

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

RECEIVED
9/1/2011

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: 96850

Name of Operator: Williams Production RMT Company

Address: 1058 County Road 215

City: Parachute State: CO Zip: 81635

Contact Name and Telephone:

Karolina Blaney

No: 970-683-2295

Fax: 970-285-9573

API Number: 05-045-08056

County: Garfield

Facility Name: PA 311-5 Workover/Skim Pit

Facility Number: PA 311-5

Well Name: PA

Well Number: PA 311-5

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SWSE, S32, T6S, R95W, 6PM Latitude: 39.476069 Longitude: -108.019514

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Flowback and Tank Bottoms

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.): Range Land

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Arvada Loam

Potential receptors (water wells within 1/4 mi, surface waters, etc.): There are no permitted water wells within 1/4 mile of the facility.

Surface water ~1,743 feet (Colorado River)

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

Impacted Media (check):

- ☒ Soils
☐ Vegetation
☐ Groundwater
☐ Surface Water

Extent of Impact:

Confined within the pit boundary

How Determined:

Soil Boring

REMEDIALATION WORKPLAN

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

See Attachment A

Describe how source is to be removed:

See Attachment A

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.:

Analytical results indicated that there are some residual hydrocarbon impacts present within the pit boundary. However all the constituents analyzed are below the COGCC Table 910 criteria applicable at the time of the pit closure. Field observations, P.I.D. readings, and analytical results indicate that there is no hydrocarbon contamination present below the bottom of the pit which is at approximately 15 feet.



REMEDIAL WORKPLAN (Cont.)

Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: Location ID #
Well Name & No: PA 31-5
Facility Name & No: wakeaer P.T

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Based on borehole observations and regional information from the state engineers office, groundwater has not been impacted by this facility.

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.

See Attachment A for reclamation activities completed to date under COGCC 1000 series rules. Based on recent analytical results, Williams would recommend that no remediation will be necessary in regards to hydrocarbon impacts. Williams will monitor the soil surface conditions and vegetative growth to ensure that reclamation goals are met. If vegetative growth does not meet acceptable standards then the site will be revisited the soils will be analyzed and appropriate soil amendments will be incorporated and the site will be reseeded.

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:

See Attachment B for the analytical results

See Bore Hole/Soil Sample Location Map for sample locations

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

See Attachment A

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>1/20/2010</u>	Date Site Investigation Completed: <u>6/6/2011</u>	Date Remediation Plan Submitted: <u>9/1/2011</u>
Remediation Start Date: <u>N/A</u>	Anticipated Completion Date: <u>N/A</u>	Actual Completion Date: <u>6/6/2011</u>

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Karolina Blaney

Signed: Karolina Blaney

Title: Environmental Specialist

Date: 9/1/2011

OGCC Approved: [Signature]

Title: FOR Chris Canfield

Date: 09/20/2011

EPS NW Region

Attachment A - Summary of Activities
PA 311-5 Workover/Skim Pit located at the PA 334-32 pad

The PA 311-5 Workover/Skim Pit was taken out of service in August 2008. The following closure activities were initiated in September 2008:

- Removal and disposal of fluids at the Centralized E&P Waste Management Facility
- Mixing of pit solids with stockpiled clean soil onsite to dry and stabilize material
- Backfilling of the pit and covering with topsoil
- Interim reclamation activities to stabilize the location

Additional closure activities were performed on 1/20/2010 and 6/6/2011, at the request of the COGCC, to confirm that no residual contamination existed within or below the former pit location. These activities included the following:

- Installation of five soil borings to a depth of 31 feet. Collection of split spoon samples at selected intervals (noted below).
- Visual and PID inspection of the soils for evidence of hydrocarbon staining, odors, and volatile organics.
- Soil samples were collected and submitted to an accredited analytical laboratory for analysis according to the COGCC 910-1 table.
- Samples were selected to correspond to topsoil at the 1' to 3' interval, hydrocarbon staining/contamination within the pit at a depth of 4' to 6' and again at 11' to 15', and native soils below the pit at a depth of 27' to 31'.
- The topsoil interval was collected to verify suitability for re-vegetation in accordance with the 900 series rules.
- Analytical results were then compared to the COGCC 910-1 standards. Inorganic analysis indicates that EC and SAR are exceeding COGCC criteria above the C Horizon.
- A map depicting the soil boring locations is attached – Attachment C

Proposed Remedial Actions

Based on findings of the field investigation and the analytical results, there is limited residual contamination within the pit at levels below the COGCC TPH standard applicable at the time of the pit closure. There was no indication of residual contamination below the pit at this location therefore Williams does not believe additional remediation is necessary.

Williams will continue to monitor surface soil conditions and vegetative growth to ensure that reclamation goals are met. If vegetative growth does not meet acceptable standards then the site will be revisited, the soils will be analyzed, and appropriate soil amendments will be incorporated before the site is reseeded.

Attachment B
PA 311-5 Pit Closure Analytical Results (PA 334-32 Pad)

Contaminant of Concern	Allowable Concentrations	Units	PA 311-5 pit (PA 334-32 pad)						
Sampling Location			BH01	BH01	BH01	BH01	BH02	BH02	BH02
Depth from the surface			1-3'	4-6'	11-15'	27-31'	4-6'	11-15'	27-31'
Sampling date			1/20/2010	1/20/2010	1/20/2010	1/20/2010	6/6/2011	6/6/2011	6/6/2011
Organic Compounds in Soil									
TPH Non-Sensitive Area	10,000	mg/kg		1439	2750	ND	630	4000	5.8
Inorganics in Soil									
EC	<4 mmhos/cm or 2 x background	mmhos	7.74		9.72	8.12		4.88	
SAR	<12	Unitless	17.3		18.4	14.2		119.4	
pH	6-9	Unitless	8.92		8.61	8.85		8.02	
Metals in Soil									
Arsenic	41.00	mg/kg			5.3	5.9		6.6	5.1
Barium	180,000	mg/kg			4,990	171		4400	180
Boron	2	mg/L			0.5	0.5			
Cadmium	26	mg/kg			0.98	0.92		0.49	0.45
Chromium	1,500	mg/kg			7.6	7.3		12	10
Copper	750	mg/kg			12.8	5.5		19	10
Lead	300	mg/kg			12.1	10.4		15	12
Mercury	17	mg/kg			0.11	0.1		0.44	ND
Nickel	210	mg/kg			10	11.5		15	16
Silver	100	mg/kg			2.9	2.8		ND	ND
Zinc	1,400	mg/kg			36.4	41.9		130	57

Attachment B
PA 311-5 Pit Closure Analytical Results (PA 334-32 Pad)

Contaminant of Concern	Allowable Concentrations	Units	PA 311-5 pit (PA 334-32 pad)								
Sampling Location			BH03	BH03	BH03	BH04	BH04	BH04	BH05	BH05	BH05
Depth from the surface			4-6'	11-15'	27-31'	4-6'	11-15'	27-31'	4-6'	11-15'	27-31'
Sampling date			6/6/2011	6/6/2011	6/6/2011	6/6/2011	6/6/2011	6/6/2011	6/6/2011	6/6/2011	6/6/2011
Organic Compounds in Soil											
TPH Non-Sensitive Area	10,000	mg/kg	686	3440	ND	109	900	5.2	720	670	6.9
Inorganics in Soil											
EC	<4 mmhos/cm or 2 x background	mmhos		4.67	7.79		5.01	7.26		5.91	5.12
SAR	<12	Unitless		143.5	72.1		91.4	81		71.3	115
pH	6-9	Unitless		8.85	8.15		11	8.45		8.82	8.34
Metals in Soil											
Arsenic	41.00	mg/kg		4.3	5.4		5.3	5.9		5.7	6
Barium	180,000	mg/kg		5500	230		2600	620		3500	360
Boron	2	mg/L									
Cadmium	26	mg/kg		0.38	0.51		0.52	0.45		0.6	0.48
Chromium	1,500	mg/kg		11	10		10	9.8		11	9.4
Copper	750	mg/kg		17	12		12	10		13	9.4
Lead	300	mg/kg		13	12		14	12		14	16
Mercury	17	mg/kg		0.052	ND		0.032	0.025		0.08	0.021
Nickel	210	mg/kg		11	15		14	15		14	13
Silver	100	mg/kg		ND	ND		ND	ND		ND	ND
Zinc	1,400	mg/kg		42	57		51	49		50	46



Borehole Summary

744 Horizon Court, Ste. 140
Grand Junction, CO 81503
970-243-3271

Project: PA 334-32 Workover Pit
Location: PA 334-32 Well Pad
Date(s): 1/20/2010
Contractor: O'Dell Drilling
Rig Type: Track Mounted CME 55
Drilling Method: 4" Solid Stem Auger
Sample Type: Calf. and Standard Split Spoons

Borehole Number BH01
Total Depth: 31 feet
Elevation Ground:
State Plane Cord. North:
State Plane Cord. East:
Logged By: M. E. Mumby

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Depth	Sample Interval	Recovery	Graphic Log	Material Description
0				Ground Surface
2				
4	1			Fill Dark to yellowish brown, moist, stiff, intermixed clay sandstone and shale cobbles, clean to approximately 3 feet. Starting to observe some hydrocarbon staining and odor below the three foot interval, increasing clay content with depth.
6				
8				
10	2			
12				Silty Clay Very dark brown with abundant hydrocarbon staining, moist, soft, the 11-15 foot interval appears to be the most contaminated, very strong hydrocarbon odor, bottom of the pit is approximately 15-16 feet.
14	3			
16				
18	4			
20				
22				Gravelly Clay Brown, very stiff, slightly moist, does not exhibit any hydrocarobon staining, very faint hydrocarbon odor (Native Soil).
24				
26	5			
28				
30	6			
32				
34				



Borehole Summary

744 Horizon Court, Ste. 140
Grand Junction, CO 81503
970-243-3271

Project: PA 334-32 Workover Pit
Location: PA 334-32 Well Pad
Date(s): 6/6/2011
Contractor: O'Dell Drilling
Rig Type: Track Mounted CME 55
Drilling Method: 4" Solid Stem Auger
Sample Type: Calf. and Standard Split Spoons

Borehole Number BH02
Total Depth: 31 feet
Elevation Ground:
State Plane Cord. North:
State Plane Cord. East:
Logged By: M. E. Mumby

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Depth	Sample Interval	Recovery	Graphic Log	Material Description
0				Ground Surface
2				
4	1			Fill Dark to yellowish brown, moist, stiff, intermixed clay sandstone and shale cobbles, clean to approximately 3 feet. Fill is starting to exhibit a mottled appearance below 3 feet with abundant areas exhibiting hydrocarbon staining and odor. increasing clay content with depth.
6				
8				
10	2			
12				Silty Clay Very dark brown to black with abundant hydrocarbon staining, moist, soft, the 11-15 foot interval appears to be the most contaminated, very strong hydrocarbon odor, bottom of the pit is approximately 15-16 feet.
14	3			
16				
18	4			
20				
22				Gravelly Clay Brown, very stiff, slightly moist, does not exhibit any hydrocarobon staining, very faint hydrocarbon odor (Native Soil).
24				
26	5			
28				
30	6			
32				
34				



Borehole Summary

744 Horizon Court, Ste. 140
Grand Junction, CO 81503
970-243-3271

Project: PA 334-32 Workover Pit
Location: PA 334-32 Well Pad
Date(s): 6/6/2011
Contractor: O'Dell Drilling
Rig Type: Track Mounted CME 55
Drilling Method: 4" Solid Stem Auger
Sample Type: Calf. and Standard Split Spoons

Borehole Number BH03
Total Depth: 31 feet
Elevation Ground:
State Plane Cord. North:
State Plane Cord. East:
Logged By: M. E. Mumby

Page 1 of 1

Depth	Sample Interval	Recovery	Graphic Log	Material Description
0				Ground Surface
2				
4	1			Fill Dark to yellowish brown, moist, stiff, intermixed clay sandstone and shale cobbles, clean to approximately 3 feet. Fill is starting to exhibit a mottled appearance below 3 feet with abundant areas exhibiting hydrocarbon staining and odor. increasing clay content with depth.
6				
8				
10	2			
12				Silty Clay Very dark brown to black with abundant hydrocarbon staining, moist, soft, the 11-15 foot interval appears to be the most contaminated, very strong hydrocarbon odor, bottom of the pit is approximately 15-16 feet.
14	3			
16				
18	4			
20				
22				Gravelly Clay Brown, very stiff, slightly moist, does not exhibit any hydrocarobon staining, very faint hydrocarbon odor (Native Soil).
24				
26	5			
28				
30	6			
32				
34				



Borehole Summary

744 Horizon Court, Ste. 140
Grand Junction, CO 81503
970-243-3271

Project: PA 334-32 Workover Pit
Location: PA 334-32 Well Pad
Date(s): 6/6/2011
Contractor: O'Dell Drilling
Rig Type: Track Mounted CME 55
Drilling Method: 4" Solid Stem Auger
Sample Type: Calf. and Standard Split Spoons

Borehole Number BH04
Total Depth: 31 feet
Elevation Ground:
State Plane Cord. North:
State Plane Cord. East:
Logged By: M. E. Mumby

Page 1 of 1

Depth	Sample Interval	Recovery	Graphic Log	Material Description
0				Ground Surface
2				
4				
6	1			Fill Dark to yellowish brown with scattered black, moist, stiff, intermixed clay sandstone and shale cobbles, clean to approximately 3 feet. Scattered areas of hydrocarbon staining, areas of stained soil have a moderate hydrocarbon odor, still see increasing clay content with depth.
8				
10	2			
12				
14	3			Silty Clay Very dark brown to black with abundant hydrocarbon staining, moist, soft, the 11-15 foot interval appears to be the most contaminated, very strong hydrocarbon odor, bottom of the pit is approximately 15 feet.
16				
18	4			
20				
22				
24				Gravelly Clay Brown, very stiff, slightly moist, does not exhibit any hydrocarbon staining or hydrocarbon odor (Native Soil).
26				
28	5			
30	6			
32				
34				



Borehole Summary

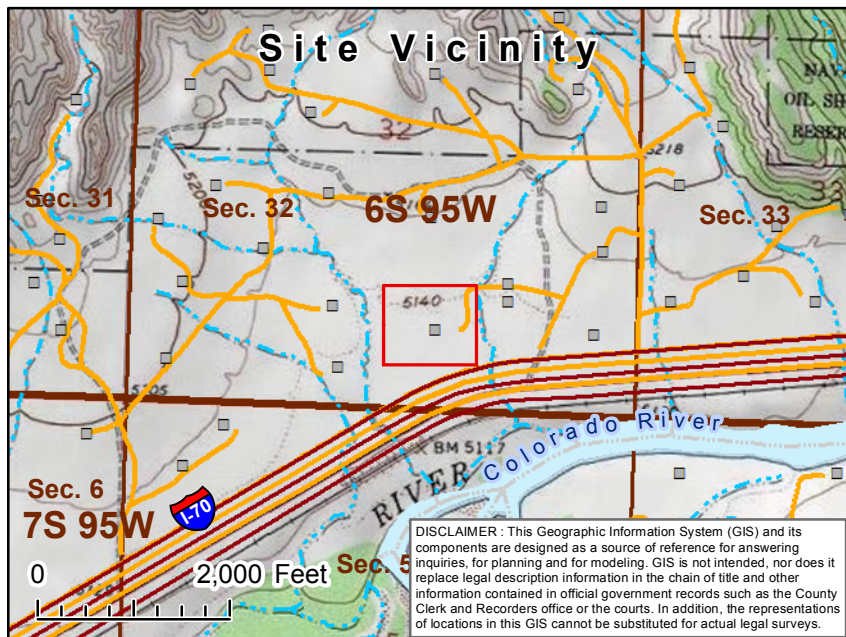
744 Horizon Court, Ste. 140
Grand Junction, CO 81503
970-243-3271

Project: PA 334-32 Workover Pit
Location: PA 334-32 Well Pad
Date(s): 6/6/2011
Contractor: O'Dell Drilling
Rig Type: Track Mounted CME 55
Drilling Method: 4" Solid Stem Auger
Sample Type: Calf. and Standard Split Spoons

Borehole Number BH05
Total Depth: 31 feet
Elevation Ground:
State Plane Cord. North:
State Plane Cord. East:
Logged By: M. E. Mumby

Page 1 of 1

Depth	Sample Interval	Recovery	Graphic Log	Material Description
0				Ground Surface
2				
4				
6	1			Fill Dark to yellowish brown, moist, stiff, intermixed clay sandstone and shale cobbles, clean to approximately 3 feet. Scattered black areas of hydrocarbon staining, moderate hydrocarbon odor. Slight increase in clay content with depth.
8				
10	2			
12				
14	3			Silty Clay Very dark brown to black with abundant hydrocarbon staining, moist, soft, the 11-15 foot interval appears to be the most contaminated, very strong hydrocarbon odor, bottom of the pit is approximately 14 feet.
16				
18	4			
20				
22				
24				Gravelly Clay Brown, very stiff, slightly moist, does not exhibit any hydrocarbon staining, very faint hydrocarbon odor (Native Soil).
26				
28	5			
30	6			
32				
34				



Attachment C--Borehole Location Map

Location: PA 334-32

Williams Production RMT

Legend

PLSS

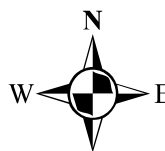
- Township
- Section

Transportation Features

- Highways
- Public Roads
- Williams Access Roads

Hydrographic Features

- Perennial Stream
- Intermittent Stream
- Ditch/Canal
- River



0 50 100 200 Feet

