

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



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FOR OGCC USE ONLY

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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> Name of Operator: <u>Chevron USA, Inc.</u> Address: <u>760 Horizon Drive</u> City: <u>Grand Junction</u> State: <u>CO</u> Zip: <u>81506</u>	Contact Name and Telephone: <u>Eric Page</u> No: Cell: <u>832.439.3832</u> Office: <u>713.372.1022</u> Fax: <u>NA</u>
API Number: <u>045-09796</u> County: <u>Garfield</u> Facility Name: <u>Skinner Ridge</u> Facility Number: <u>286029</u> Well Name: <u>SKINNER RIDGE 698-28-01</u> Well Number: <u>324266</u> Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>SESW 28 6S 98W</u> Latitude: <u>39.497794</u> Longitude: <u>-108.330692</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 10/26/11 and 10/31/11. 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 north and south floor areas of the excavation and the west wall on 10/31/11. Sample results are presented in Table 1 as 28-1 "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 2,900 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 28-1 BENCH "mix ratio". Based on these results, the Pit 28-1 material was mixed at a ratio of approximately 1:1.



Tracking Number: Name of Operator: OGCC Operator No: Received Date: Well Name & No: Facility Name & No: Pit # 286029

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.): 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 1:1. 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 11/10/11 and 11/11/11, samples were collected from the backfill as it was being placed in the pit. These samples were collected after 400 cubic yards (cy) of pit material was mixed with 400 cy of borrow material, when 800 cy (cumulative) of pit material was mixed with 800 cy (cumulative) of borrow material, and when 1,200 cy (cumulative) of pit material had been mixed with 1,200 cy (cumulative) of borrow material. The results of these backfill samples are located in Table 1 and are identified as 28-1 BACKFILL "backfill amount". The final surface was graded to match the existing 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? [X] Y [ ] 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 28-1 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. One confirmation sample had elevated sodium adsorption ratio (SAR) 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 confirmation samples is within COGCC allowable limits. All the samples have elevated arsenic concentrations above COGCC allowable limits. The background samples show comparable concentrations of arsenic.

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 implementation schedule details: Date Site Investigation Began: 6/6/11, Date Site Investigation Completed: 6/8/11, Date Remediation Plan Submitted: 7/1/11, Remediation Start Date: 9/13/2011, Anticipated Completion Date: 11/30/2011, Actual Completion Date: 11/11/2011

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

Print Name: ERIC PAGE Signed: [Signature] Title: Chevron Project Manager Date: 4/10/12

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

**Table 1**  
**Chevron Piceance Pits**  
**Pit 28-1**

Sample Summary														COGCC Allowable Limits Table 915-1	Units
Sample Location	28-1 BENCH 1:1	28-1 BENCH 2:1	28-1 BENCH 3:1	28-1 NORTH FLOOR CONF	28-1 SOUTH FLOOR CONF	28-1 WEST WALL CONF	28-1 BRGD NORTH	28-1 BRGD SOUTH	28-1 BRGD WEST	28-1 BACKFILL 1200YD	28-1 BACKFILL 400YD	28-1 BACKFILL 800YD			
Sample Type	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite		
Sample Date	10/31/2011	10/31/2011	10/31/2011	10/31/2011	10/31/2011	10/31/2011	10/31/2011	9/14/2011	9/14/2011	9/14/2011	11/11/2011	11/10/2011	11/10/2011		
Laboratory Data Summary															
Analytical Parameters															
<b>Organic Compounds</b>															
TPH-Total	37.3	29	23.6	ND	ND	ND	NA	NA	NA	38.6	52.2	32.2	500 (Comb)	mg/kg	
Gasoline Range Organics	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	*	mg/kg	
Diesel Range Organics	37.3	29	23.6	ND	ND	ND	NA	NA	NA	38.6	52.2	32.2	*	mg/kg	
Benzene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.17	mg/kg	
Toluene	ND	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	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	175	mg/kg	
Acenaphthene	ND	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	ND	0.0043	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	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	22	mg/kg	
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	0.022	mg/kg	
Fluoranthene	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg	
Fluorene	0.007	ND	0.0043	ND	0.0043	ND	NA	NA	NA	0.0044	0.005	0.0047	1,000	mg/kg	
Naphthalene	0.0306	0.0143	0.0138	ND	ND	ND	NA	NA	NA	0.0134	0.0135	0.013	23	mg/kg	
Pyrene	0.0042	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	1,000	mg/kg	
<b>Physical Properties</b>															
Sodium Adsorption Ratio	8.3	7.6	7	34.5	9.5	2.3	ND	ND	ND	8.0	8.7	8.9	<12		
Specific Conductivity	1.31	1.34	1.43	2.59	2.95	1.46	0.0464	0.0436	0.0304	1.52	1.95	1.73	<4	mmhos/cm	
pH	8.8	8.7	8.6	8.3	8.6	8.3	9.2	8.8	8.7	8.8	8.8	8.9	6 to 9	Std. Units	
<b>Metals</b>															
Arsenic	16.5	13.2	13.1	27.8	35.5	18.2	8.3	24.1	13.7	17.8	19	18.7	0.39	mg/kg	
Barium	601	368	364	338	313	325	NA	NA	NA	701	677	657	15000	mg/kg	
Cadmium	ND	ND	ND	ND	ND	ND	NA	NA	NA	0.55	0.59	0.58	70	mg/kg	
Chromium, Hexavalent	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	ND	ND	23	mg/kg	
Chromium, Trivalent	30.7*	16*	17.7	19.1	18.1	17.2	NA	NA	NA	20.7	21.1	21.1	120000	mg/kg	
Copper	30.3	20	20.7	25.6	29.7	15.2	NA	NA	NA	28.6	28	28.2	3100	mg/kg	
Lead	13	11.1	10.4	16.1	17.7	12	NA	NA	NA	14.9	14.3	14.6	400	mg/kg	
Mercury	ND	ND	ND	ND	ND	ND	NA	NA	NA	0.054	ND	0.053	23	mg/kg	
Nickel	18.4	13.9	13.9	20.2	19.2	14	NA	NA	NA	16.4	17.4	16.6	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	52	41.2	43.9	58.2	52.3	44.7	NA	NA	NA	55.1	55.7	56.3	23000	mg/kg	

\* - value calculated by validation chemist; test omitted from COC

NA - Not analyzed

ND - Parameter reported under detection limit

mg/kg - milligrams per kilogram

mmhos/cm - milliohms per centimeter

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