

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



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#5987

FOR OGCC USE ONLY

**RECEIVED**  
4/11/2012

**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): \_\_\_\_\_

OGCC Operator Number: <u>16700</u>	Contact Name and Telephone: _____
Name of Operator: <u>Chevron USA, Inc.</u>	Eric Page
Address: <u>760 Horizon Drive</u>	No: Cell: <u>832.439.3832</u> Office: <u>713.372.1022</u>
City: <u>Grand Junction</u> State: <u>CO</u> Zip: <u>81506</u>	Fax: <u>NA</u>

API Number: <u>045-11429</u>	County: <u>Garfield</u>
Facility Name: <u>Skinner Ridge</u>	Facility Number: <u>286030</u>
Well Name: <u>SKINNER RIDGE 698-27-01</u>	Well Number: <u>324350</u>
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>NESW 27 6S 98W</u> Latitude: <u>39.501426</u> Longitude: <u>-108.323896</u>	

**TECHNICAL CONDITIONS**

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

**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: Happle-Rock outcrop association

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Clear Creek

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

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	<u>Impacted soils in lined pit, no impacts below liner.</u>	<u>See attached analytical results and sampling plan.</u>
<input type="checkbox"/> Vegetation	_____	_____
<input type="checkbox"/> Groundwater	_____	_____
<input type="checkbox"/> Surface Water	_____	_____

**REMEDIATION WORKPLAN**

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

Initial work at this location consisted of the removal of the netting material and fencing in order to access the pit. The exposed liner material that was on top of the pit contents was removed using an excavator. All gross pit material was shaken off the liner while it was being removed. The liner material was then cut into manageable sized pieces and was stored temporarily in a bermed area at the pit location.

**Describe how source is to be removed:**

Excavation of the pit material occurred between 10/20/11 and 10/21/11. This material was stockpiled within a bermed area on the well pad. Excavation continued until there were no visual impacts observed after the lower pit liner was encountered. Confirmation samples were collected from the east and west floor areas of the excavation and the north wall on 10/21/11. Sample results are presented in Table 1 as 27-1 "sample location" CONF.

**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.:**

Pit contents were mixed with approximately 2,400 cy of soil from a nearby borrow area and tested to verify that constituent concentrations in mixed soil did not exceed COGCC regulatory requirements summarized in Table 910-1 as listed on the attached Table 1. The mix ratio was determined by analyzing three bench scale mixes of pit contents to borrow material (1:1, 2:1, 3:1) presented in Table 1 and identified as 27-1 BENCH "mixing ratio". Based on these results, the Pit 27-1 material was mixed at a ratio of approximately 3:1 to meet COGCC allowable limits and to provide adequate volume to backfill the pit.



Tracking Number: Name of Operator: OGCC Operator No: Received Date: Well Name & No: Facility Name & No: Pit # 286030

REMEDIATION WORKPLAN (Cont.)

OGCC Employee:

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.): Impacted material was excavated until clean native soil was observed and tested. No groundwater was observed, therefore groundwater was not impacted from the pit.

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. The pit contents were mixed with soil from the borrow area at a ratio of approximately 3:1. Mixing occurred by placing one loader bucket of pit material into the pit, then placing 3 loader buckets of borrow material into the pit and mixing the material in the pit with an excavator until well mixed. The material was then compacted by wheel-rolling the material with the front-end loader. Between 11/1/11 and 11/3/11, samples were collected from the backfill as it was being placed in the pit. These samples were collected after 200 cubic yards (cy) of pit material was mixed with 600 cy of backfill, when 400 cy (cumulative) of pit material was mixed with 1,200 cy of backfill, and when 550 cy (cumulative) of pit material had be mixed with 1,650 cy of backfill. The results of these backfill samples are located in Table 1 and are identified as 27-1 BACKFILL "backfill amount". The final surface was graded to match the existng elevation of the well pad and will be utilized as a traffic area.

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 [x] N If yes, describe: Based on the backfill and pit confirmation sample results, further investigation is not required. Three background soil samples were collected from the edges of the well pad away from the 27-1 pit and analyzed for Sodium Adsorption Ratio (SAR), pH, Arsenic, and Specific Conductivity to justify elevated levels for these constituents in the mixing, backfill, and confirmation samples. Some of the backfill and confirmation sample results have elevated sodium adsorption ratio (SAR), pH, and arsenic above COGCC allowable limits. According to COGCC regulations section 910.b.(3).E, "Where EC of the impacted soil exceeds the level in Table 910-1, the sodium adsorption ratio (SAR) shall also be determined." The electrical conductivity (EC) of the backfill and confirmation samples is within COGCC allowable limits. The background samples show comparable concentrations of arsenic. The background pH samples are relatively high and exceed COGCC allowable limits in two of the samples and are relatively as high as the pH of the soil mixture, background, and confirmation samples which are likely the results of naturally high pH soil from the borrow area.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.): Pit contents were mixed with borrow soil and backfilled within the closed pits.

IMPLEMENTATION SCHEDULE

Table with 3 columns: Date Site Investigation Began, Date Site Investigation Completed, Date Remediation Plan Submitted, Remediation Start Date, Anticipated Completion Date, Actual Completion Date. Values include 6/6/11, 6/8/11, 7/11/11, 9/23/2011, 11/30/2011, 11/3/2011.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete. Print Name: ERIC PAGO Signed: [Signature] Title: Chevron Project Manager Date: 4/10/12

OGCC Approved: [Signature] Title: FOR Chris Canfield Date: 04/13/2012 EPS NW Region

**Table 1**  
**Chevron Piceance Pits**  
**Pit 27-1**

Sample Summary														
Sample Location	27-1 BENCH 1:1	27-1 BENCH 2:1	27-1 BENCH 3:1	27-1 E FLOOR CONF	27-1 N WALL CONF	27-1 W FLOOR CONF	27-1 BKGD EAST	27-1 BKGD NORTH	27-1 BKGD SOUTH	27-1 BACKFILL 200YD	27-1 BACKFILL 400YD	27-1 BACKFILL 550YD		
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	
Sample Date	10/21/2011	10/21/2011	10/21/2011	10/21/2011	10/21/2011	10/21/2011	9/14/2011	9/14/2011	9/14/2011	11/1/2011	11/2/2011	11/3/2011		
Laboratory Data Summary														
													COGCC Allowable Limits Table 910-1	Units
<b>Analytical Parameters</b>														
<b>Organic Compounds</b>														
TPH-Total	91.2	55.5	21.8	ND	ND	ND	NA	NA	NA	181	80.4	78.2	500 (Comb)	mg/kg
Gasoline Range Organics	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	*	mg/kg
Diesel Range Organics	91.2	55.5	21.8	ND	ND	ND	NA	NA	NA	181	80.4	78.2	*	mg/kg
Benzene	0.0088	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.17	mg/kg
Toluene	0.0161	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	85	mg/kg
Ethylbenzene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	100	mg/kg
Xylenes, Total	0.0133	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	175	mg/kg
Acenaphthene	0.0098	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg
Anthracene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.22	mg/kg
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.022	mg/kg
Benzo(b)fluoranthene	0.0041	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.22	mg/kg
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	2.2	mg/kg
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.22	mg/kg
Chrysene	0.0081	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	22	mg/kg
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.022	mg/kg
Fluoranthene	0.0045	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg
Fluorene	0.0196	0.0092	0.005	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg
Naphthalene	0.0904	0.0479	0.0339	0.0043	ND	ND	NA	NA	NA	0.14	0.0687	0.0537	23	mg/kg
Pyrene	0.0124	0.0049	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg
<b>Physical Properties</b>														
Sodium Adsorption Ratio	14.4	10.6	9.7	8.8	34.3	4.8	ND	ND	ND	16.9	11.1	11.6	<12	
Specific Conductivity	1.82	1.95	0.827	0.491	0.0036	0.491	0.0483	0.0505	0.0543	0.778	0.519	0.457	<4	mmhos/cm
pH	9.6	9.1	9.4	8.1	8.5	9.3	9	9.2	9.1	10.6	10	9.9	6 to 9	Std. Units
<b>Metals</b>														
Arsenic	17.7	10.9	12.9	20.8	18.6	20.9	13.4	23.6	11	17.7	23.5	16.5	0.39	mg/kg
Barium	736	623	462	249	824	357	NA	NA	NA	1300	848	664	15000	mg/kg
Cadmium	ND	ND	ND	ND	0.64	ND	NA	NA	NA	ND	ND	ND	70	mg/kg
Chromium, Hexavalent	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	23	mg/kg
Chromium, Trivalent	18	18.8	16.9	23.9	12	22.3	NA	NA	NA	25.4	22	22.3	120000	mg/kg
Copper	28.4	20.1	20.3	20.7	25.2	30.6	NA	NA	NA	30.4	24.3	26	3100	mg/kg
Lead	14.2	11.2	10.8	11	8.7	12.5	NA	NA	NA	22	18.5	15.4	400	mg/kg
Mercury	ND	ND	ND	ND	ND	ND	NA	NA	NA	0.078	0.09	0.097	23	mg/kg
Nickel	16.7	12.3	13.8	9.9	13.6	17.7	NA	NA	NA	19	19.3	19.4	1600	mg/kg
Selenium	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	390	mg/kg
Silver	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	390	mg/kg
Zinc	50.5	40	44.3	30.8	32.2	47.8	NA	NA	NA	63.3	61.2	61.3	23000	mg/kg

NA - Not analyzed  
 ND - Parameter reported under detection limit  
 mg/kg - milligrams per kilogram  
 mmhos/cm - milliohms per centimeter  
 Revised Extracts COGCC allowable limits