



**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 # _____
Name: _____
Address 1: _____
Address 2: _____
City: _____ State: _____ Zip: _____ + _____
Contact Person: _____
Phone: (_____) _____
Lease Name: _____
Well Number: _____

API No.: _____
Permit No.: _____
Reporting Year: _____
(January 1 to December 31)
____ - ____ - ____ - ____ Sec. ____ Twp. ____ S. R. ____ E W
(a/a/a/a)
_____ feet from N / S Line of Section
_____ feet from E / W Line of Section
County: _____

I. Injection Fluid:

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

II. Well Data:

Maximum Authorized Injection Pressure: _____ psi Injection Zone: _____
Maximum Authorized Injection Rate: _____ 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	_____	_____	_____	_____	_____
	February	_____	_____	_____	_____	_____
	March	_____	_____	_____	_____	_____
	April	_____	_____	_____	_____	_____
	May	_____	_____	_____	_____	_____
	June	_____	_____	_____	_____	_____
	July	_____	_____	_____	_____	_____
	August	_____	_____	_____	_____	_____
	September	_____	_____	_____	_____	_____
	October	_____	_____	_____	_____	_____
	November	_____	_____	_____	_____	_____
	December	_____	_____	_____	_____	_____
	TOTAL	_____	_____	_____	_____	_____



LINN OPERATING
DREW LOTT
KEARNY KS

SAUER A SWDW
WATER DUMP VALVE

Report Date: 01-22-2016 Sampled: 01-14-2016
Sample #: 3076 at 0000

Sample ID: 117223

CATIONS

Calcium (as Ca)	9158
Magnesium (as Mg)	5707
Barium (as Ba)	0.832
Strontium (as Sr)	198.10
Sodium (as Na)	63114
Potassium (as K)	830.70
Lithium (as Li)	9.43
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	4.24
Manganese (as Mn)	3.52
Zinc (as Zn)	1.70
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	145400
Sulfate (as SO ₄)	1300
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	70.00
Bicarbonate (as HCO ₃)	36.60
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)	0.250
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	7.17

PARAMETERS

Calculated T.D.S.	215503
Molar Conductivity	386922
Resistivity	2.58
Sp.Gr.(g/mL)	1.15
Pressure(atm)	1.00
pCO ₂ (atm)	0.00327
pH ₂ S(atm)	< 0.001
Temperature (°F)	48.00
pH	6.80

COMMENTS

KEARNY KS

JACAM LABORATORIES

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



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DREW LOTT
KEARNY KS

SAUER A SWDW
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SATURATION LEVEL

Calcite (CaCO ₃)	0.237
Aragonite (CaCO ₃)	0.211
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.00528
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.140
Anhydrite (CaSO ₄)	0.630
Gypsum (CaSO ₄ *2H ₂ O)	0.858
Barite (BaSO ₄)	2.65
Celestite (SrSO ₄)	0.246
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)	0.0371
Halite (NaCl)	0.219
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.0506

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.00748
Aragonite (CaCO ₃)	-0.00869
Witherite (BaCO ₃)	-25.18
Strontianite (SrCO ₃)	-0.641
Calcium oxalate (CaC ₂ O ₄)	-0.00368
Magnesite (MgCO ₃)	-0.0120
Anhydrite (CaSO ₄)	-66.16
Gypsum (CaSO ₄ *2H ₂ O)	-21.13
Barite (BaSO ₄)	0.307
Celestite (SrSO ₄)	-152.09
Fluorite (CaF ₂)	-1.84
Calcium phosphate	>-0.001
Hydroxyapatite	-223.63
Silica (SiO ₂)	-19.22
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-73.50
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0681
Halite (NaCl)	-72796
Thenardite (Na ₂ SO ₄)	-88208
Iron sulfide (FeS)	-0.297

SIMPLE INDICES

Langelier	0.242
Ryznar	6.32
Puckorius	6.63
Larson-Skold Index	8370
Stiff Davis Index	0.103
Oddo-Tomson	-0.866

BOUND IONS

Calcium	9158	8966
Barium	0.832	0.832
Carbonate	0.680	0.00399
Phosphate	0.00	0.00
Sulfate	1300	231.57

TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F)	48.00
Time(secs)	0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
SAUER A SWDW
DREW LOTT
WATER DUMP VALVE
KEARNY KS

Sample ID#: 3076
ID: 117223
Report Date: 01-22-2016
Sample Date: 01-14-2016
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	9158
Magnesium(as Mg)	5707
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Sodium(as Na)	63114
Potassium(as K)	830.70
Lithium(as Li)	9.43
Iron(as Fe)	4.24
Field Iron(as Fe)	10.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	3.52
Zinc(as Zn)	1.70
Lead(as Pb)	0.00

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Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	7.17

PARAMETERS

Temperature(°F)	48.00
T.D.S.	215503
Conductivity:	386922
Resistivity:	2.58
Sample pH	6.80

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	0.247	-0.00725	0.616	-69.23	0.838	-24.39	2.46	0.292	0.239	-155.42	0.0394	-0.0658	0.275	-0.212	0.0403	0.00327
65.45	0.00	0.335	-0.00565	0.536	-86.23	0.706	-47.29	1.44	0.150	0.200	-173.51	0.0598	-0.0510	0.233	-0.232	0.0754	0.00327
80.91	0.00	0.429	-0.00434	0.495	-91.93	0.607	-66.08	0.894	-0.0584	0.179	-181.82	0.0852	-0.0400	0.197	-0.252	0.0275	0.00327
96.36	0.00	0.519	-0.00332	0.481	-88.18	0.534	-80.95	0.588	-0.343	0.166	-184.57	0.114	-0.0318	0.165	-0.271	0.0360	0.00327
111.82	0.00	0.592	-0.00257	0.490	-77.61	0.514	-80.02	0.406	-0.715	0.156	-184.81	0.143	-0.0256	0.139	-0.290	0.0377	0.00327
127.27	0.00	0.648	-0.00206	0.521	-62.93	0.524	-70.39	0.285	-1.22	0.147	-185.51	0.172	-0.0210	0.118	-0.309	0.0316	0.00327
142.73	0.00	0.678	-0.00177	0.576	-46.57	0.532	-63.08	0.202	-1.90	0.138	-186.90	0.195	-0.0176	0.100	-0.327	0.0256	0.00327
158.18	0.00	0.675	-0.00169	0.660	-30.37	0.537	-57.54	0.145	-2.81	0.129	-188.98	0.211	-0.0151	0.0855	-0.345	0.0267	0.00327
173.64	0.00	0.641	-0.00178	0.780	-15.55	0.539	-53.37	0.106	-3.98	0.121	-191.75	0.215	-0.0134	0.0731	-0.365	0.0276	0.00327
189.09	0.00	0.583	-0.00200	0.950	-2.74	0.540	-50.27	0.0779	-5.47	0.113	-195.25	0.209	-0.0122	0.0624	-0.385	0.0139	0.00327
204.55	0.00	0.511	-0.00229	1.19	7.85	0.538	-48.06	0.0580	-7.33	0.106	-199.52	0.195	-0.0114	0.0531	-0.406	0.0117	0.00327
220.00	0.171	0.421	-0.00276	1.51	16.63	0.533	-48.53	0.0434	-9.70	0.0988	-208.89	0.170	-0.0113	0.0506	-0.430	0.0159	0.00383
		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.

