

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

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



FOR OGCC USE ONLY  
Rec 7/7/16  
Doc #200439949  
Rem #9759

**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: 05-071-08947

County: Las Animas

Facility Name: Lorencito 8-21-34-66 Offsite pit

Facility Number: 261276

Well Name: Lorencito

Well Number: 8-21-34-66

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SENE 21 34S 66W Latitude: 37.071037 Longitude: -104.779027

**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: Saruche-Rombo-Rock outcrop complex

Potential receptors (water wells within 1/4 mi, surface waters, etc.): nearest water well - 1562' (if DWR point is accurate)

nearest surface water - 1296' (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

**REMEDIALTION WORKPLAN**

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

Produced water from this well was being stored in this offsite 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 supression.



REMEDIATION WORKPLAN (Cont.)

Tracking Number: \_\_\_\_\_  
Name of Operator: \_\_\_\_\_  
OGCC Operator No: \_\_\_\_\_  
Received Date: \_\_\_\_\_  
Well Name & No: \_\_\_\_\_  
Facility Name & No: \_\_\_\_\_

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 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.

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 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: 8/15/14 Date Site Investigation Completed: 8/15/14 Date Remediation Plan Submitted: 7/7/16  
Remediation Start Date: upon approval Anticipated Completion Date: 3rd Qtr 2016 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: LaCretia White

Signed: LaCretia White

Title: Staff Environmental Specialist

Date: 7/7/16

OGCC Approved: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

## CONDITIONS OF APPROVAL:

Notify COGCC when pit 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 pit also exceed Table 910-1 concentration levels and the pit concentrations are less than or within 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	2.4-4.3	1.6-2.5	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	LORENCITO 8-21-34-66 OFFSITE PIT NATIVE NORTH	LORENCITO 8-21-34-66 OFFSITE PIT NATIVE EAST	LORENCITO 8-21-34-66 OFFSITE PIT NATIVE SOUTH	LORENCITO 8-21-34-66 OFFSITE PIT NATIVE WEST	LORENCITO 8-21-34-66 OFFSITE PIT TOP OF PIT	LORENCITO 8-21-34-66 OFFSITE PIT BOTTOM OF PIT
Organic Compounds in Soil								
TPH (Gasoline Range Organics)		mg/kg						ND
TPH (Diesel Range Organics)		mg/kg						5.8
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						
Napthalene	23	mg/kg						
Pyrene	1000	mg/kg						
Organic Compounds in Ground Water								
Benzene	5	µg/l						
Toluene	560 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					28	22
Sodium Adsorption Ratio (SAR)	<12	NA					ND	2.0
pH	6.0-9.0	NA					8.42	8.50
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	2.6	4.3	2.4	3.0	1.6	2.5
Barium Total	15,000	mg/kg						160
Boron	NA	mg/kg						ND
Boron (Hot Water Soluble)	2	mg/L						NT
Cadmium	70	mg/kg						ND
Chromium (III)	120,000	mg/kg						NT
Chromium (VI)	23	mg/kg						NT
Copper	3,100	mg/kg						31
Lead	400	mg/kg						14
Mercury	23	mg/kg						0.071
Nickel	1,600	mg/kg						17
Selenium	390	mg/kg						0.51
Silver	390	mg/kg						ND
Zinc	23,000	mg/kg						87
Chromium	NA	mg/kg						27
Liquid Hydrocarbons in Soils and Ground Water								
Liquid hydrocarbons including condensate and oil	Below detection level	NA						

NA - not applicable

NT - not tested

ND - below the method detection limit

Cr - if Total Cr is >23 mg/kg, an analysis is completed for Cr VI, to facilitate calculation of Cr III

# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

**Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT**

**Lab Sample ID: 280-59032-1**

**NATIVE NORTH**

Date Collected: 08/15/14 11:43

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 89.8

## Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.6		0.10		mg/Kg	☼	08/21/14 07:30	08/22/14 00:52	1

## General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			08/19/14 13:25	1

## Client Sample Results

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

TestAmerica Job ID: 280-59032-1

**Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT**

**Lab Sample ID: 280-59032-2**

**NATIVE EAST**

Date Collected: 08/15/14 11:47

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 96.3

### Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.3		0.091		mg/Kg	☼	08/21/14 07:30	08/22/14 00:56	1

### General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	3.7		0.10		%			08/18/14 15:48	1

# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

**Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT**

**Lab Sample ID: 280-59032-3**

**NATIVE SOUTH**

Date Collected: 08/15/14 11:52

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 94.3

## Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.4		0.11		mg/Kg	☼	08/21/14 07:30	08/22/14 01:00	1

## General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.7		0.10		%			08/18/14 15:48	1

# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

**Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT**

**Lab Sample ID: 280-59032-4**

**NATIVE WEST**

Date Collected: 08/15/14 11:56

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 94.3

## Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.0		0.093		mg/Kg	☼	08/21/14 07:30	08/22/14 01:03	1

## General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.7		0.10		%			08/18/14 15:48	1



# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

**Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT TOP OF PIT**

**Lab Sample ID: 280-59032-5**

Date Collected: 08/15/14 11:59

Matrix: Solid

Date Received: 08/16/14 09:25

## Method: 20B - Sodium Adsorption Ratio - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	ND		1.2		No Unit		08/17/14 16:55	08/26/14 01:50	10

## Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.6		0.096		mg/Kg	☼	08/26/14 15:15	08/27/14 03:58	1

## General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.0		0.10		%			08/19/14 13:25	1

## General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.42		0.100		SU			08/18/14 14:45	1
Specific Conductance	28		2.0		umhos/cm			08/18/14 15:04	1

# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT

Lab Sample ID: 280-59032-6

BOTTOM OF PIT

Date Collected: 08/15/14 12:01

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 80.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		6.8		ug/Kg	☼	08/21/14 17:00	08/21/14 23:33	1
Ethylbenzene	ND		6.8		ug/Kg	☼	08/21/14 17:00	08/21/14 23:33	1
Toluene	ND		6.8		ug/Kg	☼	08/21/14 17:00	08/21/14 23:33	1
Xylenes, Total	ND		6.8		ug/Kg	☼	08/21/14 17:00	08/21/14 23:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	90		58 - 140	08/21/14 17:00	08/21/14 23:33	1
Toluene-d8 (Surr)	97		80 - 126	08/21/14 17:00	08/21/14 23:33	1
4-Bromofluorobenzene (Surr)	96		76 - 127	08/21/14 17:00	08/21/14 23:33	1
Dibromofluoromethane (Surr)	99		75 - 121	08/21/14 17:00	08/21/14 23:33	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.4		mg/Kg	☼	08/18/14 17:09	08/20/14 13:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	85		77 - 123	08/18/14 17:09	08/20/14 13:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	5.8		4.8		mg/Kg	☼	08/20/14 15:36	08/24/14 07:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	78		49 - 115	08/20/14 15:36	08/24/14 07:28	1

## Method: 20B - Sodium Adsorption Ratio - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium Adsorption Ratio	2.0		1.2		No Unit		08/17/14 16:55	08/26/14 01:53	10

## Method: 6010B - Total Metals

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	160		1.1		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Boron	ND		11		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Cadmium	ND		0.53		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Calcium	3700		53		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Magnesium	3600		21		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Molybdenum	ND		2.1		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Silver	ND	^	1.1		mg/Kg	☼	08/20/14 14:30	08/21/14 16:21	1
Sodium	560		530		mg/Kg	☼	08/20/14 14:30	08/25/14 15:49	1

## Method: 6020 - Total Metals by ICP-MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.5		0.12		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Chromium	27		0.25		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Copper	31		0.31		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Lead	14		0.12		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Nickel	17		0.18		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Selenium	0.51		0.25		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1
Zinc	87		1.2		mg/Kg	☼	08/21/14 07:30	08/22/14 01:07	1

TestAmerica Denver

# Client Sample Results

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

TestAmerica Job ID: 280-59032-1

Client Sample ID: LORENCITO 8-21-34-66 OFFSITE PIT

Lab Sample ID: 280-59032-6

BOTTOM OF PIT

Date Collected: 08/15/14 12:01

Matrix: Solid

Date Received: 08/16/14 09:25

Percent Solids: 80.6

## Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	71		19		ug/Kg	☼	08/20/14 13:00	08/20/14 15:56	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cr (VI)	ND		0.49		mg/Kg	☼	08/27/14 09:36	08/28/14 16:25	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cr (III)	27		2.0		mg/Kg			09/03/14 16:41	1
Percent Moisture	19		0.10		%			08/16/14 14:26	1

## General Chemistry - Soluble

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH adj. to 25 deg C	8.50		0.100		SU			08/18/14 14:45	1
Specific Conductance	22		2.0		umhos/cm			08/18/14 15:04	1