

State of Colorado
Oil and Gas Conservation Commission

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



#7737

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 _____ _____

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.:



Page 2
REMEDIAL WORKPLAN (Cont.)

Tracking Number: _____
Name of Operator: XTO
OGCC Operator No: _____
Received Date: _____
Well Name & No: APF # 103 11180
Facility Name & No: 197-36A / Location # 335962

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 Pits #1, #2 and #3 (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. Reserve Pit, Cuttings Pit #1 and #3 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: <u>9/5/12</u>	Date Site Investigation Completed: <u>in progress</u>	Date Remediation Plan Submitted: <u>2/25/2013</u>
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: Lead EH&S Coordinator

Date: 2/25/2013

OGCC Approved: _____

Title: EPS II NW Region

Date: 04/29/2013

ATTACHMENT I

PCU 197-36A Pit Closure Workplan, Form 27 Page 1

Describe initial action taken:

The site consists of Freshwater, Reserve and Cuttings Pits #1, #2 and #3 (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 (9.34) and Arsenic (5.8 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 TPH (590 mg/kg), EC (10.700 mmhos/cm), SAR (21.9), pH (12.24) and Arsenic (11.1 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 (9.68) and Arsenic (7.0 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 (910 mg/kg), EC (11.400 mmhos/cm), SAR (93.8), pH (12.43) and Arsenic (16.8 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 (13.2) and Arsenic (7.7 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 EC (6.230 mmhos/cm), SAR (23.0), pH (11.32) and Arsenic (6.6 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 (9.37) and Arsenic (4.9 mg/kg).

5. Cuttings Pit #3

- Cuttings Pit #3 contents were solidified and composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for Benzene (0.636 mg/kg), Benzo(A)pyrene (0.0231 mg/kg), EC (14.000 mmhos/cm), SAR (31.0), pH (12.36) and Arsenic (6.5 mg/kg).
- Cuttings Pit #3 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.61) and Arsenic (6.4 mg/kg).
- Reserve, Cuttings #1 and #3 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.
- Mix/blend and/or Thermal Desorption Unit processed Reserve Pit, Cuttings Pit #1 and #3 material that meets Table 910-1 concentration levels will be used onsite for backfill.
- All associated Reserve, Cuttings Pit #1, #2 and #3 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, #2 and #3. 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 197-36A
Lab Summary

Last update 12/14/2012

Analytical Parameter	Fresh Water Pit		Reserve Pit		Cuttings #1		Cuttings #2		Cuttings #3		Cuttings Spoil	Background								COGCC	Maximum based on Background
(with units)	FW Pit Contents	FW Pit Subliner 10/17/12	RP Post Solid. 10/16/12	RP Subliner 10/18/12	Cut #1 Post Solid. 9/5/12	Cut #1 Subliner 9/19/12	Cut #2 Post Solid. 11/12/12	Cut #2 Subliner 10/1/12	Cut #3 Post Solid. 11/12/12	Cut #3 Pit Subliner 10/1/12	Cuttings Spoil Pile 9/17/12	#1	#2	#3	#4	#5	#6	#7	#8	Table 910-1 Concentration Levels	
Accutest Job #	Pit Contents De Minimus	D40074	D40002	D40114	D38480	D39008	D40910	D39442	D40910	D39442	D38897	D38598 (9/7/12)								-	-
Sample type (Composite/Discrete)		C	C	C	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)		ND	12.3	ND	68.0	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)		46.6	578	17.8	842	157	407	14.8	460	ND	21.4	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)		46.6	590	17.8	910	157	407	14.8	460	ND	21.4	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)		ND	ND	ND	ND	0.0836	0.162	ND	0.636	ND	ND	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)		ND	0.165	ND	0.490	0.285	0.845	ND	1.64	ND	ND	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)		ND	ND	ND	0.131	0.0589	0.197	ND	0.148	ND	ND	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)		ND	0.268	ND	0.567	0.263	0.926	ND	1.65	ND	ND	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)		ND	0.0105	ND	ND	ND	0.0097	ND	0.0224	0.0074	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(B)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0335	0.0058	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0063	0.0079	ND	-	-	-	-	-	-	-	-	2.2	-
Benzo(A)pyrene (mg/Kg)		ND	ND	ND	ND	ND	0.0092	ND	0.0231	0.0065	ND	-	-	-	-	-	-	-	-	0.022	-
Chrysene (mg/Kg)		ND	0.0269	ND	ND	0.0109	0.0254	ND	0.0616	0.0059	ND	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0083	0.0069	ND	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)		0.0080	0.0120	ND	ND	ND	0.0147	ND	0.0244	ND	ND	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)		ND	ND	ND	ND	0.0199	0.0498	ND	0.106	ND	ND	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)		ND	ND	ND	ND	ND	ND	ND	0.0090	0.0069	ND	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)		ND	0.133	ND	0.170	0.114	0.331	ND	0.461	ND	ND	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)		0.0075	0.0232	ND	ND	0.0099	0.0278	ND	0.0443	0.0063	ND	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)		0.588	10.700	0.604	11.400	1.18	6.230	2.740	14.000	0.920	0.663	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)		3.71	21.9	7.42	93.8	13.2	23.0	11.8	31.0	6.71	5.0	-	-	-	-	-	-	-	-	12	-
pH		9.34	12.24	9.68	12.43	8.67	11.32	9.37	12.36	9.61	9.76	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)		5.8	11.1	7.0	16.8	7.7	6.6	4.9	6.5	6.4	6.7	5.2	5.2	4.3	6.2	4.6	7.4	7.3	5.5	0.39	8.1
Barium (mg/kg)		429	8810	1120	1270	2130	4180	230	12700	902	480	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)		<1.1	<1.6	<1.1	<1.3	<1.1	<1.2	<1.2	<1.2	<1.1	<1.1	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)		62.2	14.7	69.9	28.9	60.9	21.7	61.1	15.4	62.5	68.9	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)		11.0	29.5	11.0	28.8	13.9	18.2	11.9	23.4	12.8	12.1	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)		8.4	23.0	8.5	15.0	9.6	17.9	8.7	25.4	10	9.6	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)		<0.086	<0.13	<0.098	<0.12	<0.11	<0.087	<0.12	<0.10	<0.12	<0.11	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)		19.9	72.5	20.7	22.4	21.3	12.6	20.3	13.4	20.7	22.5	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)		<5.4	<7.9	<5.6	<6.3	<5.3	<6.0	<5.8	<6.1	<5.7	<5.7	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)		<3.2	<4.8	<3.4	<3.8	<3.2	<3.6	<3.5	<3.6	<3.4	<3.4	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)		37.8	42.3	39.7	51.8	41.5	39.3	45.1	41.9	46.1	41.1	-	-	-	-	-	-	-	-	23000	-
% Solids		93.4	64.2	86.7	79.4	89.2	82.0	88.6	82.3	87.9	87.5	92.5	89.0	93.8	92.3	91.0	90.9	90.3	92.0	-	-

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: PCU 197-36A
Lab Summary - Arsenic Summary

Last update 11/14/2012

Analytical Parameter	Cuttings #1 Discrete Arsenic					Background 9/7/12								COGCC	Maximum based on Background
(with units)	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#6	#7	#8	Table 910-1 Concentration Levels	
Accutest Job #	D40716 (11/6/12)					D38598								-	-
Sample type (Composite/Discrete)	D	D	D	D	D	-	-	-	-	-	-	-	-	-	-
TPH (GRO) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(B)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-
Benzo(A)pyrene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Chrysene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	14.0	16.2	14.9	12.7	18.2	5.2	5.2	4.3	6.2	4.6	7.4	7.3	5.5	0.39	8.1
Barium (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	23000	-
% Solids	85.3	81.4	83.9	87.2	86.4	92.5	89.0	93.8	92.3	91.0	90.9	90.3	92.0	-	-

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.
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