



**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
MICHAEL BELLOMY
SUMNER KS

HEGER SWD 1
FLOWLINE

Report Date: 01-22-2016 Sampled: 01-13-2016
Sample #: 3076 at 0000

Sample ID: 117382

CATIONS

Calcium (as Ca)	7808
Magnesium (as Mg)	1869
Barium (as Ba)	0.204
Strontium (as Sr)	156.90
Sodium (as Na)	40038
Potassium (as K)	415.50
Lithium (as Li)	6.30
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	4.28
Manganese (as Mn)	0.0120
Zinc (as Zn)	1.24
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	86600
Sulfate (as SO ₄)	1125
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	105.00
Bicarbonate (as HCO ₃)	30.50
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)	0.500
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	2.70

PARAMETERS

Calculated T.D.S.	135040
Molar Conductivity	198098
Resistivity	5.05
Sp.Gr.(g/mL)	1.10
Pressure(atm)	1.00
pCO ₂ (atm)	0.00880
pH ₂ S(atm)	< 0.001
Temperature (°F)	54.00
pH	5.99

COMMENTS

SUMNER KS

JACAM LABORATORIES

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



DownHole R_x

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
MICHAEL BELLOMY
SUMNER KS

HEGER SWD 1
FLOWLINE

Report Date: 01-22-2016 Sampled: 01-13-2016
Sample #: 3076 at 0000

Sample ID: 117382

SATURATION LEVEL

Calcite (CaCO ₃)	0.0478
Aragonite (CaCO ₃)	0.0423
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.00177
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.00984
Anhydrite (CaSO ₄)	0.598
Gypsum (CaSO ₄ *2H ₂ O)	0.910
Barite (BaSO ₄)	1.23
Celestite (SrSO ₄)	0.418
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)	0.0177
Halite (NaCl)	0.0616
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.00537

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.0170
Aragonite (CaCO ₃)	-0.0193
Witherite (BaCO ₃)	-23.88
Strontianite (SrCO ₃)	-0.702
Calcium oxalate (CaC ₂ O ₄)	-0.00715
Magnesite (MgCO ₃)	-0.0722
Anhydrite (CaSO ₄)	-115.91
Gypsum (CaSO ₄ *2H ₂ O)	-19.54
Barite (BaSO ₄)	0.0223
Celestite (SrSO ₄)	-86.77
Fluorite (CaF ₂)	-2.66
Calcium phosphate	>-0.001
Hydroxyapatite	-288.82
Silica (SiO ₂)	-24.41
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-87.34
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0537
Halite (NaCl)	-123327
Thenardite (Na ₂ SO ₄)	-82733
Iron sulfide (FeS)	-0.934

SIMPLE INDICES

Langelier	-0.876
Ryznar	7.74
Puckorius	7.26
Larson-Skold Index	5438
Stiff Davis Index	-1.40
Oddo-Tomson	-2.02

BOUND IONS

Calcium	7808	7612
Barium	0.204	0.204
Carbonate	0.0652	0.00147
Phosphate	0.00	0.00
Sulfate	1125	359.85

TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F)	54.00
Time(secs)	0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
HEGER SWD 1
MICHAEL BELLOWY
FLOWLINE
SUMNER KS

Sample ID#: 3076
ID: 117382
Report Date: 01-22-2016
Sample Date: 01-13-2016
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	7808
Magnesium(as Mg)	1869
Barium(as Ba)	0.204
Strontium(as Sr)	156.90
Sodium(as Na)	40038
Potassium(as K)	415.50
Lithium(as Li)	6.30
Iron(as Fe)	4.28
Field Iron(as Fe)	0.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.0120
Zinc(as Zn)	1.24
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	86600
Sulfate(as SO ₄)	1125
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	105.00
Bicarbonate(as HCO ₃)	30.50
Carbonate(as CO ₃)	0.00
Silica(as SiO ₂)	0.00
Phosphate(as PO ₄)	0.00
H ₂ S (as H ₂ S)	0.500
Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	2.70

PARAMETERS

Temperature(°F)	54.00
T.D.S.	135040
Conductivity:	198098
Sample pH	5.99
Resistivity:	5.05

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	0.0438	-0.0177	0.616	-109.23	0.942	-12.32	1.40	0.0346	0.435	-82.25	0.0158	-0.0573	0.0275	-0.889	0.0806	0.00880
65.45	0.00	0.0601	-0.0153	0.561	-128.61	0.830	-38.50	0.858	-0.0201	0.383	-96.04	0.0243	-0.0448	0.0264	-0.906	0.237	0.00880
80.91	0.00	0.0791	-0.0134	0.541	-131.44	0.747	-59.94	0.558	-0.0955	0.359	-102.20	0.0356	-0.0356	0.0251	-0.925	0.113	0.00880
96.36	0.00	0.100	-0.0118	0.549	-120.48	0.686	-76.74	0.384	-0.193	0.347	-104.02	0.0501	-0.0287	0.0234	-0.947	0.149	0.00880
111.82	0.00	0.123	-0.0106	0.584	-99.70	0.688	-72.10	0.277	-0.315	0.341	-103.96	0.0677	-0.0234	0.0216	-0.971	0.158	0.00880
127.27	0.00	0.148	-0.00949	0.646	-73.23	0.731	-55.91	0.202	-0.476	0.334	-104.37	0.0895	-0.0193	0.0200	-0.996	0.139	0.00880
142.73	0.00	0.176	-0.00859	0.741	-44.72	0.769	-43.52	0.149	-0.687	0.326	-105.41	0.116	-0.0161	0.0186	-1.02	0.117	0.00880
158.18	0.00	0.205	-0.00783	0.879	-16.97	0.804	-34.01	0.111	-0.961	0.317	-107.05	0.147	-0.0135	0.0172	-1.05	0.109	0.00880
173.64	0.00	0.235	-0.00719	1.07	8.20	0.835	-26.73	0.0837	-1.31	0.307	-109.25	0.183	-0.0114	0.0159	-1.08	0.101	0.00880
189.09	0.00	0.264	-0.00666	1.35	29.84	0.861	-21.18	0.0635	-1.76	0.296	-112.00	0.221	-0.00970	0.0147	-1.12	0.0441	0.00880
204.55	0.00	0.291	-0.00624	1.73	47.71	0.882	-16.99	0.0487	-2.33	0.285	-115.31	0.262	-0.00833	0.0135	-1.15	0.0331	0.00880
220.00	0.171	0.309	-0.00616	2.25	62.98	0.891	-15.65	0.0371	-3.08	0.271	-121.75	0.298	-0.00748	0.0139	-1.20	0.0442	0.0103

	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	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.

