

State of Colorado Oil and Gas Conservation Commission



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

#6916

FOR OGCC USE ONLY

RECEIVED
3/12/2012

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.

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): Pit Closure

OGCC Operator Number: 100264

Name of Operator: XTO Energy Inc.

Address: 9127 S Jamacia Drive

City: Englewood

State: CO Zip: 80112

Contact Name and Telephone:

Jessica Dooling

No: 970-675-4122

Fax: 970-675-4150

API Number: 05-103-11255-00

County: Rio Blanco

Facility Name: Freedom Unit

Facility Number: 294705 Drilling Pit

Well Name: Freedom Unit

Well Number: FRU 297-20A

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SE/NE 20, 2S, 97W, 6th

Latitude: 39.862867 Longitude: -108.298900

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 5-30% slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): no water wells with 1/4 mi., surface water within 1/4 mile

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

Impacted Media (check):



Soils



Vegetation



Groundwater



Surface Water

Extent of Impact:

pit contents: elevated TPH, arsenic, barium

How Determined:

laboratory analysis

REMEDIATION 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 de minmuis contents have been removed and transported to an off-site permitted disposal/recycling facility. Reserve and Cuttings Pit synthetic liners were 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. Cuttings Pit contents were below Table 910-1 concentrations (with the exception of Arsenic) after solidification 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.:

NA

XTO

FORM
27
Rev 6/99State of Colorado
Oil and Gas Conservation Commission
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REMEDIAL WORKPLAN (Cont.)

Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: FRU 297-20 A
Facility Name & No: _____

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 approximately 35 feet below 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 and Cuttings Pits (please see Table 1 and Table 2).

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

Synthetic pit liners from the Freshwater, Reserve and Cuttings pits were removed to an off-site permitted disposal/recycling facility. De minimus Freshwater pit contents were removed from the site and transported to an off-site facility for disposal/recycling. Reserve pit contents were mix/blended with onsite spoils to below Table 910-1 parameters and will be used onsite for backfill. Cuttings pit contents were below Table 910-1 parameters (with the exception of Arsenic) after solidification and will be used onsite for backfill (see Table 1).

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>11/4/11</u>	Date Site Investigation Completed: <u>in progress</u>	Date Remediation Plan Submitted: <u>3/12/2012</u>
Remediation Start Date: <u>pending approval</u>	Anticipated Completion Date: <u>pending approval</u>	Actual Completion Date: _____

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: 3/12/2012

OGCC Approved: _____

Title: FOR Chris CamfieldDate: 03/21/2012

EPS NW Region

ATTACHMENT I

FRU 297-20A Pit Closure Workplan, Form 27 Page 1

Describe initial action taken:

- i. The site consists of a Freshwater Pit, Reserve Pit and a Cuttings Pit (see Figure 1).
- ii. De minimus Freshwater Pit contents and associated synthetic liners were removed and transported to an off-site permitted disposal/recycling facility.
- iii. Freshwater Pit sub-liner composite samples were collected and analyzed for Table 910-1 parameters, results are below Table 910-1 concentrations with the exception of Arsenic (6.4 mg/kg).
- iv. Reserve Pit contents were mix/blend processed to meet Table 910-1 concentrations with the exception of EC (11.2 mmhos/cm), SAR (17.1), pH (10.05-12.43) and Arsenic (4.3 mg/kg) and will be used on-site for backfill.
- v. Reserve Pit sub-liner composite samples were collected and analyzed for Table 910-1 parameters, results are below Table 910-1 concentrations with the exception of SAR (16.5), pH (10.45) and Arsenic (6.9 mg/kg).
- vi. Cuttings Pit contents met Table 910-1 concentration levels with the exception of EC (16.5 mmhos/cm), SAR (138), pH (12.04) and Arsenic (17.4 mg/kg) after solidification and will be used on-site for backfill.

The initial Cuttings Pit contents Arsenic concentration of 17.4 mg/kg is presumed to be the result of material from the Mancos formation. Ten additional discrete samples representing the Cuttings Pit material including, in part, material from the Mancos formation, were analyzed for Arsenic and result in a range of 6.0 mg/kg to 17.1 mg/kg and a mean of 9.07 mg/kg. The mean of the Cuttings Pit material is within the allowable Arsenic concentration of 9.35 mg/kg. Please refer to the associated sundry requesting consideration of background arsenic levels.

- vii. Cuttings pit sub-liner composite samples were collected and analyzed for full Table 910-1 parameters, results are below Table 910-1 concentrations with the exception of pH (9.12) and Arsenic (8.5 mg/kg).

- viii. Refer to Table 1 and Table 2 for a summary of laboratory results.
- ix. Elevated arsenic levels above Table 910-1 concentration were detected beneath the Freshwater, Reserve and Cuttings Pits. Please refer to the associated sundry requesting consideration of background arsenic levels.

ATTACHMENT II

FRU 297-20A Pit Closure Workplan, Form 27 Page 2

REMEDIATION WORKPLAN

Describe Reclamation Plan:

1. Fresh Water Pit

- The pit will be closed and backfilled with native on-site material or material transported to the site.

2. Reserve Pit

- The pit will be backfilled with Mix/blended, native on-site material or material transported to the site.

3. Cuttings Pit

- The pit will be backfilled with Mix/blended, native on-site material or material transported to the site.
- Elevated arsenic levels above the Table 910-1 concentration level were detected beneath the Freshwater, Reserve and Cuttings Pits. 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 EC, 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 297-20A
Lab Summary

Last update: 2/20/2012

Analytical Parameter		Fresh Water Pit	Reserve Pit								Cuttings #1		Backfill	Background 01/26/11					Background 11/18/11					COGCC	Maximum based on Background
(with units)	FW Pit Subliner 12/5/11 ¹	RP Contents 11/4/11	Solidified RP Contents 11/30/11	RP Mix Blend (1/24) 1/25/12	RP Mix Blend (1/25) 1/25/12	RP Mix Blend (1/25) Reworked and Resampled 2/9/12	RP Mix Blend (1/26) 1/30/12	RP Mix Blend (1/27) 1/30/12	RP Subliner 1/30/12	Cut #1 Pit Contents 11/10/11 ⁶	Cut #1 Pit Subliner 01/04/12	Pit Backfill Material 11/18/11 ⁷	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	Table 910-1 Concentration Levels		
Accutest Job #	D29982	D29208	D29894	D31354	D31354	D31782	D31468	D31468	D31467	D29403	D30800	D29643	D20762					D29648					-	-	
Sample type (Composite/Discrete)	C	C	C	C	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	-	-	
TPH (GRO) (mg/Kg)	ND	48.7	49.6	-	-	-	-	-	ND	34.4	ND	ND	-	-	-	-	-	-	-	-	-	-	-	-	
TPH (DRO) (mg/Kg)	86.5	785	37.3	-	-	-	-	-	22.1	281	44.4	ND	-	-	-	-	-	-	-	-	-	-	-	-	
TPH (GRO + DRO) (mg/Kg)	86.5	834	86.9	-	-	-	-	-	22.1	315	44.4	ND	-	-	-	-	-	-	-	-	-	-	500	-	
Benzene (mg/Kg)	ND	ND	ND	-	-	-	-	-	ND	0.130	0.0522	ND	-	-	-	-	-	-	-	-	-	-	0.170	-	
Toluene (mg/Kg)	ND	ND	ND	-	-	-	-	-	ND	0.652	0.235	ND	-	-	-	-	-	-	-	-	-	-	85	-	
Ethylbenzene (mg/Kg)	ND	0.165	ND	-	-	-	-	-	ND	0.142	0.0540	ND	-	-	-	-	-	-	-	-	-	-	100	-	
Xylenes (total) (mg/Kg)	ND	0.764	0.668	-	-	-	-	-	ND	0.733	0.299	ND	-	-	-	-	-	-	-	-	-	-	175	-	
Acenaphthene (mg/Kg)	ND	ND	ND	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Anthracene (mg/Kg)	ND	ND	ND	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Benzo(A)anthracene (mg/Kg)	ND	ND	0.0101	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	0.22	-	
Benzo(B)fluoranthene (mg/Kg)	ND	ND	0.0122	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	0.22	-	
Benzo(K)fluoranthene (mg/Kg)	ND	ND	0.0053	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	2.2	-	
Benzo(A)pyrene (mg/Kg)	ND	ND	0.0067	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	0.022	-	
Chrysene (mg/Kg)	ND	ND	0.0265	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	22	-	
Dibenzo(A,H)anthracene (mg/Kg)	ND	ND	ND	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	0.022	-	
Fluoranthene (mg/Kg)	ND	ND	0.0142	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Fluorene (mg/Kg)	ND	ND	0.0982	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Indeno(1,2,3-cd)pyrene (mg/Kg)	ND	ND	0.0064	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	0.22	-	
Naphthalene (mg/Kg)	ND	ND	0.228	-	-	-	-	-	ND	0.307	0.0207	-	-	-	-	-	-	-	-	-	-	-	23	-	
Pyrene (mg/Kg)	ND	ND	0.0344	-	-	-	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Electrical Conductivity (mmhos/cm)	1.830	3.08	11.200	-	-	-	-	-	2.100	16.5	3.650	-	-	-	-	-	-	-	-	-	-	-	4	-	
Sodium Adsorption Ratio (SAR)	3.12	40.8	17.1	-	-	-	-	-	16.5	138	9.39	-	-	-	-	-	-	-	-	-	-	-	12	-	
pH	8.51	10.52	12.87	10.05	12.43	-	11.48	11.23	10.45	12.04	9.12	-	-	-	-	-	-	-	-	-	-	-	6-9	-	
Arsenic (mg/kg)	6.4	8.2	4.3	-	-	-	-	-	6.9	17.4	8.5	-	3.8	4.0	4.1	6.8	7.6	7.3	3.2	3.9	5.5	8.5	0.39	9.4	
Barium (mg/kg)	360	29300	17800	13300	15400	9170	12500	10000	2540	4290	1350	-	-	-	-	-	-	-	-	-	-	-	15000	-	
Cadmium (mg/kg)	<1.2	<3.2	<3.0	-	-	-	-	-	<1.2	2	<1.0	-	-	-	-	-	-	-	-	-	-	-	70	-	
Chromium (III) (mg/Kg)	29.9	30.9	23.2	-	-	-	-	-	24.2	19.7	22.7	-	-	-	-	-	-	-	-	-	-	-	120000	-	
Chromium (VI) (mg/Kg)	<0.47	<1.4	<1.2	-	-	-	-	-	<0.45	0.69	<0.43	-	-	-	-	-	-	-	-	-	-	-	23	-	
Copper (mg/kg)	13.4	35.2	15.7	-	-	-	-	-	16.1	26.9	16.8	-	-	-	-	-	-	-	-	-	-	-	3100	-	
Lead (inorganic) (mg/kg)	12.4	<16	<15	-	-	-	-	-	12.0	32.5	11.0	-	-	-	-	-	-	-	-	-	-	-	400	-	
Mercury (mg/kg)	<0.12	<0.35	<0.27	-	-	-	-	-	<0.11	<0.15	<0.11	-	-	-	-	-	-	-	-	-	-	-	23	-	
Nickel (mg/kg)	16.3	17.9	9.3	-	-	-	-	-	14.6	16.1	16.8	-	-	-	-	-	-	-	-	-	-	-	1600	-	
Selenium (mg/kg)	<6.0	<160	<150	-	-	-	-	-	<5.8	<7.7	<5.2	-	-	-	-	-	-	-	-	-	-	-	390	-	
Silver (mg/kg)	<3.6	<9.6	<8.9	-	-	-	-	-	<3.5	<4.6	<3.1	-	-	-	-	-	-	-	-	-	-	-	390	-	
Zinc (mg/kg)	42.4	60.6	24.0	-	-	-	-	-	42.0	88.4	45.6	-	-	-	-	-	-	-	-	-	-	-	23000	-	
% Solids	84.6	29.2	33.8	55.8	55.9	69.3	71.6	64.8	86.5	65.7	92.0	93.0	81.2	70.1	78.1	81.0	87.4	80.4	87.4	91.0	92.8	91.3	-	-	

Notes:

1. Freshwater pit contained de minimus contents - properly disposed of with liner/felt material at the Wray Gulch Landfill.
2. ND = not detectable to the laboratory detection limit.
3. Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in gray exceed Table 910-1, but are below background levels.
4. "-" indicates no analysis.
5. See site map for sample locations.
6. Cuttings #1 pit content additional arsenic results summarized on Table 2.
7. Plans include backfill of a portion of the freshwater pit with mix blended soils from the reserve pit.

