



ANNUAL REPORT OF PRESSURE MONITORING, FLUID INJECTION AND ENHANCED RECOVERY

Complete all blanks - add pages if needed. Copy to be retained for five (5) years after filing date.

OPERATOR: License # 33999
Name: Linn Operating, Inc.
Address 1: 600 TRAVIS STE 5100
Address 2: _____
City: HOUSTON State: TX Zip: 77002 + 3018
Contact Person: Shawn Hildreth
Phone: (281) 840-4234
Lease Name: WHITE ERNEST
Well Number: 1

API No.: 15-093-20696-00-00
Permit No.: D19847.0
Reporting Year: 2015
(January 1 to December 31)
____ - NW - NW - NE Sec. 4 Twp. 26 S. R. 35 ☐ E ☒ W
(a/a/a/a)
6933 feet from ☐ N / ☒ S Line of Section
1980 feet from ☒ E / ☐ W Line of Section
County: Kearny

I. Injection Fluid:

Type (Pick one): ☐ Fresh Water ☐ Treated Brine ☒ Untreated Brine ☐ Water/Brine
Source: ☒ Produced Water ☐ Other (Attach list)
Quality: Total Dissolved Solids: 160359 mg/l Specific Gravity: 1.11 Additives: _____
(Attach water analysis, if available)

II. Well Data:

Maximum Authorized Injection Pressure: 500 psi Injection Zone: GLORIETTA
Maximum Authorized Injection Rate: 750 barrels per day
Total Number of Enhanced Recovery Injection Wells Covered by this Permit: _____ (Include TA's)

III.	Month:	Total Fluid Injected BBL	Maximum Fluid Pressure	Total Gas Injected MCF	Maximum Gas Pressure	# Days of Injection
	January	<u>12100</u>	<u>0</u>	<u>0</u>		<u>31</u>
	February	<u>9420</u>	<u>300</u>	<u>0</u>		<u>28</u>
	March	<u>11060</u>	<u>300</u>	<u>0</u>		<u>31</u>
	April	<u>11970</u>	<u>300</u>	<u>0</u>		<u>30</u>
	May	<u>180</u>	<u>0</u>	<u>0</u>		<u>31</u>
	June	<u>4030</u>	<u>1</u>	<u>0</u>		<u>30</u>
	July	<u>12820</u>	<u>141</u>	<u>0</u>		<u>31</u>
	August	<u>12030</u>	<u>60</u>	<u>0</u>		<u>31</u>
	September	<u>10400</u>	<u>60</u>	<u>0</u>		<u>30</u>
	October	<u>12080</u>	<u>0</u>	<u>0</u>		<u>31</u>
	November	<u>8470</u>	<u>0</u>	<u>0</u>		<u>30</u>
	December	<u>8200</u>	<u>0</u>	<u>0</u>		<u>31</u>
	TOTAL	<u>112760</u>		<u>0</u>		

Submitted Electronically



JACAM LABORATORIES

DownHole Rx

WATER CHEMISTRY

LINN OPERATING
MICHAEL BELLOMY
KEARNY KS

WHITE ERNEST SWD
FLOWLINE

Report Date: 01-22-2016 Sampled: 01-11-2016
Sample #: 3076 at 0000

Sample ID: 117379

CATIONS

Calcium (as Ca)	7656
Magnesium (as Mg)	2272
Barium (as Ba)	0.204
Strontium (as Sr)	150.00
Sodium (as Na)	49214
Potassium (as K)	453.20
Lithium (as Li)	6.91
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	0.0510
Manganese (as Mn)	0.0910
Zinc (as Zn)	0.827
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	104600
Sulfate (as SO ₄)	700.00
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	120.00
Bicarbonate (as HCO ₃)	109.80
Carbonate (as CO ₃)	0.00
Oxalic acid (as C ₂ O ₄)	0.00
Silica (as SiO ₂)	0.00
Phosphate(as PO ₄)	0.00
H ₂ S (as H ₂ S)	11.00
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	9.03

PARAMETERS

Calculated T.D.S.	160359
Molar Conductivity	249194
Resistivity	4.01
Sp.Gr.(g/mL)	1.11
Pressure(atm)	1.00
pCO ₂ (atm)	0.00402
pH ₂ S(atm)	0.00746
Temperature (°F)	52.00
pH	7.25

COMMENTS

KEARNY KS

JACAM LABORATORIES

205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096



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DownHole R_x

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
MICHAEL BELLOMY
KEARNY KS

WHITE ERNEST SWD
FLOWLINE

Report Date: 01-22-2016 Sampled: 01-11-2016
Sample #: 3076 at 0000
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SATURATION LEVEL

Calcite (CaCO ₃)	2.22
Aragonite (CaCO ₃)	1.97
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.0679
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.580
Anhydrite (CaSO ₄)	0.364
Gypsum (CaSO ₄ *2H ₂ O)	0.535
Barite (BaSO ₄)	0.656
Celestite (SrSO ₄)	0.205
Fluorite (CaF ₂)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO ₂)	0.00
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	0.00
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	0.00
Siderite (FeCO ₃)	0.00818
Halite (NaCl)	0.0994
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.137

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	0.0197
Aragonite (CaCO ₃)	0.0177
Witherite (BaCO ₃)	-24.38
Strontianite (SrCO ₃)	-0.721
Calcium oxalate (CaC ₂ O ₄)	-0.00635
Magnesite (MgCO ₃)	-0.0219
Anhydrite (CaSO ₄)	-171.52
Gypsum (CaSO ₄ *2H ₂ O)	-97.31
Barite (BaSO ₄)	-0.0632
Celestite (SrSO ₄)	-147.56
Fluorite (CaF ₂)	-2.48
Calcium phosphate	>-0.001
Hydroxyapatite	-269.47
Silica (SiO ₂)	-22.58
Brucite (Mg(OH) ₂)	0.00183
Magnesium silicate	-83.28
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.393
Halite (NaCl)	-106893
Thenardite (Na ₂ SO ₄)	-84527
Iron sulfide (FeS)	-0.0276

SIMPLE INDICES

Langelier	0.931
Ryznar	5.39
Puckorius	5.47
Larson-Skold Index	2150
Stiff Davis Index	0.522
Oddo-Tomson	-0.232

BOUND IONS

Calcium	7656
Barium	0.204
Carbonate	4.15
Phosphate	0.00
Sulfate	700.00

TOTAL

FREE

7530
0.204
0.0618
0.00
204.55

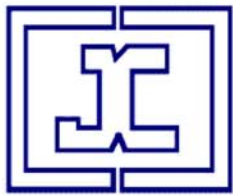
OPERATING CONDITIONS

Temperature (°F)	52.00
Time(secs)	0.00

JACAM LABORATORIES

205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
WHITE ERNEST SWD
MICHAEL BELLOWY
FLOWLINE
KEARNY KS

Sample ID#: 3076
ID: 117379
Report Date: 01-22-2016
Sample Date: 01-11-2016
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca) 7656
Magnesium(as Mg) 2272
Barium(as Ba) 0.204
Strontium(as Sr) 150.00
Sodium(as Na) 49214
Potassium(as K) 453.20
Lithium(as Li) 6.91
Iron(as Fe) 0.0510
Field Iron(as Fe) 0.00
Ammonia(as NH₃) 0.00
Aluminum(as Al) 0.00
Manganese(as Mn) 0.0910
Zinc(as Zn) 0.827
Lead(as Pb) 0.00

ANIONS

Chloride(as Cl) 104600
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Silica(as SiO₂) 0.00
Phosphate(as PO₄) 0.00
H₂S (as H₂S) 11.00
Fluoride(as F) 0.00
Nitrate(as NO₃) 0.00
Boron(as B) 9.03

PARAMETERS

Temperature(°F) 52.00
Sample pH 7.25
T.D.S. 160359
Conductivity: 249194
Resistivity: 4.01

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (atm)	Calcite CaCO ₃		Anhydrite CaSO ₄		Gypsum CaSO ₄ *2H ₂ O		Barite BaSO ₄		Celestite SrSO ₄		Siderite FeCO ₃		Mackawenite FeS		CO ₂ (mpy)	pCO ₂ (atm)
50.00	0.00	2.13	0.0186	0.370	-168.63	0.545	-94.28	0.703	-0.0511	0.209	-145.20	0.00774	-0.400	0.740	-0.00158	0.0140	0.00402
65.45	0.00	2.83	0.0266	0.334	-183.79	0.477	-115.75	0.426	-0.162	0.183	-158.61	0.0115	-0.347	0.584	-0.00312	0.0490	0.00402
80.91	0.00	3.53	0.0329	0.320	-183.77	0.425	-133.06	0.275	-0.317	0.170	-163.76	0.0160	-0.304	0.465	-0.00494	0.0188	0.00402
96.36	0.00	4.15	0.0370	0.322	-171.14	0.387	-146.31	0.188	-0.520	0.163	-164.32	0.0208	-0.269	0.374	-0.00702	0.0247	0.00402
111.82	0.00	4.57	0.0385	0.339	-149.51	0.385	-139.07	0.134	-0.776	0.158	-162.97	0.0252	-0.241	0.304	-0.00935	0.0258	0.00402
127.27	0.00	4.78	0.0378	0.372	-122.76	0.405	-120.90	0.0970	-1.11	0.154	-162.25	0.0288	-0.218	0.250	-0.0119	0.0217	0.00402
142.73	0.00	4.74	0.0350	0.423	-94.29	0.423	-106.71	0.0710	-1.56	0.149	-162.36	0.0309	-0.201	0.207	-0.0146	0.0176	0.00402
158.18	0.00	4.48	0.0308	0.498	-66.72	0.439	-95.60	0.0525	-2.14	0.143	-163.22	0.0314	-0.187	0.172	-0.0176	0.0183	0.00402
173.64	0.00	4.05	0.0258	0.604	-41.75	0.452	-86.93	0.0392	-2.88	0.138	-164.81	0.0302	-0.177	0.143	-0.0208	0.0189	0.00402
189.09	0.00	3.54	0.0207	0.752	-20.28	0.463	-80.23	0.0296	-3.83	0.132	-167.13	0.0277	-0.169	0.118	-0.0243	0.00955	0.00402
204.55	0.00	3.01	0.0159	0.959	-2.54	0.471	-75.14	0.0225	-5.00	0.126	-170.18	0.0244	-0.162	0.0974	-0.0281	0.00800	0.00402
220.00	0.171	2.44	0.0116	1.24	11.53	0.473	-74.43	0.0171	-6.53	0.119	-177.51	0.0202	-0.160	0.0891	-0.0280	0.00247	0.00471
		xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO₃}/K_{sp}. pCO₂ (atm) is the partial pressure of CO₂ in the gas phase.

Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.

