

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 8713
DOC 2142260

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

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: _____

Page 2

REMEDATION WORKPLAN (Cont.)

OGCC Employee: _____

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: 09/24/14 Date Site Investigation Completed: 09/26/14 Date Remediation Plan Submitted: 10/24/14
Remediation Start Date: 10/01/14 Anticipated Completion Date: 10/03/14 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: _____ Title: _____ Date: _____

SOIL ANALYSIS REPORT

CLIENT:	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
Fax 620.227.2047

LAB NO:	3956 - 3957
INVOICE NO:	193403
DATE RECEIVED:	10/10/2014
DATE REPORTED:	10/23/2014

SOIL ANALYSIS RESULTS FOR: HILLMAN 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
3956	01-25 TANK	0 - 36	8.5		2.44	Hi					481			3441	141	1604					
3957	01-25 BACKG	0 - 12	7.9		0.49	Hi					874			3161	188	5					

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						
3956	01-25 TANK	0 - 36	38	8.0	10.1	77	16	148	15.6	2050	<10	190	3220	3.12	42.8	99.8 / 95.7						
3957	01-25 BACKG	0 - 12	40	7.7	1.33	165	11	151	18.5	6	<10	220	15	0.13	0.1	13.6 / 4.8						

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	P2O5	K2O	Zn	S	Mn	Cu	MgO	B	Ca	Cl	CEC	%H	%K	%Ca	%Mg	%N		
				6.0	6.5	7.0																			
3956	01-25 TANK																	27	0	5	65	4	26		
3957	01-25 BACKG																	20	0	11	80	8	0		

SPECIAL COMMENTS AND SUGGESTIONS:

Lab Number(s): 3956

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): 3956, 3957

Servi-Tech Laboratory fertilizer recommendations were not requested.

Lab Number(s): 3956, 3957

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

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

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10/23/2014 11:20 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

Lab No.: 3956		SOIL ANALYSIS RESULTS		Date Reported: 10/23/2014	
Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: HILLMAN		Invoice No.: 193403		Date Received: 10/10/2014	
Sample Identification: 01-25 TANK		Field ID		TANK REMOVALS	
Sample Depth: 0-36"					
Exchangable:					
	ppm	%			
Calcium, Ca	3441	65	Cation Exchange Capacity, CEC meq/100g		27
Magnesium, Mg	141	4	Soil pH - 1:1		8.5
Potassium, K	481	5	Soil pH - Saturated Paste		8.0
Sodium, Na	1604	26	Soluble Salts, mmho/cm		2.44
Excess Lime Rating		HIGH	Exchangable Sodium Percent, ESP		26
Extractable (from saturated paste, based on 38% water saturation):					
	mg/L		meq/L		
Calcium (Ca)	148		7.4		
Magnesium (Mg)	15.6		1.3		
Sodium (Na)	2050		89.1		
Chloride (Cl)	3220		90.8		
Sulfur (S)	16		1.0		
Boron (B)	3.12				
Potassium (K)	77		2.0		
Bicarbonate (HCO ₃)	190		3.1		
Carbonate (CO ₃)	<10		<0.3		
Sodium Adsorption Ratio (SAR) 42.8					
Electrical Conductivity (ECe), mmho/cm 10.1					
Cation:Anion 99.8 / 95.7					
Calculated Gypsum Recommendation (from ESP and CEC)					
Soil Texture			Gypsum Rec. T/A		
COARSE	(sands, loamy sands, sandy loams)		5.8	To	7.0
MEDIUM	(loams, silt loams, clay loams)		8.7	To	9.9
FINE	(silty clay, clay loams, clays)		10.4	To	11.6
This soil is considered: SALINE/SODIC					
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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Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 TANK 0-36"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID TANK REMOVALS	
SOIL PERMEABILITY HAZARD (based on ESP and SAR):					
Soil texture		Potential hazard			
-----		-----			
COARSE (sands, loamy sands, sandy loams)		CAUTION			
MEDIUM (loams, silt loams, clay loams)		HIGH			
FINE (silty clay loams, clays)		HIGH			
SOIL SALINITY: 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.					
SOIL SALINITY HAZARD (based on extractable salts, ECe):					
Crop type		Potential hazard			
-----		-----			
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)		HIGH			
MODERATELY SENSITIVE (seedling alfalfa, corn, soybeans, many vegetables, etc.)		HIGH			
MODERATELY TOLERANT (wheat, wheatgrass, sudangrass, sorghum, fescue, oats, brome grass, etc.)		HIGH			
SALT TOLERANT (barley, bermudagrass, sugarbeets, cotton, etc.)		CAUTION			
CHLORIDE: 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.					
EXTRACTABLE CHLORIDE HAZARD (based on soil extractable chloride, Cl):					
HIGH for chloride sensitive crops (includes berries, fruit trees, grapes, citrus, etc.)					
HIGH for moderately tolerant crops (includes alfalfa, beans, rice, sorghum, etc.)					
HIGH for chloride tolerant crops (includes wheat, flax, tomato, cotton, barley, corn, beets, etc.)					
BORON: 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.					



Fax: 620.227.2047

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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Lab No.: 3957		SOIL ANALYSIS RESULTS		Date Reported: 10/23/2014	
Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 BACKG 0-12"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID TANK REMOVALS	
Exchangable:					
	ppm	%			
Calcium, Ca	3161	80	Cation Exchange Capacity, CEC meq/100g		20
Magnesium, Mg	188	8	Soil pH - 1:1		7.9
Potassium, K	874	11	Soil pH - Saturated Paste		7.7
Sodium, Na	5	0	Soluble Salts, mmho/cm		0.49
Excess Lime Rating		HIGH	Exchangable Sodium Percent, ESP		0
Extractable (from saturated paste, based on 40% water saturation):					
	mg/L		meq/L		
Calcium (Ca)	151		7.5		
Magnesium (Mg)	18.5		1.5		
Sodium (Na)	6		0.3		
Chloride (Cl)	15		0.4		
Sulfur (S)	11		0.7		
Boron (B)	0.13				
Potassium (K)	165		4.2		
Bicarbonate (HCO ₃)	220		3.6		
Carbonate (CO ₃)	<10		<0.3		
Sodium Adsorption Ratio (SAR) 0.1					
Electrical Conductivity (ECe), mmho/cm 1.33					
Cation:Anion 13.6 / 4.8					
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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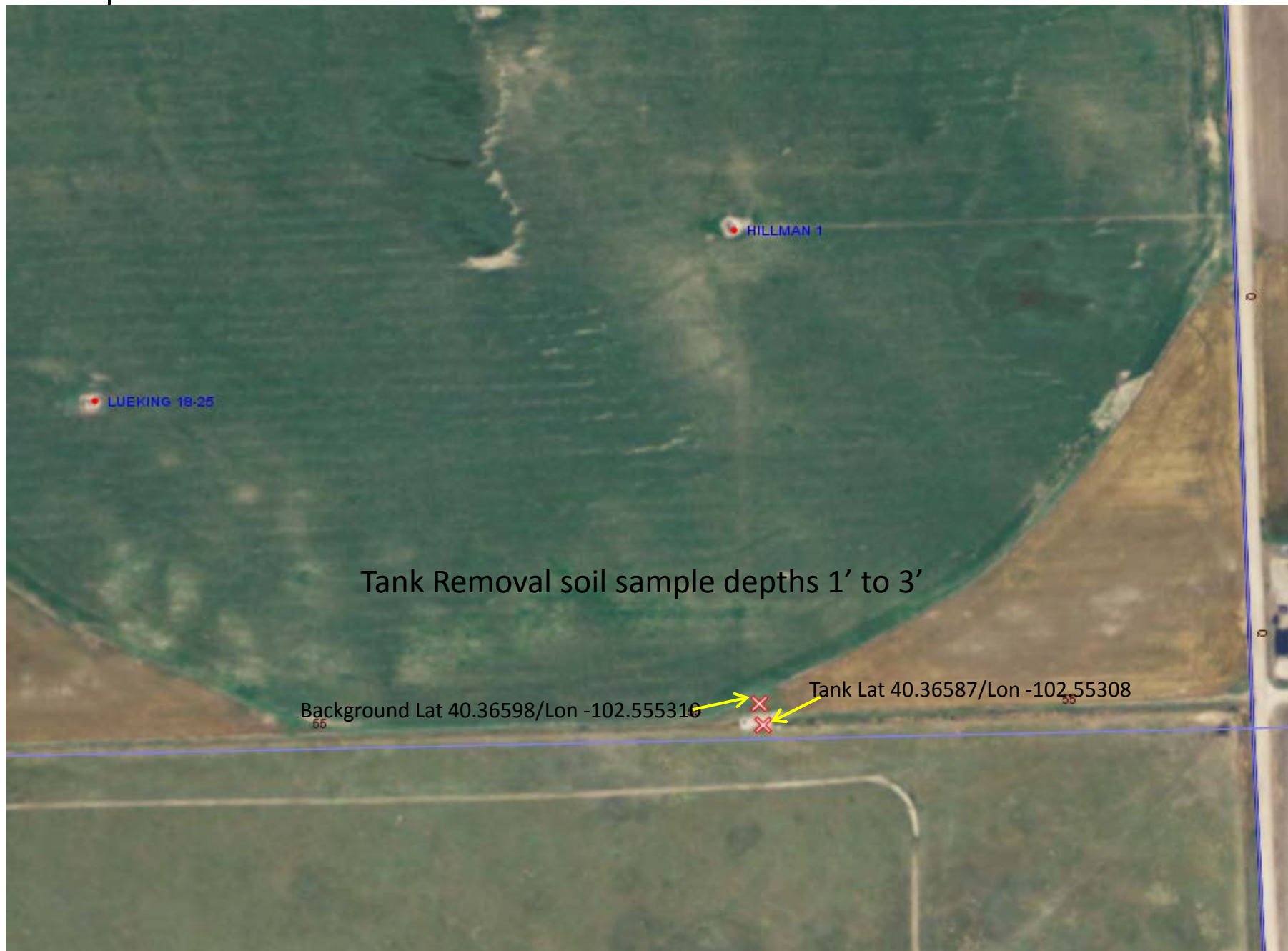
800.557.7509

Fax: 620.227.2047

Lab No.: 3957		SOIL ANALYSIS RESULTS		Date Reported: 10/23/2014	
Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 BACKG 0-12"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID TANK REMOVALS	
SOIL SALINITY: 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.					
SOIL SALINITY HAZARD (based on extractable salts, ECe):					
Crop type		Potential hazard			
-----		-----			
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)		CAUTION			
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.)		LOW			
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
↑

Hillman 01-25- Tank Pull



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



Page 2

REMEDIATION 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: 09/24/14	Date Site Investigation Completed: 09/26/14	Date Remediation Plan Submitted: 10/24/14
Remediation Start Date: 10/01/14	Anticipated Completion Date: 10/03/14	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. Gekman Title: EPS NE CO Date: 10/27/14
for Rob Young

SOIL ANALYSIS REPORT

CLIENT:	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
Fax 620.227.2047

LAB NO:	3956 - 3957
INVOICE NO:	193403
DATE RECEIVED:	10/10/2014
DATE REPORTED:	10/23/2014

SOIL ANALYSIS RESULTS FOR: HILLMAN

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
3956	01-25 TANK	0 - 36	8.5		2.44	Hi					481				3441	141	1604					
3957	01-25 BACKG	0 - 12	7.9		0.49	Hi					874				3161	188	5					

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						
3956	01-25 TANK	0 - 36	38	8.0	10.1	77	16	148	15.6	2050	<10	190	3220	3.12	42.8	99.8 / 95.7						
3957	01-25 BACKG	0 - 12	40	7.7	1.33	165	11	151	18.5	6	<10	220	15	0.13	0.1	13.6 / 4.8						

FERTILIZER RECOMMENDATIONS:

POUNDS ACTUAL NUTRIENT PER ACRE

Lab Number	Sample ID	Crop To Be Grown	Yield Goal	Lime, ECC Tons/A to raise pH to:			N	P ₂ O ₅	K ₂ O	Zn	S	Mn	Cu	MgO	B	Ca	Cl	Cation Exchange Capacity					
				6.0	6.5	7.0												CEC	%H	%K	%Ca	%Mg	%Na
3956	01-25 TANK																	27	0	5	65	4	26
3957	01-25 BACKG																	20	0	11	80	8	0

SPECIAL COMMENTS AND SUGGESTIONS:

Lab Number(s): 3956

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): 3956, 3957

Servi-Tech Laboratory fertilizer recommendations were not requested.

Lab Number(s): 3956, 3957

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

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

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Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 TANK 0-36"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID TANK REMOVALS	
Exchangable:					
	ppm	%			
Calcium, Ca	3441	65	Cation Exchange Capacity, CEC meq/100g		27
Magnesium, Mg	141	4	Soil pH - 1:1		8.5
Potassium, K	481	5	Soil pH - Saturated Paste		8.0
Sodium, Na	1604	26	Soluble Salts, mmho/cm		2.44
Excess Lime Rating		HIGH	Exchangable Sodium Percent, ESP		26
Extractable (from saturated paste, based on 38% water saturation):					
	mg/L		meq/L		
Calcium (Ca)	148		7.4		
Magnesium (Mg)	15.6		1.3		
Sodium (Na)	2050		89.1		
Chloride (Cl)	3220		90.8		
Sulfur (S)	16		1.0		
Boron (B)	3.12				
Potassium (K)	77		2.0		
Bicarbonate (HCO ₃)	190		3.1		
Carbonate (CO ₃)	<10		<0.3		
Sodium Adsorption Ratio (SAR)		42.8			
Electrical Conductivity (ECe), mmho/cm		10.1			
Cation:Anion		99.8 / 95.7			
Calculated Gypsum Recommendation (from ESP and CEC)					
Soil Texture			Gypsum Rec. T/A		
COARSE	(sands, loamy sands, sandy loams)	5.8	To	7.0	
MEDIUM	(loams, silt loams, clay loams)	8.7	To	9.9	
FINE	(silty clay, clay loams, clays)	10.4	To	11.6	
This soil is considered: SALINE/SODIC					
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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Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 TANK 0-36"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID TANK REMOVALS	
SOIL PERMEABILITY HAZARD (based on ESP and SAR):					
Soil texture		Potential hazard			
-----		-----			
COARSE (sands, loamy sands, sandy loams)		CAUTION			
MEDIUM (loams, silt loams, clay loams)		HIGH			
FINE (silty clay loams, clays)		HIGH			
SOIL SALINITY: 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.					
SOIL SALINITY HAZARD (based on extractable salts, ECe):					
Crop type		Potential hazard			
-----		-----			
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)		HIGH			
MODERATELY SENSITIVE (seedling alfalfa, corn, soybeans, many vegetables, etc.)		HIGH			
MODERATELY TOLERANT (wheat, wheatgrass, sudangrass, sorghum, fescue, oats, brome grass, etc.)		HIGH			
SALT TOLERANT (barley, bermudagrass, sugarbeets, cotton, etc.)		CAUTION			
CHLORIDE: 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.					
EXTRACTABLE CHLORIDE HAZARD (based on soil extractable chloride, Cl):					
HIGH for chloride sensitive crops (includes berries, fruit trees, grapes, citrus, etc.)					
HIGH for moderately tolerant crops (includes alfalfa, beans, rice, sorghum, etc.)					
HIGH for chloride tolerant crops (includes wheat, flax, tomato, cotton, barley, corn, beets, etc.)					
BORON: 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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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




Servi-Tech Laboratories

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Lab No.: 3957		SOIL ANALYSIS RESULTS		Date Reported: 10/23/2014	
Send To: 18250		AUGUSTUS ENERGY RESOURCES LLC 36695 HWY 385 PO BOX 250 WRAY, CO 80758		 Steve Harrold Technical Coordinator	
Results For: Sample Identification: Sample Depth:		HILLMAN 01-25 BACKG 0-12"		Invoice No.: 193403 Date Received: 10/10/2014 Field ID: TANK REMOVALS	
Exchangable:					
	ppm	%			
Calcium, Ca	3161	80	Cation Exchange Capacity, CEC meq/100g		20
Magnesium, Mg	188	8	Soil pH - 1:1		7.9
Potassium, K	874	11	Soil pH - Saturated Paste		7.7
Sodium, Na	5	0	Soluble Salts, mmho/cm		0.49
Excess Lime Rating		HIGH	Exchangable Sodium Percent, ESP		0
Extractable (from saturated paste, based on 40% water saturation):					
	mg/L		meq/L		
Calcium (Ca)	151		7.5		
Magnesium (Mg)	18.5		1.5		
Sodium (Na)	6		0.3		
Chloride (Cl)	15		0.4		
Sulfur (S)	11		0.7		
Boron (B)	0.13				
Potassium (K)	165		4.2		
Bicarbonate (HCO ₃)	220		3.6		
Carbonate (CO ₃)	<10		<0.3		
Sodium Adsorption Ratio (SAR) 0.1					
Electrical Conductivity (ECe), mmho/cm 1.33					
Cation:Anion 13.6 / 4.8					
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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SOIL SALINITY: 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.					
SOIL SALINITY HAZARD (based on extractable salts, ECe):					
Crop type			Potential hazard		
-----			-----		
SALT SENSITIVE (onions, carrots, many ornamentals, many fruit crops, etc.)			CAUTION		
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.)			LOW		
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
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Hillman 01-25- Tank Pull

