

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

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



FOR OGCC USE ONLY  
RECEIVED 10/24/2014  
REM 8723  
DOC 200416133

**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.

**CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED**

Spill or Release    Plug & Abandon    Central Facility Closure    Site/Facility Closure    Other (describe): \_\_\_\_\_

OGCC Operator Number: _____	Contact Name and Telephone: _____
Name of Operator: _____	_____
Address: _____	No: _____
City: _____ State: _____ Zip: _____	Fax: _____
API Number: _____	County: _____
Facility Name: _____	Facility Number: _____
Well Name: _____	Well Number: _____
Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ 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.): \_\_\_\_\_

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.): \_\_\_\_\_

\_\_\_\_\_

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

Impacted Media (check):	Extent of Impact:	How Determined:
Soils	_____	_____
Vegetation	_____	_____
Groundwater	_____	_____
Surface Water	_____	_____

**REMEDIALTION WORKPLAN**

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

Describe how source is to be removed:

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.:

FORM  
27  
Rev 6/99

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Page 2  
REMEDIAL WORKPLAN (Cont.)

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

OGCC Employee: Young

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 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 tank hole was treated with agricultural pelleted gypsum and covered with 3' of fill dirt. The location will be seeded and straw will be crimped to help prevent erosion and promote re-growth.

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:

We will continue to monitor the location for re-growth and erosion and will take the necessary steps to alleviate any issues or problems

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

### IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>09/26/14</u>	Date Site Investigation Completed: <u>09/29/14</u>	Date Remediation Plan Submitted: <u>10/24/14</u>
Remediation Start Date: <u>10/03/14</u>	Anticipated Completion Date: <u>10/07/14</u>	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: Loni J. Davis

Signed: Loni J. Davis

Title: Operations Accounting and Regulatory Specialist

Date: 10/24/14

OGCC Approved: Ann C. Eckman

Title: EPS NE CO

Date: 10/27/14

for Rob Young

# SOIL ANALYSIS REPORT

<b>CLIENT:</b>	AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758
18250	



1816 E. Wyatt Earp  
PO Box 1397  
Dodge City, KS 67801  
800.557.7509  
620.227.7123  
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<b>LAB NO:</b>	3964 - 3965
<b>INVOICE NO:</b>	193403
<b>DATE RECEIVED:</b>	10/10/2014
<b>DATE REPORTED:</b>	10/23/2014

## SOIL ANALYSIS RESULTS FOR: SCHMIDT 01-18 FIELD IDENTIFICATION: TANK REMOVALS

METHOD USED:			1:1 Water-Soil		1:1 Water-Soil				Ammonium Acetate				Ammonium Acetate							
Lab Number	Sample ID	Sample Depth	Soil pH	Buffer pH	Sol. Salts mmho/cm	Excess Lime	% Organic Matter		Phosphorus ppm P	Potassium ppm K			Calcium ppm Ca	Magnesium ppm Mg	Sodium ppm Na	Zinc ppm Zn	Iron ppm Fe	Manganese ppm Mn	Copper ppm Cu	Boron ppm B
3964	01-18 TANK	0 - 36	9.4		0.83	Hi				332			3027	134	1252					
3965	01-18 BACKG	0 - 12	8.0		0.28	No				681			2144	259	40					

METHOD USED:			Sat. Paste																	
Lab Number	Sample ID	Sample Depth	Saturation % Sat	Soil pH	Electrical Conductivity mmho/cm	Potassium mg/L K	Sulfur mg/L S	Calcium mg/L Ca	Magnesium mg/L Mg	Sodium mg/L Na	Carbonate mg/L CO3	Bicarbonate mg/L HCO3	Chloride mg/L Cl	Boron mg/L B	Sodium Adsorption Ratio	Cation:Anion				
3964	01-18 TANK	0 - 36	36	8.7	2.17	22	16	18	15.0	460	<10	330	475	2.75	19.4	22.7 / 20.6				
3965	01-18 BACKG	0 - 12	45	7.6	0.73	78	7	91	16.9	15	<10	310	23	0.32	0.4	8.6 / 6.3				

FERTILIZER RECOMMENDATIONS:										POUNDS ACTUAL NUTRIENT PER ACRE										Cation Exchange Capacity					
Lab Number	Sample ID	Crop To Be Grown	Yield Goal	Lime, ECC Tons/A to raise pH to:			N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Zn	S	Mn	Cu	MgO	B	Ca	Cl	CEC	%H	%K	%Ca	%Mg	%N		
				6.0	6.5	7.0																			
3964	01-18 TANK																	23	0	4	67	5	24		
3965	01-18 BACKG																	15	0	12	72	15	1		

### SPECIAL COMMENTS AND SUGGESTIONS:

Lab Number(s): 3964

WARNING: Soil sodium (% Na) is very high. Typical symptoms of a sodic soil are surface crusting, soil sealing, and poor water penetration. Additional soil analysis can determine the proper rate of gypsum or other soil amendment. If irrigated, water analysis can help identify the sodium source. Contact the laboratory for more information.

Lab Number(s): 3964

CEC calculated by cation summation may overestimate true CEC and underestimate exchangeable sodium percentage (ESP) in soils containing excess lime.

Lab Number(s): 3964, 3965

Servi-Tech Laboratory fertilizer recommendations were not requested.

Analyses are representative of the samples submitted

Samples are retained 30 days after report of analysis

Explanations of soil analysis terms are available upon request

Reviewed and  
Approved By:

Steve Harrold  
Technical Coordinator

Page 1 of 1  
10/23/2014 11:23 am




# Servi-Tech Laboratories

1816 E. Wyatt Earp • PO Box 1397 • Dodge City, KS 67801  
www.servitechlabs.com

Phone: 620.227.7123

800.557.7509

Fax: 620.227.2047

<b>Lab No.:</b> 3964		<b>SOIL ANALYSIS RESULTS</b>		<b>Date Reported:</b> 10/23/2014	
<b>Send To:</b> 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
<b>Results For:</b> SCHMIDT <b>Sample Identification:</b> 01-18 TANK <b>Sample Depth:</b> 0-36"		<b>Invoice No.:</b> 193403 <b>Date Received:</b> 10/10/2014 <b>Field ID</b> TANK REMOVALS			

<b>Exchangable:</b>					
	<u>ppm</u>	<u>%</u>			
Calcium, Ca	3027	67	Cation Exchange Capacity, CEC meq/100g		23
Magnesium, Mg	134	5	Soil pH - 1:1		9.4
Potassium, K	332	4	Soil pH - Saturated Paste		8.7
Sodium, Na	1252	24	Soluble Salts, mmho/cm		0.83
Excess Lime Rating		HIGH	Exchangable Sodium Percent, ESP		24

<b>Extractable (from saturated paste, based on 36% water saturation):</b>		
	<b>mg/L</b>	<b>meq/L</b>
Calcium (Ca)	18	0.9
Magnesium (Mg)	15.0	1.2
Sodium (Na)	460	20.0
Chloride (Cl)	475	13.4
Sulfur (S)	16	1.0
Boron (B)	2.75	
Potassium (K)	22	0.6
Bicarbonate (HCO <sub>3</sub> )	330	5.4
Carbonate (CO <sub>3</sub> )	<10	<0.3

Sodium Adsorption Ratio (SAR)	19.4
Electrical Conductivity (ECe), mmho/cm	2.17
Cation:Anion	22.7 / 20.6

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Calculated Gypsum Recommendation (from ESP and CEC)		
Soil Texture	Gypsum Rec. T/A	
COARSE (sands, loamy sands, sandy loams)	4.0	To 4.9
MEDIUM (loams, silt loams, clay loams)	6.4	To 7.4
FINE (silty clay, clay loams, clays)	7.9	To 8.9

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This soil is considered: NON-SALINE/SODIC

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**GYPSUM SUGGESTIONS:** If soil has good internal drainage, full gypsum rate can be used to reclaim the affected area, but keep applications below 2 to 3 tons in a single year. Reclamation may not be feasible if a high water table is present, but applying 1/2 to 1 ton of gypsum every one to two years may help prevent crusting and surface "sealing".




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<b>Sample Depth:</b> 0-36"		<b>Field ID</b> TANK REMOVALS			
<b>SOIL PERMEABILITY HAZARD (based on ESP and SAR):</b>					
Soil texture		Potential hazard			
-----		-----			
COARSE (sands, loamy sands, sandy loams)		CAUTION			
MEDIUM (loams, silt loams, clay loams)		HIGH			
FINE (silty clay loams, clays)		HIGH			
<b>SOIL SALINITY:</b> Saline soils can be managed by choosing tolerant crops, keeping the seedbed moist until crop establishment, and/or irrigating with relatively good quality irrigation water. Good internal soil drainage is needed to reclaim saline areas, so lowering water tables may be necessary. Test soil (and water) annually to monitor changes in salinity levels.					
<b>SOIL SALINITY HAZARD (based on extractable salts, ECe):</b>					
Crop type		Potential hazard			
-----		-----			
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)		HIGH			
MODERATELY SENSITIVE (seedling alfalfa, corn, soybeans, many vegetables, etc.)		CAUTION			
MODERATELY TOLERANT (wheat, wheatgrass, sudangrass,					
sorghum, fescue, oats, brome grass, etc.)		LOW			
SALT TOLERANT (barley, bermudagrass, sugarbeets, cotton, etc.)		LOW			
<b>CHLORIDE:</b> Excess soil chloride may cause toxicity symptoms in sensitive plants. Toxicity should be verified by plant tissue analysis. High chloride soils can be managed by choosing tolerant crops, keeping the seed bed moist until crop establishment, and/or by irrigating with relatively good quality irrigation water.					
<b>EXTRACTABLE CHLORIDE HAZARD (based on soil extractable chloride, Cl):</b>					
HIGH for chloride sensitive crops (includes berries, fruit trees, grapes, citrus, etc.)					
LOW for moderately tolerant crops (includes alfalfa, beans, rice, sorghum, etc.)					
LOW for chloride tolerant crops (includes wheat, flax, tomato, cotton, barley, corn, beets, etc.)					
<b>BORON:</b> Excess soil boron may cause toxicity symptoms in sensitive plants. Toxicity should be verified by plant tissue analysis. If toxicity is a problem, choose boron tolerant crops and/or irrigate with relatively good quality irrigation water.					




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<b>Sample Identification:</b>		01-18 TANK		<b>Date Received:</b> 10/10/2014	
<b>Sample Depth:</b>		0-36"		<b>Field ID</b> TANK REMOVALS	
EXTRACTABLE BORON HAZARD (based on soil extractable boron, B):					
Crop type		Potential hazard			
<hr/>					
BORON SENSITIVE (such as sunflower, barley, onions, citrus, fruit trees, grapes, etc.) . . . . . HIGH					
MODERATELY SENSITIVE (such as potatoes, peppers, peas, radishes, etc.) . . . . . HIGH					
MODERATELY TOLERANT (such as wheat, corn, oats, clover, lettuce, turnips, celery, etc.) . . CAUTION					
BORON TOLERANT (such as alfalfa, beets, cotton, grain sorghum, tomatoes, vetch, etc.) . . . . . LOW					




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<b>Sample Identification:</b> 01-18 BACKG		<b>Field ID</b>		TANK REMOVALS	
<b>Sample Depth:</b> 0-12"					
<b>Exchangable:</b>					
	ppm	%			
Calcium, Ca	2144	72	Cation Exchange Capacity, CEC meq/100g		15
Magnesium, Mg	259	15	Soil pH - 1:1		8.0
Potassium, K	681	12	Soil pH - Saturated Paste		7.6
Sodium, Na	40	1	Soluble Salts, mmho/cm		0.28
Excess Lime Rating		NO	Exchangable Sodium Percent, ESP		1
<b>Extractable (from saturated paste, based on 45% water saturation):</b>					
	mg/L		meq/L		
Calcium (Ca)	91		4.5		
Magnesium (Mg)	16.9		1.4		
Sodium (Na)	15		0.7		
Chloride (Cl)	23		0.6		
Sulfur (S)	7		0.4		
Boron (B)	0.32				
Potassium (K)	78		2.0		
Bicarbonate (HCO <sub>3</sub> )	310		5.1		
Carbonate (CO <sub>3</sub> )	<10		<0.3		
Sodium Adsorption Ratio (SAR) 0.4					
Electrical Conductivity (ECe), mmho/cm 0.73					
Cation:Anion 8.6 / 6.3					
Calculated Gypsum Recommendation (from ESP and CEC)					
Soil Texture			Gypsum Rec. T/A		
COARSE	(sands, loamy sands, sandy loams)		0.0	To	0.0
MEDIUM	(loams, silt loams, clay loams)		0.0	To	0.0
FINE	(silty clay, clay loams, clays)		0.0	To	0.0
This soil is considered: NON-SALINE/NON-SODIC					
SOIL PERMEABILITY HAZARD (based on ESP and SAR):					
Soil texture		Potential hazard			
COARSE (sands, loamy sands, sandy loams)		LOW			
MEDIUM (loams, silt loams, clay loams)		LOW			
FINE (silty clay loams, clays)		LOW			



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<b>Sample Identification:</b> 01-18 BACKG		<b>Date Received:</b> 10/10/2014		<b>Field ID</b> TANK REMOVALS	
<b>Sample Depth:</b> 0-12"		<b>Field ID</b> TANK REMOVALS			
SOIL SALINITY HAZARD (based on extractable salts, ECe):					
Crop type			Potential hazard		
-----					
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)			LOW		
MODERATELY SENSITIVE (seedling alfalfa, corn, soybeans, many vegetables, etc.)			LOW		
MODERATELY TOLERANT (wheat, wheatgrass, sudangrass, sorghum, fescue, oats, brome grass, etc.)			LOW		
SALT TOLERANT (barley, bermudagrass, sugarbeets, cotton, etc.)			LOW		
EXTRACTABLE CHLORIDE HAZARD (based on soil extractable chloride, Cl):					
LOW for chloride sensitive crops (includes berries, fruit trees, grapes, citrus, etc.)					
LOW for moderately tolerant crops (includes alfalfa, beans, rice, sorghum, etc.)					
LOW for chloride tolerant crops (includes wheat, flax, tomato, cotton, barley, corn, beets, etc.)					
EXTRACTABLE BORON HAZARD (based on soil extractable boron, B):					
Crop type			Potential hazard		
-----					
BORON SENSITIVE (such as sunflower, barley, onions, citrus, fruit trees, grapes, etc.)			CAUTION		
MODERATELY SENSITIVE (such as potatoes, peppers, peas, radishes, etc.)			LOW		
MODERATELY TOLERANT (such as wheat, corn, oats, clover, lettuce, turnips, celery, etc.)			LOW		
BORON TOLERANT (such as alfalfa, beets, cotton, grain sorghum, tomatoes, vetch, etc.)			LOW		



North  
↑

## Schmidt 01-18 - Tank Pull

Tank Removal soil sample depths 1' to 3'

Background Lat 40.39527/Lon -102.54286

Tank Lat 40.39520/Lon -102.54293

SCHMIDT 2-18

SCHMIDT 1-18

KNAUS 33-18 5N46W

KNAU

LUEKING 11-19 5N46W

LUEKING 21-19 5N46W

LUEKING 31-19 5N46W

LUEKING 3-19