator: X T O

OGCC Operator No: \_\_\_\_\_

Received Date: \_\_\_\_\_

Well Name & No: API # 103 11248

Facility Name & No: 296-SA / Location #335896

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 I

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 #1, or #2 Pits (see Table 1).

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

Synthetic liners from each of the pits were removed and will be transported to an approved offsite disposal/recycling facility. Cuttings Pit #1 and #2 contents will either be treated onsite with a temporary Thermal Desorption Unit; mix/blend processed to below Table 910-1 concentration levels and/or transported to an approved offsite disposal/recycling facility. Material mix/blend and/or Thermal Desorption Unit processed will be used for on-site fill.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 10/25/12

Date Site Investigation Completed: in progress

Date Remediation Plan Submitted: 4/23/2013

Remediation Start Date: pending approval

Anticipated Completion Date: pending approval

Actual Completion Date: TBD

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: Pleance EH&S Coordinator

Date: 4/23/2013

OGCC Approved: \_\_\_\_\_

Title: EPS II NW Region Date: 04/29/2013

## **ATTACHMENT I**

### **PCU 296-5A Pit Closure Workplan, Form 27 Page 1**

#### **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 will be transported to an offsite permitted disposal/recycling facility.
- Freshwater Pit subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.50) and Arsenic (4.1 mg/kg).

#### **2. Reserve Pit**

- Reserve Pit contents were solidified and sampled for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for EC (8.770 mmhos/cm), SAR (13.6), pH (12.32) and Arsenic (9.9 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 (9.93) and Arsenic (5.0 mg/kg).

#### **3. Cuttings Pit #1**

- Cuttings Pit #1 contents were solidified and composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for TPH (629 mg/kg), EC (8.300 mmhos/cm), SAR (59.2), pH (10.66) and Arsenic (10.2 mg/kg).
- Cuttings Pit #1 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for SAR (14.2), pH (11.08) and Arsenic (8.1 mg/kg).

#### **4. Cuttings Pit #2**

- Cuttings Pit #2 contents were solidified and composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for Benzene (0.811 mg/kg), Benzo(A)pyrene (0.0338 mg/kg), EC (5.380 mmhos/cm), SAR (30.5), pH (12.18) and Arsenic (8.3 mg/kg).

- Cuttings Pit #2 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.90) and Arsenic (13.0 mg/kg).
- Cuttings #1 and #2 Pit contents were removed from the respective pits and will either be treated on-site with a temporary Thermal Desorption Unit; mix/blend processed and sampled to ensure Table 910 compliance and/or transported to an offsite permitted disposal/recycling facility.
- Reserve Pit material that meets Table 910-1 concentration levels will be used onsite for backfill.
- Mix/blend and/or Thermal Desorption Unit processed Cuttings Pit #1 and #2 material that meets Table 910-1 concentration levels will be used onsite for backfill.
- All associated Reserve, Cuttings Pit #1, and #2 synthetic liners were removed and will be transported to an offsite permitted disposal/recycling facility.
- Refer to Table 1 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 beneath the Freshwater, Reserve and Cuttings Pits #1, and #2. Please refer to the associated sundry requesting consideration of background Arsenic levels.
- Any remaining elevated levels of Electrical Conductivity, 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.
- Material used to fill the top 3 feet of each pit will be found onsite.
- Reclamation activities will be 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: PCU 296-5A**  
**Lab Summary**

Last update 4/12/2013

Analytical Parameter	Fresh Water Pit		Reserve Pit		Cuttings #1			Cuttings #2		Background								COGCC		Last update
(with units)	FW Pit Contents	FW Pit Subliner 10/25/12	RP Post Solid. 11/30/12	RP Subliner 12/3/12	Cut #1 Post Solid. 1/8/13	Cut #1 Subliner 1/7/13	Cut #1 Overburden 1/8/13	Cut 2 Post Solid. 11/27/12	Cut #2 Subliner 11/14/12	#1	#2	#3	#4	#5	#6	#7	#8	Table 910-1 Concentration Levels	Maximum based on Background	
Accutest Job #	Pit Contents De Minimis	D40328	D41448	D41506	D42556	D42511	D42556	D41305	D41014	D40539 (11/1/12)								-	-	
Sample type (Composite/Discrete)		C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	-	-	
TPH (GRO) (mg/Kg)		ND	12.3	ND	24.9	ND	ND	ND	7.36	ND	-	-	-	-	-	-	-	-	-	
TPH (DRO) (mg/Kg)		ND	159	33.8	604	66.6	66.6	45.6	240	24.7	-	-	-	-	-	-	-	-	-	
TPH (GRO + DRO) (mg/Kg)		ND	171	33.8	629	66.6	66.6	45.6	247	24.7	-	-	-	-	-	-	-	-	500	
Benzene (mg/Kg)		ND	0.128	ND	ND	ND	ND	ND	0.811	0.0444	-	-	-	-	-	-	-	-	0.170	
Toluene (mg/Kg)		ND	0.327	ND	0.396	ND	ND	ND	1.91	0.158	-	-	-	-	-	-	-	-	85	
Ethylbenzene (mg/Kg)		ND	0.0466	ND	0.179	0.0319	ND	ND	0.221	0.0330	-	-	-	-	-	-	-	-	100	
Xylenes (total) (mg/Kg)		ND	0.399	ND	0.854	ND	ND	ND	1.79	0.161	-	-	-	-	-	-	-	-	175	
Acenaphthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	1000	
Anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	1000	
Benzo(A)anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0234	ND	-	-	-	-	-	-	-	-	0.22	
Benzo(A)pyrene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0338	ND	-	-	-	-	-	-	-	-	0.022	
Benzo(B)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	0.22	
Benzo(K)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	2.2	
Chrysene (mg/Kg)		ND	0.0107	ND	ND	ND	ND	ND	0.0819	ND	-	-	-	-	-	-	-	-	22	
Dibenzo(A,H)anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	0.022	
Fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0304	ND	-	-	-	-	-	-	-	-	1000	
Fluorene (mg/Kg)		ND	0.0149	ND	ND	ND	ND	ND	0.131	ND	-	-	-	-	-	-	-	-	1000	
Indeno(1,2,3,C,D)pyrene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	0.22	
Naphthalene (mg/Kg)		ND	0.0576	ND	0.185	0.0222	ND	ND	0.662	0.0348	-	-	-	-	-	-	-	-	23	
Pyrene (mg/Kg)		ND	0.0080	ND	0.0270	ND	ND	ND	0.0512	ND	-	-	-	-	-	-	-	-	1000	
Electrical Conductivity (mmhos/cm)		0.228	8.770	0.406	8.300	1.560	1.050	1.050	5.380	0.353	-	-	-	-	-	-	-	-	4	
Sodium Adsorption Ratio (SAR)		1.90	13.6	4.84	59.2	14.2	2.53	2.53	30.5	3.67	-	-	-	-	-	-	-	-	12	
pH		9.50	12.32	9.93	10.66	11.08	9.54	9.54	12.18	9.90	-	-	-	-	-	-	-	-	6-9	
Arsenic (mg/kg)		4.1	9.9	5.0	10.2	8.1	4.4	4.4	8.3	13.0	4.5	4.6	3.6	6.3	11.9	6.5	6.0	6.1	0.39	
Barium (mg/kg)		488	11400	2270	1640	358	679	679	8740	1710	-	-	-	-	-	-	-	-	15000	
Cadmium (mg/kg)		<1.3	<1.6	<1.1	<1.2	<1.2	<1.1	<1.1	<1.2	<1.1	-	-	-	-	-	-	-	-	70	
Chromium (III) (mg/Kg)		20.3	14.1	23.4	24.1	56.8	32.7	32.7	13.5	65.4	-	-	-	-	-	-	-	-	120000	
Chromium (VI) (mg/Kg)		<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-	-	23	
Copper (mg/kg)		12.0	28.4	9.5	24.8	10.4	11.8	11.8	28.9	8.1	-	-	-	-	-	-	-	-	3100	
Lead (inorganic) (mg/kg)		10.9	15.5	19.9	39.4	9.6	10.1	10.1	29.4	9.1	-	-	-	-	-	-	-	-	400	
Mercury (mg/kg)		<0.098	<0.13	<0.092	<0.10	<0.10	<0.094	<0.094	<0.10	<0.090	-	-	-	-	-	-	-	-	23	
Nickel (mg/kg)		15.2	112	11.9	15.4	19.7	17.0	17.0	12.7	20.5	-	-	-	-	-	-	-	-	1600	
Selenium (mg/kg)	<6.6	<8.1	<5.5	<6.1	<6.2	<5.7	<5.7	<5.9	<5.7	-	-	-	-	-	-	-	-	390		
Silver (mg/kg)	<4.0	<4.9	<3.3	<3.7	<3.7	<3.4	<3.4	<3.6	<3.4	-	-	-	-	-	-	-	-	390		
Zinc (mg/kg)	33.7	33.8	27.7	51.3	40.0	36.1	36.1	35.3	38.2	-	-	-	-	-	-	-	-	23000		
% Solids	78.8	61.7	90.2	81.8	81.0	88.2	88.2	81.9	86.4	90.5	86.2	86.3	86.5	87.3	85.2	86.9	86.8	-		

## Notes:

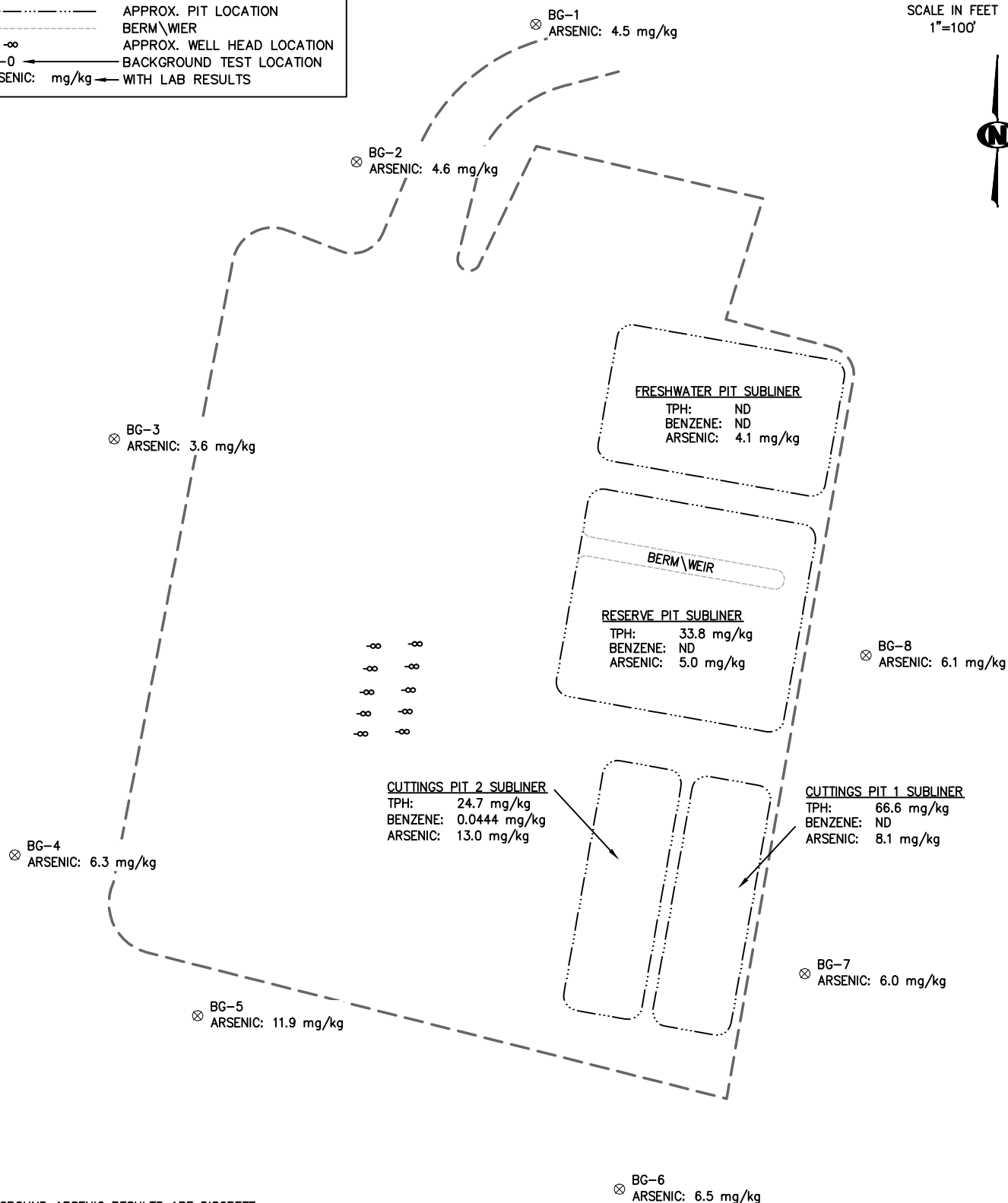
- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.
- 4) See site map for sample locations.

\\hyper-v03\kwd-co\sdk\proj\cto environmental\1210-04-pcu 296-5a\samples.dwg,4/23/13

LEGEND	
	EDGE OF PAD
	APPROX. PIT LOCATION
	BERM\WEIR
	APPROX. WELL HEAD LOCATION
	BACKGROUND TEST LOCATION
	ARSENIC: mg/kg WITH LAB RESULTS

0 50 100

SCALE IN FEET  
1"=100'



NOTES:

1. BACKGROUND ARSENIC RESULTS ARE DISCRETE SAMPLES.
2. ND INDICATES NOT DETECTED WITHIN LABORATORY DETECTION LIMITS.

GPS:	CHECKED:	FIGURE 1	DATE	REVISIONS
TRIMBLE	DK			
DATE:	DRAWN:			
4/23/13	DRF			
FILE NAME:	SHEET NO.	1 of 1		
samples				
PROJECT NO.	SCALE:			
1210-04	1" = 100'			

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

**FIGURE 1**  
PICEANCE CREEK  
PCU 296-5A  
SAMPLE LOCATIONS WITH  
ARSENIC LEVELS  
PREPARED FOR XTO ENERGY