

State of Colorado  
Oil and Gas Conservation Commission

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FOR OGCC USE ONLY  
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REM 9237

**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): drill cuttings and pit material

OGCC Operator Number: <u>10516</u>	Contact Name and Telephone: <u>Bryan Burns</u>
Name of Operator: <u>LINN Operating, Inc.</u>	No: <u>281-840-4033 (office), 303-726-8040 (cell)</u>
Address: <u>600 Travis St., Suite 5100</u>	Fax: <u>303-999-4345</u>
City: <u>Houston</u> State: <u>TX</u> Zip: <u>77019</u>	

API Number: <u>05-045-19069</u>	County: <u>Garfield</u>
Facility Name: <u>Latham I02 697</u>	Facility Number: <u>415531</u>
Well Name: <u>Latham #2-14D</u>	Well Number: <u>2-14D</u>
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>NE1/4 SE1/4 Sec 2 T6S R97W</u>	Latitude: <u>39.550061</u> Longitude: <u>108.182545</u>

**TECHNICAL CONDITIONS**

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): drill 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.): rangeland and natural gas production

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

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Circle Dot Gulch, 750 feet north

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>5243' cu. drill cuttings and pit material contained within soil berm</u>	<u>laboratory testing</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):

Drill cuttings were excavated and tested for Table 910-1 parameters. The most recent analyses showed all parameters except arsenic were below table 910-1 standards. These cuttings are currently stockpiled on site and being landfarmed. Remaining pit solids are being removed with a mini-excavator with plastic tracks to limit damage to the liner. The pit liner will be washed with water and the cuttings slurry sucked out of the pit and hauled to an approved disposal facility via vacuum truck. The liner will be cut below the buried/anchor portion on the pit perimeter and folded onto itself to limit escape of contaminants onto clean dirt below the liner.

Describe how source is to be removed:

The folded liner will be allowed to dry, pulled from pit, sampled per landfill requirements, loaded onto a truck and hauled to disposal. Drill cuttings and material excavated from the pit will be landfarmed on location. Background soil samples were collected and analyzed for arsenic in the vicinity of the pit to characterize natural soil arsenic concentrations.

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.:

Soils will be landtreated in the following way: 1. Soils will be spread on the available area of the pad in the thinnest possible layer to maximize exposure to air, water, and sunlight for bioremediation to occur. Soils will be turned/tilled quarterly when snowfall is not present to expedite bioremediation. As sampling efforts identify clean material, it will be segregated so more dirty soil can be spread thinner on location. Depending on the type of contaminants found, amendments such as nitrogen and phosphorus will be added to soils to expedite treatment.



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

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.):

There are no impacts to 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.

Soil sampling procedures are detailed in the attached document prepared by Nicholson GeoSolutions. After background levels of arsenic in the drill cuttings are demonstrated, drill cuttings will be blended with non-contaminated on-site materials, buried in the pit and compacted. The pit will be backfilled using native rock and soil, the pad surface will be minimized to allow for operation of the wells, regraded to conform to the surrounding ground surface contours, and reseeded using a landowner-approved seed mix. Mulch will be placed atop seed to limit seed predation and wind transport. Noxious weeds will be controlled biannually and as necessary using approved methods.

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:

During closure of the water storage pit, samples of the pit bottom materials will be collected and analyzed for the Table 910-1 parameters to evaluate the compliance with the standards. Please see attached soil sampling methodology prepared by Nicholson GeoSolutions.

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

The remediated drill cuttings and water storage pit bottom materials will be blended with on-site materials and buried in the pit during site reclamation beneficial reuse as described above.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 5/28/2015 Date Site Investigation Completed: 8-25-15 Date Remediation Plan Submitted: 8-27-15 Remediation Start Date: 8-29-15 Anticipated Completion Date: 10/31/2016 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: Bryan Burns, M.S. Signed: [Signature] Title: Sr. Environmental, Health, and Safety Representative Date: 8-27-15

OGCC Approved: Carlos Lujan, Ph.D. Title: [Signature] Date: \_\_\_\_\_

Digitally signed by Carlos Lujan, Ph.D. DN: cn=Carlos Lujan, Ph.D., o=COGCC, ou=EPS NW Region, email=carlos.lujan@state.co.us, c=US Date: 2015.09.02 12:15:58 -0600'

## **Conditions of Approval for Linn Energy Latham I-02 Pit Closure:**

*The Form 27 is conditionally approved; however, additional information or activities may be required during the course of remediation.*

### **Pit Closure:**

- Operator shall notify the COGCC 72 hours prior to beginning sampling and/or pit closure activities.
- The extent of impact shall be determined by field instrumentation (PID, Petro Flag, etc.) and confirmation sampling, *NOT* by visual/olfactory evaluation after excavation.
- Submit soil analytical results and a summary of pit closure activities via and amended Form 27.
- Pit excavation shall not be backfilled prior to 910-1 confirmation sampling.
- Fluid and sludge shall be removed prior to liner removal.
- The liner shall be removed intact as practicable, to prevent impact to material beneath the liner; removal of the liner by backhoe, mixing pieces of it with soil, is unacceptable.
- Liners shall be disposed of at an approved facility.
- Discrete samplings shall be collected from the bottom and each of the sidewalls of the pit.
- Provide provisions for maintaining the site and remediation activities during the winter and spring months within two weeks of the Form 27 approval date.

### **In Situ Soil Treatment:**

- Land Treatment of oily waste shall be performed in strict accordance with the requirements of COGCC Rule 907.e.(2).
- Provide surface owner's approval for land treatment.
- Soil will be spread on the available area of the pad in the thinnest possible layer to maximize exposure to air, water, and sunlight for bioremediation to occur. Land farming layer should be no thicker than 18 inches.
- If the operator prefers to use the "wind row" approach, the height of the wind row piles should not exceed 6 feet. Enough work space must be provided for heavy equipment to perform the soil mixing operation.
- The frequency of farming (tilling, disking, nutrient loading, surfactants, etc.) shall be more frequent, and aggressive enough to reduce the constituents of concern (i.e. at least three to four times during the growing season). This should be based on analytical results and not visual inspection alone.
- LINN shall provide a schedule for working the treatment areas.
- Soil samples shall be collected from the treatment areas at a frequency to determine rate of biodegradation.
- Progress samples shall be analyzed for Total Petroleum Hydrocarbons (TPH) – gasoline range organics (GRO), diesel range organics (DRO) and Polycyclic Aromatic Hydrocarbons (PAHs).
- Provide sample results with sample location diagram, summary table of results compared to Table 910-1 standards, and full laboratory reports.

- Final confirmation samples prior to reuse of the material shall be analyzed for TPH – GRO & DRO, PAHs, Electrical Conductivity (EC), pH, Sodium Adsorption Ratio (SAR).
- If one or more of the inorganics (EC, pH or SAR) exceed Table 910-1 standards, operator will be required to provide a plan to the COGCC for approval to either bury the waste with at least 3-feet of clean fill, or reuse it in another location outside of active agricultural areas. If buried off site, land owner permission is required (see Rule 907.e.(2)).
- No additional wastes shall be treated in the land treatment area. Addition of other waste will result in a violation of use of the land treatment area, and the location will be converted a CE&P facility and must meet Rule 908. d. requirements.
- The operator shall present monthly status reports, until it is determined that the project is moving forward at a satisfactory pace. These status reports can be a brief summary of what was done, if anything. Additionally, a more detailed status report shall be provided twice a year.
- Operator shall complete remediation within three years of the date of this conditional approval. Any treated waste failing to meet Table 910-1 standards within three (3) years, must be removed and disposed of at a commercial facility within 30 days. Disposal documentation must be received by COGCC within 15 days following disposal.

**Soil Sampling Procedure:**

For screening purposes, operator may use his preferred protocol given that this is an internal tracking procedure.

Number of samples for compliance purposes (as a minimum):

- Operator will 1) report the approximate volume and shape of the waste material pile (volume, area, height), 2) provide a figure showing the area occupied or to be occupied by the waste material, and 3) Indicate in the figure the sampling locations and depths.
- For soil piles equal or less than 500 cu yards:  
One composite sample for every 250 cu yards. Every composite sample made of 6 sub-samples.
  - For fairly spread out, land farmed material, eight (6) random samples at least one (1) foot deep.
  - For stockpile or wind row, four (4) shallow samples two (2) or more feet deep toward the perimeter of the pile, and two (2) deep samples four (4) or more feet deep toward the center of the pile (consider a backhoe).
- For soil piles from 500 and up to 2000 cu yards:  
Two (2) composite samples for the first 500 cu yards plus one composite for every 500 cu yards.
- For soil piles larger than 2000 cu yards:  
Five (5) composite samples for the first 2000 cu yards plus one composite for every 1000 cu yards.

Example: A 5000 cu yards pile will require eight (8) composite samples. Each composite sample made of 6 sub-samples.

Operator may propose an alternate sampling procedure via e-form 04 if there are valid reasons for a change.