

State of Colorado
Oil and Gas Conservation Commission

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FOR OGCC USE ONLY

Rec 09/20/16

Rem #9875

Doc #200440432

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 Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

OGCC Operator Number: 10084

Name of Operator: Pioneer Natural Resources USA, Inc.

Address: 5205 N. O'Connor Blvd., Ste 200

City: Irving State: TX Zip: 75039

Contact Name and Telephone:

LaCretia White

No: 972-969-3738

Fax: 972-969-3559

API Number: 05-071-09295

County: Las Animas

Facility Name: Finland 31-3

Facility Number: 301169

Well Name: Finland

Well Number: 31-3

37.292745, -104.87199

Location: (QtrQtr, Sec, Twp, Rng, Meridian): NWNE 3 32S 67W

Latitude: ~~33.29262X~~ Longitude: ~~X104.872X~~

TECHNICAL CONDITIONS

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

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-crop land

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Allens Park-Wahatoya Complex

Potential receptors (water wells within 1/4 mi, surface waters, etc.): nearest water well - 2702' (if DWR point is accurate)

nearest surface water - 1144' (if live water present)

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

Impacted Media (check):

- ☒ Soils
☐ Vegetation
☐ Groundwater
☐ Surface Water

Extent of Impact:

soil within pit

How Determined:

soil sampling

REMEDIAL WORKPLAN

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

Produced water from this well was being stored in this onsite pit. The well is no longer going to the pit.

Describe how source is to be removed:

Produced water is not being sent to this pit and it is no longer needed.

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.:

Produced water may be surface discharged under a CDPS permit, disposed of in a Class II UIC injection well, or utilized for dust suppression.



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.):

It is not expected that produced water stored in this lined pit communicated with nor affected groundwater.

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.

Pit liner has been removed for soil sampling and properly disposed of. If back berm of pit exists, this material will be utilized to backfill pit. Native fill material may be collected from the recontouring of cut and fill slopes. Fill material will be brought onsite, if needed, to adequately backfill pit. The top 3 feet of the pit will be filled with at least 25% native soil. If topsoil exists, this material will be overlain on the fill material. Backfilled material may be contoured in a manner to be utilized as a stormwater BMP.

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:

No impact to the surrounding environment occurred from the use of this lined pit.

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

Produced water may be surface discharged under a CDPS permit, disposed of in a Class II UIC injection well, or utilized for dust suppression.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>4/29/15</u>	Date Site Investigation Completed: <u>4/29/16</u>	Date Remediation Plan Submitted: <u>8/9/16</u>
Remediation Start Date: <u>upon approval</u>	Anticipated Completion Date: <u>4thqtr 2016</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: Cherylyn Morgan

Signed: _____

Title: Environmental Technician

Date: 9/16/16

OGCC Approved: _____ Title: _____ Date: _____

Notify COGCC when closure process is completed.

METALS

Analytical results demonstrate that background concentrations of arsenic (As) exceed Table 910-1 concentration levels. Analytical results demonstrate that concentrations of As in soils in the fill at the top of the pit also exceed Table 910-1 concentration levels and the pit concentrations are greater than but within the analytical uncertainty of being equal to the background concentrations. The analytical results are summarized below:

METAL	BACKGROUND CONCENTRATION (MG/KG)	PIT CONTENTS, SOIL/BEDROCK BELOW PIT OR IMPACTED MEDIA (MG/KG)	TABLE 910-1 CONCENTRATION LEVELS (MG/KG)
Arsenic	1.4-2.1	2.2-2.3	0.39

COGCC and CDPHE have consulted and agree that operators do not need to request variances from CDPHE for instances where the concentrations of metals in impacted soils are equal to or less than background concentrations, but do not meet Table 910-1 concentration values. Operators must ensure that remaining pit contents are covered with a minimum of 3 feet of backfill and soil. The soil horizons must be replaced in their original relative position, and reclaimed in accordance with 1000 Series Rules.

Table 910-1		PIONEER						
		NATURAL RESOURCES						
CONCENTRATION LEVELS								
Contaminant of Concern	Concentrations	Units	Finland 31-3 Top of Pit	Finland 31-3 Bottom of Pit	Finland 31-3 Native South	Finland 31-3 Native West	Finland 31-3 Native North	Finland 31-3 Native East
Organic Compounds in Soil								
TPH (Gasoline Range Organics)		mg/kg		ND				
TPH (Diesel Range Organics)		mg/kg		4.5				
Benzene	0.17	mg/kg		ND				
Toluene	85	mg/kg		ND				
Ethylbenzene	100	mg/kg		ND				
Xylenes (total)	175	mg/kg		ND				
Acenaphthene	1000	mg/kg						
Anthracene	1000	mg/kg						
Benzo(A)anthracene	0.22	mg/kg						
Benzo(B)fluoranthene	0.22	mg/kg						
Benzo(K)fluoranthene	2.2	mg/kg						
Benzo(A)pyrene	0.022	mg/kg						
Chrysene	22	mg/kg						
Dibenzo(A,H)anthracene	0.022	mg/kg						
Fluoranthene	1000	mg/kg						
Fluorene	1000	mg/kg						
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg						
Naphthalene	23	mg/kg						
Pyrene	1000	mg/kg						
Organic Compounds in Ground Water								
Benzene	5	µg/l						
Toluene	500 to 1000	µg/l						
Ethylbenzene	700	µg/l						
Xylenes (total)	1400 to 10,000	µg/l						
Inorganics in Soils								
Electrical Conductivity (EC)	<4000 or 2x background	umhos/cm	620	510				
Sodium Adsorption Ratio (SAR)	<12	NA	4.5	3.4				
pH	6.0-9.0	NA	8.09	8.25				
Inorganics in Ground Water								
Total Dissolved Solids (TDS)	<1.25 x background	NA						
Chlorides	<1.25 x background	NA						
Sulfates	<1.25 x background	NA						
Metals in Soils								
Arsenic	0.39	mg/kg	2.3	2.2	1.7	2.1	1.4	1.4
Barium Total	15,000	mg/kg		180				
Boron		mg/kg		ND				
Boron (Hot Water Soluble)	2	mg/L						
Cadmium	70	mg/kg		ND				
Chromium (III)	120,000	mg/kg						
Chromium (VI)	23	mg/kg						
Copper	3,100	mg/kg		16				
Lead	400	mg/kg		9.1				
Mercury	23	mg/kg		ND				
Nickel	1,600	mg/kg		14				
Selenium	390	mg/kg		ND				
Silver	390	mg/kg		ND				
Zinc	23,000	mg/kg		51				
Chromium		mg/kg		16				
Liquid Hydrocarbons in Soils and Ground Water								
Liquid hydrocarbons including condensate and oil	Below detection level	NA						

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Top of Pit

Date Collected: 04/25/16 12:19

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-1

Matrix: Solid

Method: 20B - Sodium Adsorption Ratio - Soluble

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	4.5		1.2	No Unit		04/27/16 21:05	05/03/16 10:47	10
Sodium	99		10	mg/Kg		04/27/16 21:05	05/03/16 10:47	10
Calcium	27		2.0	mg/Kg		04/27/16 21:05	05/03/16 10:47	10
Magnesium	6.4		2.0	mg/Kg		04/27/16 21:05	05/03/16 10:47	10

General Chemistry

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.8		0.1	%			04/28/16 16:08	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
pH	8.09		0.100	SU		04/30/16 18:00	05/04/16 10:56	1
Specific Conductance (25C)	620		10	umhos/cm		04/30/16 18:00	05/09/16 07:03	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Top of Pit

Date Collected: 04/25/16 12:19

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-1

Matrix: Solid

Percent Solids: 87.2

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.3		0.080		mg/Kg	04/28/16 14:50	04/29/16 14:22		1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Bottom of Pit

Date Collected: 04/25/16 12:24

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-2

Matrix: Solid

Percent Solids: 86.4

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0067		mg/Kg	☐	05/02/16 17:00	05/02/16 23:09	1
Ethylbenzene	ND		0.0067		mg/Kg	☐	05/02/16 17:00	05/02/16 23:09	1
Toluene	ND		0.0067		mg/Kg	☐	05/02/16 17:00	05/02/16 23:09	1
Xylenes, Total	ND		0.0067		mg/Kg	☐	05/02/16 17:00	05/02/16 23:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		58 - 140	05/02/16 17:00	05/02/16 23:09	1
Toluene-d8 (Surr)	105		80 - 126	05/02/16 17:00	05/02/16 23:09	1
4-Bromofluorobenzene (Surr)	103		76 - 127	05/02/16 17:00	05/02/16 23:09	1
Dibromofluoromethane (Surr)	101		75 - 121	05/02/16 17:00	05/02/16 23:09	1

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	ND		1.4		mg/Kg	☐	05/04/16 14:54	05/04/16 22:01	1
-C6-C10									

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	82		77 - 123	05/04/16 14:54	05/04/16 22:01	1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	4.5		4.4		mg/Kg	☐	04/28/16 17:10	05/02/16 21:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	69		49 - 115	04/28/16 17:10	05/02/16 21:11	1

Method: 20B - Sodium Adsorption Ratio - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	3.4		1.2		No Unit		04/27/16 21:05	05/03/16 10:50	10

Method: 6010B - Total Metals

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	180		0.83		mg/Kg	☐	04/28/16 14:50	04/29/16 23:08	1
Boron	ND	F1	8.3		mg/Kg	☐	04/28/16 14:50	04/30/16 21:15	1
Cadmium	ND		0.41		mg/Kg	☐	04/28/16 14:50	04/29/16 23:08	1
Calcium	3500		41		mg/Kg	☐	04/28/16 14:50	04/29/16 23:08	1
Magnesium	3900		17		mg/Kg	☐	04/28/16 14:50	04/30/16 21:15	1
Molybdenum	ND		1.7		mg/Kg	☐	04/28/16 14:50	04/29/16 23:08	1
Silver	ND		0.83		mg/Kg	☐	04/28/16 14:50	04/29/16 23:08	1
Sodium	820		410		mg/Kg	☐	04/28/16 14:50	04/30/16 21:15	1

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.2		0.10		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Chromium	16		0.20		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Copper	18		0.25		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Lead	9.1		0.10		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Nickel	14		0.15		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Selenium	ND		0.20		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1
Zinc	51		1.0		mg/Kg	☐	04/28/16 14:50	04/29/16 14:25	1

TestAmerica Denver

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Bottom of Pit

Date Collected: 04/25/16 12:24

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-2

Matrix: Solid

Percent Solids: 86.4

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.023		mg/Kg	05/02/16 12:50	05/02/16 12:50	05/02/16 19:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.6		0.1		%			04/28/16 16:08	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.25		0.100		SU		04/30/16 18:00	05/04/16 10:56	1
Specific Conductance (25C)	510		10		umhos/cm		04/30/16 18:00	05/09/16 07:03	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native South

Date Collected: 04/25/16 12:27

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-3

Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.9		0.1		%			04/28/16 16:08	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native South

Date Collected: 04/25/16 12:27

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-3

Matrix: Solid

Percent Solids: 79.1

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.7		0.096		mg/Kg	☐	04/28/16 14:50	04/29/16 14:51	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native West

Date Collected: 04/25/16 12:29

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-4

Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.6		0.1	%			04/28/16 16:08	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native West

Date Collected: 04/25/16 12:29

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-4

Matrix: Solid

Percent Solids: 79.4

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.1		0.11		mg/Kg	04/28/16 14:50	04/29/16 14:55		1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native North

Date Collected: 04/25/16 12:31

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-5

Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dif Fac
Percent Moisture	10.0		0.1	%			04/28/16 16:08	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native North

Date Collected: 04/25/16 12:31

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-5

Matrix: Solid

Percent Solids: 90.0

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.4		0.10		mg/Kg	☐	04/28/16 14:50	04/29/16 14:58	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native East

Date Collected: 04/25/16 12:33

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-6

Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.5		0.1	%			04/28/16 16:08	1

Client Sample Results

Client: Pioneer Natural Resources USA, Inc.
Project/Site: Soil Testing Suite

TestAmerica Job ID: 280-82461-1

Client Sample ID: Finland 31-3 Native East

Date Collected: 04/25/16 12:33

Date Received: 04/27/16 09:40

Lab Sample ID: 280-82461-6

Matrix: Solid

Percent Solids: 82.5

Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.4		0.10		mg/Kg	☐	04/28/16 14:50	04/29/16 15:02	1