

# State of Colorado Oil and Gas Conservation Commission

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Receive Date:

Report taken by:

## Site Investigation and Remediation Workplan (Supplemental Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by COGCC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27. This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Refer to Rules 340, 905, 906, 907, 908, 909, and 910

### OPERATOR INFORMATION

Name of Operator: THUNDER RIVER PRODUCTION LLC	Operator No: 10468	<b>Phone Numbers</b>
Address: 4545 POST OAK PLACE DR #240		Phone: (713) 777-6400
City: HOUSTON	State: TX	Zip: 77027
Contact Person: John Stevens	Email: john.stevens@thunder-river.com	Mobile: ( )

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 6938

Initial Form 27 Document #: 2223729

#### PURPOSE INFORMATION

- |  |  |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination                                       | <input type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water                   |
| <input type="checkbox"/> 909.c.(1), Rule 905: Pit or PW vessel closure                             | <input type="checkbox"/> Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b. |
| <input type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation                            | <input checked="" type="checkbox"/> Rule 909.e.(2)B.: Closure of remediation project                       |
| <input type="checkbox"/> 909.c.(3), Rule 907.e.: Land treatment of oily waste                      | <input type="checkbox"/> Rule 906.c.: Director request   |
| <input type="checkbox"/> 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure | <input type="checkbox"/> Other   |

#### SITE INFORMATION

N Multiple Facilities ( in accordance with Rule 909.c. )

Facility Type: WELL	Facility ID:	API #: 057-06483	County Name: JACKSON
Facility Name: Fuqua 19-02-10-1H		Latitude: 40.484650	Longitude: -106.184710
** correct Lat/Long if needed: Latitude:		Longitude:	
QtrQtr: SWSE	Sec: 18	Twp: 6N	Range: 78W
Meridian: 6		Sensitive Area? No	

#### SITE CONDITIONS

General soil type - USCS Classifications CL

Most Sensitive Adjacent Land Use RANGELAND

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? No

#### Other Potential Receptors within 1/4 mile

Monroe Ditch is .15 miles away

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste      | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             |  |
| <input checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" type="checkbox"/> Condensate     | <input type="checkbox"/> Pigging Waste               |  |
| <input type="checkbox"/> Drilling Fluids           | <input type="checkbox"/> Rig Wash                    |  |
| <input type="checkbox"/> Drill Cuttings            | <input type="checkbox"/> Spent Filters               |  |
|  | <input type="checkbox"/> Pit Bottoms                 |  |
|  | <input type="checkbox"/> Other (as described by EPA) |  |

## DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
	SOILS	~200 FT BY 450 FT	VISUALLY, SAMPLES, TAPE MEASURE/GPS
	VEGETATION	~200 FT BY 450 FT	VISUALLY, SAMPLES, TAPE MEASURE/GPS

## INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

LARAMIE ENERGY II SCRAPED UP ~20 CU YDS OF IMPACTED SAGE BRUSH AND SOIL IN CONTAINMENT NEAR THE VERTICAL SEPARATOR WHERE THE RELEASE OCCURRED. THE ORIGINAL PLAN WAS TO BURN THE IMPACTED AREAS, SCARIFY THE SOIL, AND RE-SEED WITH NATIVE GRASSES AND SAGE BRUSH. A FIRE BREAK WAS CUT AROUND THE PERIMETER OF THE IMPACT AREA IN PREPARATION FOR A CONTROLLED BURN. HOWEVER, A COUNTY WIDE BURN BAN WAS IMPLEMENTED TWO DAYS BEFORE THE CONTROLLED BURN WAS TO TAKE PLACE.

## PROPOSED SAMPLING PLAN

### Proposed Soil Sampling

☐ Will soil samples be collected as part of this investigation? ( Number, type (grab/composite), analyses, and locations of samples ):

### Proposed Groundwater Sampling

☐ Will groundwater samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

### Proposed Surface Water Sampling

☐ Will surface water samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

## Additional Investigative Actions

☐ Additional alternative investigative actions described in attached Site Investigation Plan ( summary ):

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected \_\_\_\_\_ 0  
Number of soil samples exceeding 910-1 \_\_\_\_\_  
Was the areal and vertical extent of soil contamination delineated? \_\_\_\_\_  
Approximate areal extent (square feet) \_\_\_\_\_

### NA / ND

\_\_\_\_\_ Highest concentration of TPH (mg/kg) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of SAR \_\_\_\_\_  
\_\_\_\_\_ BTEX > 910-1 \_\_\_\_\_  
\_\_\_\_\_ Vertical Extent > 910-1 (in feet) \_\_\_\_\_

### Groundwater

Number of groundwater samples collected \_\_\_\_\_ 0  
Was extent of groundwater contaminated delineated? No \_\_\_\_\_  
Depth to groundwater (below ground surface, in feet) \_\_\_\_\_  
Number of groundwater monitoring wells installed \_\_\_\_\_  
Number of groundwater samples exceeding 910-1 \_\_\_\_\_

\_\_\_\_\_ Highest concentration of Benzene (µg/l) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of Toluene (µg/l) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of Ethylbenzene (µg/l) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of Xylene (µg/l) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of Methane (mg/l) \_\_\_\_\_

### Surface Water

\_\_\_\_\_ 0 Number of surface water samples collected  
\_\_\_\_\_ Number of surface water samples exceeding 910-1  
If surface water is impacted, other agency notification may be required.

## OTHER INVESTIGATION INFORMATION

☐ Were impacts to adjacent property or offsite impacts identified?

☐ Were background samples collected as part of this site investigation?

☐ Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) \_\_\_\_\_ Volume of liquid waste (barrels) \_\_\_\_\_

☐ Is further site investigation required?

# REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? No \_\_\_\_\_

## **SOURCE REMOVAL SUMMARY**

Describe how source is to be removed.

THE RELEASE AREA WILL BE FENCED WITH 3-STRAND BARBWIRE TO PREVENT CATTLE AND WILDFIRE FROM ENTERING THE IMPACT AREA. LARAMIE ENERGY II WILL HIRE A CONTRACTOR TO SPRAY SURFACTANT AND NUTRIENTS OVER THE IMPACT AREA USING A TRACTOR AND A BOOM. ADDITIONAL SOIL SAMPLES WILL BE COLLECTED 3 MONTHS AFTER APPLICATION. IF THE IMPACTED SOILS HAVE NOT MET THE COGCC TABLE 910-1 STANDARDS AND THE BURN BAN IS LIFTED, BURNING THE IMPACTED VEGETATION AND/OR SECOND APPLICATION WILL BE EVALUATED FOLLOWING RECEIPT OF SOIL ANALYTICAL RESULTS.

## **REMEDIATION SUMMARY**

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

N/A

## **Soil Remediation Summary**

### ☐ In Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Air sparge / Soil vapor extraction  
\_\_\_\_\_ Natural Attenuation  
\_\_\_\_\_ Other \_\_\_\_\_

### ☐ Ex Situ

\_\_\_\_\_ Excavate and offsite disposal  
\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_  
\_\_\_\_\_ Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_  
\_\_\_\_\_ Excavate and onsite remediation  
\_\_\_\_\_ Land Treatment  
\_\_\_\_\_ Bioremediation (or enhanced bioremediation)  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Other \_\_\_\_\_

## **Groundwater Remediation Summary**

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Air sparge / Soil vapor extraction  
\_\_\_\_\_ Natural Attenuation  
\_\_\_\_\_ Other \_\_\_\_\_

## **GROUNDWATER MONITORING**

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

BASED ON A REVIEW OF DWR RECORDS FOR PERMITTED WATER WELLS IN THE AREA THERE ARE NO WATER WELLS LOCATED WITHIN SECTION 18. ONE PERMITTED WELL WAS IDENTIFIED IN SECTION 20, WITH A TOTAL DEPTH LISTED AT 100 FEET. THERE ARE NO PERMITTED WATER WELLS IN THE IMMEDIATE DOWNGRAIENT DIRECTION (NW) OF TEH FUQUA 18-15 WELL PAD, AND THE RELEASE WAS DIRECTED TO THE EAST, OR AWAY FROM THE CLOSEST SURFACE WATER (MONROE-OTTAWA DITCHES) AND THE ILLINOIS RIVER. GROUNDWATER IS NOT EXPECTED TO BE IMPACTED BASED ON THE REPORTED GROUNDWATER DEPTH (50 FT TO 100 FT) AND NATURE OF THE RELEASE.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

**Frequency:** ☐ Quarterly ☐ Semi-Annually ☐ Annually ☐ Other \_\_\_\_\_

**Report Type:** ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☐ Other \_\_\_\_\_

### WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? \_\_\_\_\_

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_

E&P waste (solid) description \_\_\_\_\_

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-COGCC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_

E&P waste (liquid) description \_\_\_\_\_

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-COGCC Disposal Facility: \_\_\_\_\_

## REMEDIATION COMPLETION REPORT

### REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? Yes \_\_\_\_\_

Do all soils meet Table 910-1 standards? Yes \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? Yes \_\_\_\_\_

Are the only residual soil impacts pH, SAR, or EC at depths greater than 3 feet below ground surface? \_\_\_\_\_

Does Groundwater meet Table 910-1 standards? Yes \_\_\_\_\_

Is additional groundwater monitoring to be conducted? No \_\_\_\_\_

## RECLAMATION PLAN

### RECLAMATION PLANNING

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.

SURFACE SOIL SAMPLES WERE COLLECTED ON 4/26/2012 FROM THE SPILL AREA TO ASSESS CURRENT SITE CONDITIONS AND TO DEFINE THE NATURE AND EXTENT OF THE IMPACTED AREA. THE CONDENSATE/CRUDE OIL IMPACTS ARE SURFICIAL SINCE THE RELEASE WAS FROM THE TOP OF A VERTICAL SEPARATOR. NEW GRASSES WERE OBSERVED TO HAVE GERMINATED AND CACTI AND FORBS WERE OBSERVED FLOWERING WITHIN THE IMPACT AREA AT THE TIME OF THE SAMPLING. USING A SURFACTANT TO BREAK DOWN THE PARAFIINS ON THE VEGETATION AND ADDITION OF NUTRIENT TO ENHANCE BIODEGRADATION IN THE SOIL HAS ADVANTAGES OVER BURNING SINCE THE EXISTING VEGETATION IS MAINTAINED AND THE AREA WILL RECOVER FASTER THAN IF IT WERE BRUSH HOGGED, DISKED, AND RE-SEED. CLEARING THE AREA WOULD POTENTIALLY PROVIDE AN OPPORTUNITY FOR NOXIOUS WEEDS TO BECOME ESTABLISHED IN THE IMPACTED AREA. GRADING AND RECONTOURING WILL NOT BE NECESSARY, AND COMPACTION IS NOT AN ISSUE. SAMPLES WILL BE COLLECTED SIX MONTHS AFTER TREATMENT TO ASSESS PROGRESS.

Is the described reclamation complete? \_\_\_\_\_

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

☐ Interim? ☐ Final?

Did the Surface Owner approve the seed mix? \_\_\_\_\_

If NO, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

## IMPLEMENTATION SCHEDULE

### **PRIOR DATES**

Date of Surface Owner notification/consultation, if required. \_\_\_\_\_

Actual Spill or Release date, if known. \_\_\_\_\_

### **SITE INVESTIGATION DATES**

Date of Initial Actions described in Site Investigation Plan (start date). \_\_\_\_\_

Date of commencement of Site Investigation. 01/30/2012 \_\_\_\_\_

Date of completion of Site Investigation. 04/26/2012 \_\_\_\_\_

### **REMEDIAL ACTION DATES**

Date of commencement of Remediation. \_\_\_\_\_

Date of completion of Remediation. \_\_\_\_\_

### **SITE RECLAMATION DATES**

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

## **OPERATOR COMMENT**

We resampled around the high TPH(DRO) of Sample SS-20. The confirmation samples SS-22, SS-23, and SS-24 surrounded the SS-20 location and were considered representative of the current condition of the soil. This is below the 500 ppm (for TPH) maximum concentration levels. We have included a bio and comments from the Consultant that visited site and collected samples:

Curtis Utley graduated from Colorado State University in 2001 with a BS degree in Soil and Crop Sciences and a BS in Landscape Horticulture. He then continued on with Colorado State University as a Horticulture Agent for Colorado State University Extension where he directed community outreach and the Master Gardener volunteer program in Adams County, Colorado. After his tenure in the Adams County Extension office he transferred to the Jefferson County Extension office where he managed CSU Extension's metro-area Plant Diagnostic Clinic for 16 years. In this position, Curtis diagnosed plant diseases, insect pests, soil and water relations issues for homeowners and Green Industry professionals including greenhouse growers, golf courses, nurseries, arborists, vegetable farmers, fruit growers, and landscape management professionals. Curtis also taught many classes on plant pathology, plant diagnostics, abiotic issues, and pesticide application at professional symposiums as well as the Master Gardener program. Curtis also completed his Master's Degree in Bioagricultural Sciences and Pest Management from CSU while working at the Jefferson County Extension office.

From Curtis: "While collecting soil samples at the fuqua well site spill location I evaluated the vegetation growing at the location and found it to be consistent with what I would expect to find on a flat arid steppe. A mixture of low growing dryland grasses and forbs dominated by Artemisia spp. The plant density was also consistent with what I would expect to find for this location's aspect and wind exposure."

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

Signed: ` John Stevens \_\_\_\_\_

Title: Manager \_\_\_\_\_

Submit Date: ` \_\_\_\_\_

Email: john.stevens@thunder-river.com \_\_\_\_\_

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 6938 \_\_\_\_\_

### **COA Type**

### **Description**

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## **Attachment Check List**

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

### **Att Doc Num**

### **Name**

402559441	SOIL SAMPLE LOCATION MAP
402559444	ANALYTICAL RESULTS

Total Attach: 2 Files

## **General Comments**

### **User Group**

### **Comment**

### **Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)