

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



FOR OGCC USE ONLY

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

**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): Pit Closure

OGCC Operator Number: <u>10396</u>	Contact Name and Telephone: <u>Brian Bohm</u>
Name of Operator: <u>SWN PRODUCTION COMPANY, LLC.</u>	No: <u>832-796-4713</u>
Address: <u>P. O. BOX 12359</u>	Fax: _____
City: <u>SPRING</u> State: <u>TX</u> Zip: <u>77391-2359</u>	

API Number: _____	County: <u>MOFFAT</u>
Facility Name: <u>GAMMA STATE 14-15</u>	Facility Number: <u>313399</u>
Well Name: _____	Well Number: _____
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>LOT 4, SEC 15, T7N, R93W</u> Latitude: _____ Longitude: _____	

**TECHNICAL CONDITIONS**

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

**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.): Rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: 50: Cushool Fine Sandy Loam 3-12%

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

**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>750 yards</u>	<u>soil samples</u>
<input type="checkbox"/> Vegetation	_____	_____
<input type="checkbox"/> Groundwater	_____	_____
<input type="checkbox"/> Surface Water	_____	_____

**REMEDIALTION WORKPLAN**

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

Form 4 (Doc # 400863747) approved to remove pit liner and collect soil samples July 13-14, 2015. Soil samples indicated elevated THP & BTEX. Recieved e-mail approval from Kris Niedel to continue sampling to measure extent of contamination. Sampling with hand auger was inconclusive due to hard soil. SWN continued sampling by drilling bore holes in a grid pattern across the pit and surrounding area. The depth and extent of contamination was assessed by field screening with a FID or PID and confirmation sampling of soils by testing for BTEX and TPH content.

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

See attached document.

**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.:**

See attached document.

FORM  
27  
Rev 6/99

State of Colorado  
Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
(303)894-2100 Fax:(303)894-2109



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

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REMEDIATION WORKPLAN (Cont.)

\_\_\_\_\_

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

**Describe reclamation plan.** Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeded program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

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:

Analytical results will be provided after remediation and prior to backfilling.  
See attached drawing indicating contaminated area.

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

Will be land treated and disposed on site.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: \_\_\_\_\_ Date Site Investigation Completed: \_\_\_\_\_ Date Remediation Plan Submitted: \_\_\_\_\_  
Remediation Start Date: \_\_\_\_\_ Anticipated Completion Date: \_\_\_\_\_ 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: Cheryl Rowell Signed: Cheryl Rowell  
Title: Sr. Staff Regulatory Analyst Date: 11/3/15

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

Kris Neidel  
Environmental Protection Specialist Northwest Area  
Colorado Oil and Gas Conservation Commission  
796 Megan Ave, Suite 201  
Rifle, Colorado 81650

Dear Mr. Neidel:

SWN Production Company, LLC is working to close the Gamma State 14-15D pit. After two rounds of investigations to assess the vertical and horizontal extent of impacted soils, SWN has worked with LT Environmental (LTE) to develop this work plan. LTE will be providing third party oversight of all activities described in this plan. The following is a proposed plan for onsite treatment of impacted soils, for the reclamation of the area of the former Gamma State 14-15D mud pit, to levels below the COGCC Table 910-1 concentration for TPH.

### **Background**

Two rounds of sampling were conducted to field screen for TPH and BTEX levels in the soils under the Gamma State 14-15D pit liner. The initial round of sampling was conducted by LTE at SWNs' request and resulted in the collection of soil samples for borings at 8 locations. Of these eight locations, four locations had TPH detections of the 500 mg/kg screening level from Table 910.1. These four sample locations were the two pit bottom locations (PB01 1,200 mg/kg TPH and PB02 5,700 mg/kg TPH) and the two west wall locations (WW01 7,500 mg/kg TPH and WW02 2,600 mg/kg TPH).

Following the collection of these samples, COGCC were provided the results of these samples and a work plan for the second round of sampling was developed and submitted to the COGCC. This second work plan included a proposal to use HSA to drill bore holes in a proposed grid pattern in an area outside the pit to determine the area & depth of contamination. Depth discrete samples were to be collected in the field and screened with a FID or PID, Petroflag system, and confirmation samples of soils were collected and tested for BTEX and TPH (see Table 1). The field screening indicated that outside of the boundary of the pit bottom, the TPH impacted soils were limited to the soils located in a zone from approximately 18" above the bedrock surface to a clay zone located at the top of the bedrock surface.

### **Reclamation Plan**

Based on these results SWN delineated the two red areas on Figure 1 as the potential extent of contamination. The proposed scope of work includes treating impacted soil at the site via soil shredding and ex-situ chemical oxidation. Per the preliminary work completed at the site, impacted soil has been identified exceeding COGCC TPH standards. Preliminary calculations indicate approximately 4,750 yards of overburden, with approximately 750 yards of impacted soil are present at the site. These soil volumes are based on the following assumptions:

1. Soil from the surface to a depth of approximately 2.5' above bedrock (based on depths from the previous soil borings) will be stockpiled on site and used to backfill the excavated area.

$$\frac{R^2}{A} \rightarrow V^+$$

- Soil from approximately 2.5' above bedrock down to the bedrock surface will be field screened using a petroflag by LTE and those volumes screened as over 500 mg/kg TPH will be treated onsite by Unlimited Construction.

Sample Number	Depth	TPH Result (mg/kg)
SBSW02	4-9'	68
SBS01	9-10'	20
SBSW03	9-14'	21
SBW03	0-4'	36
SBW03	4-9'	12
SBW03	9-10'	15
SBW04	9-11'	29
SBNW04	9-11.5'	20
SBNW05	9-11.5'	14
SBNW06	0-4'	16
SBNW06	4-9'	27
SBNW06	9-14'	15
SBN01	15-16'	17

The 750 yards of impacted soils will be excavated, mechanically separated, placed on a conveyor belt, and sprayed with concentrated hydrogen peroxide to oxidize the petroleum hydrocarbon impacts.

Per communication with Mr. Kris Neidel of the COGCC (email of COA's dated 10/16/2015), and follow up correspondence by LTE and SWN, one discrete soil sample will be collected for every 100 cubic yards of treated soil and submitted for laboratory analysis of total petroleum hydrocarbons (TPH)-GRO, DRO, and ORO. Additionally, 5% of treated samples will receive analysis of the full COGCC Table 910-1 for organics, to verify compliance with COGCC standards (Note: background data collected previously indicated Arsenic is present in the native soil above the Table 910.1 standard). After analytical results of confirmation samples have been received indicating compliance with cleanup objectives, the treated soil will be utilized as backfill for the excavation. LTE or SWN will submit 72 hour prior notification to the COGCC, as requested by the COGCC.

LTE will provide third party contractor oversight and management of overburden excavation, impacted soil stockpile, impacted soil treatment, confirmation sampling of treated material, confirmation sampling of excavation sidewall and floor samples, documentation, and summary reporting.

Sincerely,  
 Brian K Bohm  
 Division Planning Coordinator  
 SWN Production Company, LLC New Ventures



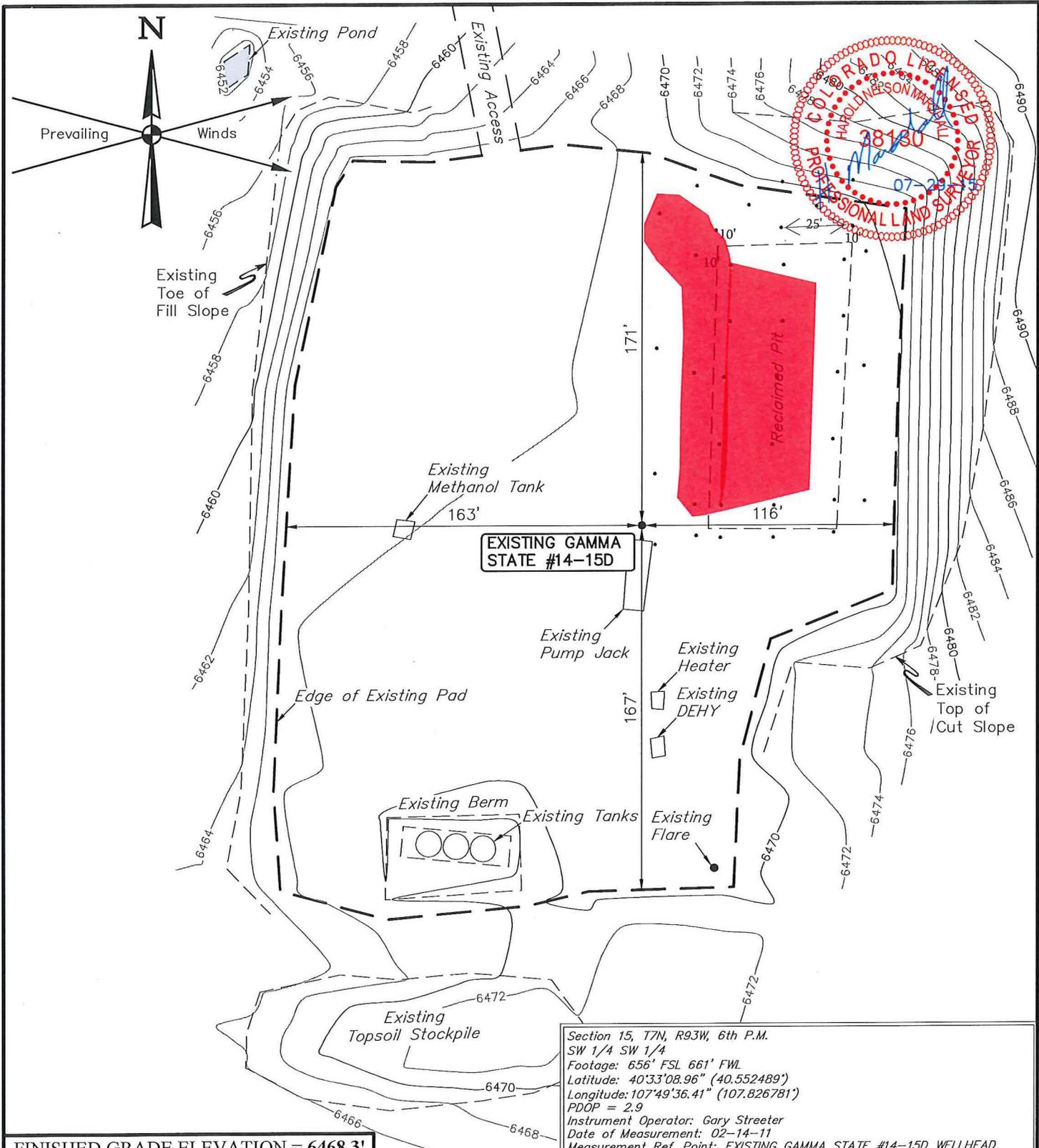
COGCC Conditions of Approval.

- Soil from the surface to a depth of approximately 2.5’ above bedrock shall be visually screened and field screened with using a FID, PID or Petroflag system. Any soils with visual staining noted, hydrocarbon odors detected, or detection using FID, PID or Petroflag system shall be segregated and treated appropriately.
- Confirmation composite samples will NOT be accepted.
- Soil samples shall be collected to adequately characterize the estimated 750 cubic yards of soil that is to be treated. Since methods for characterizing the effectiveness of the treatment during the processing of impacted material have not been addressed, one (1) sample per 100 cubic yards of treated material shall be collected and analyzed for the Table 910-1 Total Petroleum Hydrocarbons (TPH), including gasoline range organics (GRO), diesel range organics (DRO), and oil range organics (ORO) constituents. Five (5) % of the samples from the estimated 750 cubic yards of treated material shall be analyzed for the entire Table 910-1 for Organic Compounds in Soil.
- Samples shall be collected by an independent third party

Timeline

Date	Activity
Nov 9 <sup>th</sup>	Mobilize Equipment onsite / Conduct Health and Safety Site Meeting
Nov 10 <sup>th</sup> – Nov 13 <sup>th</sup>	Excavate Pit Content – Stockpile and segregate overburden by field screening, collect lab confirmation samples, Soil shredding treatment of field screened impacted soils – collection confirmation samples and retreat if necessary based on field screening.
Nov 16 <sup>th</sup> – Nov 17 <sup>th</sup>	Backfill soils verified by lab analytics
Nov 17 <sup>th</sup> – Dec 1 <sup>st</sup>	Summary report development and No Further Action Request development





**FINISHED GRADE ELEVATION = 6468.3'**

**NOTES:**  
 • Contours shown at 2' intervals.

Section 15, T7N, R93W, 6th P.M.  
 SW 1/4 SW 1/4  
 Footage: 656' FSL 661' FWL  
 Latitude: 40°33'08.96" (40.552489°)  
 Longitude: 107°49'36.41" (107.826781°)  
 PDOP = 2.9  
 Instrument Operator: Gary Streeter  
 Date of Measurement: 02-14-11  
 Measurement Ref. Point: EXISTING GAMMA STATE #14-15D WELLHEAD

**SWN PRODUCTION COMPANY, LLC**

**GAMMA STATE #14-15D**  
**SW 1/4 SW 1/4, SECTION 15, T7N, R93W, 6th P.M.**  
**MOFFAT COUNTY, COLORADO**

DRAWN BY: M.F.D.	DATE DRAWN: 07-22-15
SCALE: 1" = 60'	REVISED: 00-00-00

<b>AS-BUILT SITE PLAN</b>	<b>FIGURE #1</b>
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**UELS, LLC**  
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 Vernal, UT 84078 \* (435) 789-1017