



**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	_____	_____	_____	_____	_____
	<b>TOTAL</b>	_____	_____	_____	_____	_____



LINN OPERATING  
MICHAEL BELLOMY

WILSON MS 1 SWDW  
FLOWLINE

Report Date: 01-22-2016    Sampled: 01-11-2016  
Sample #: 3076                      at 0000  
  
Sample ID: 117370

**CATIONS**

Calcium (as Ca)	8282
Magnesium (as Mg)	6401
Barium (as Ba)	0.204
Strontium (as Sr)	183.30
Sodium (as Na)	75129
Potassium (as K)	611.50
Lithium (as Li)	7.51
Ammonia (as NH <sub>3</sub> )	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	3.83
Manganese (as Mn)	4.82
Zinc (as Zn)	2.09
Lead (as Pb)	0.00

**ANIONS**

Chloride (as Cl)	170000
Sulfate (as SO <sub>4</sub> )	1075
Bromine (as Br)	0.00
Dissolved CO <sub>2</sub> (as CO <sub>2</sub> )	95.00
Bicarbonate (as HCO <sub>3</sub> )	12.20
Carbonate (as CO <sub>3</sub> )	0.00
Oxalic acid (as C <sub>2</sub> O <sub>4</sub> )	0.00
Silica (as SiO <sub>2</sub> )	0.00
Phosphate(as PO <sub>4</sub> )	0.00
H <sub>2</sub> S (as H <sub>2</sub> S)	0.500
Fluoride (as F)	0.00
Nitrate (as NO <sub>3</sub> )	0.00
Boron (as B)	0.291

**PARAMETERS**

Calculated T.D.S.	246058
Molar Conductivity	482780
Resistivity	2.07
Sp.Gr.(g/mL)	1.18
Pressure(atm)	1.00
pCO <sub>2</sub> (atm)	0.00453
pH <sub>2</sub> S(atm)	< 0.001
Temperature (°F)	49.80
pH	5.62



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**SATURATION LEVEL**

Calcite (CaCO <sub>3</sub> )	0.00504
Aragonite (CaCO <sub>3</sub> )	0.00448
Witherite (BaCO <sub>3</sub> )	< 0.001
Strontianite (SrCO <sub>3</sub> )	< 0.001
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	0.00
Magnesite (MgCO <sub>3</sub> )	0.00398
Anhydrite (CaSO <sub>4</sub> )	0.458
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	0.591
Barite (BaSO <sub>4</sub> )	0.390
Celestite (SrSO <sub>4</sub> )	0.142
Fluorite (CaF <sub>2</sub> )	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO <sub>2</sub> )	0.00
Brucite (Mg(OH) <sub>2</sub> )	< 0.001
Magnesium silicate	0.00
Iron hydroxide (Fe(OH) <sub>3</sub> )	< 0.001
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	0.00
Siderite (FeCO <sub>3</sub> )	< 0.001
Halite (NaCl)	0.334
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	< 0.001
Iron sulfide (FeS)	< 0.001

**MOMENTARY EXCESS (Lbs/1000 Barrels)**

Calcite (CaCO <sub>3</sub> )	-0.00860
Aragonite (CaCO <sub>3</sub> )	-0.00967
Witherite (BaCO <sub>3</sub> )	-26.08
Strontianite (SrCO <sub>3</sub> )	-0.728
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	-0.00331
Magnesite (MgCO <sub>3</sub> )	-0.00919
Anhydrite (CaSO <sub>4</sub> )	-92.92
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	-61.66
Barite (BaSO <sub>4</sub> )	-0.188
Celestite (SrSO <sub>4</sub> )	-197.77
Fluorite (CaF <sub>2</sub> )	-1.75
Calcium phosphate	>-0.001
Hydroxyapatite	-205.76
Silica (SiO <sub>2</sub> )	-18.51
Brucite (Mg(OH) <sub>2</sub> )	< 0.001
Magnesium silicate	-70.53
Iron hydroxide (Fe(OH) <sub>3</sub> )	< 0.001
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	>-0.001
Siderite (FeCO <sub>3</sub> )	-0.0773
Halite (NaCl)	-54121
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	-89353
Iron sulfide (FeS)	-1.65

**SIMPLE INDICES**

Langelier	-1.35
Ryznar	8.33
Puckorius	8.17
Larson-Skold Index	28575
Stiff Davis Index	-1.38
Oddo-Tomson	-2.39

**BOUND IONS**

Calcium	8282	8144
Barium	0.204	0.204
Carbonate	0.0230	< 0.001
Phosphate	0.00	0.00
Sulfate	1075	161.54

**TOTAL**

**FREE**

**OPERATING CONDITIONS**

Temperature (°F)	49.80
Time(secs)	0.00

# DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

## SYSTEM IDENTIFICATION

LINN OPERATING  
WILSON MS 1 SWDW  
MICHAEL BELLOWY  
FLOWLINE

Sample ID#: 3076  
ID: 117370  
Report Date: 01-22-2016  
Sample Date: 01-11-2016  
at 0000

## WATER CHEMISTRY

### CATIONS

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Lithium(as Li)	7.51
Iron(as Fe)	3.83
Field Iron(as Fe)	0.00
Ammonia(as NH <sub>3</sub> )	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	4.82
Zinc(as Zn)	2.09
Lead(as Pb)	0.00

### ANIONS

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Phosphate(as PO <sub>4</sub> )	0.00
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Boron(as B)	0.291

### PARAMETERS

Temperature(°F)	49.80
Sample pH	5.62
T.D.S.	246058
Conductivity:	482780
Resistivity:	2.07

## SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (atm)	Calcite CaCO <sub>3</sub>		Anhydrite CaSO <sub>4</sub>		Gypsum CaSO <sub>4</sub> *2H <sub>2</sub> O		Barite BaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Siderite FeCO <sub>3</sub>		Mackawenite FeS		CO <sub>2</sub> (mpy)	pCO <sub>2</sub> (atm)
		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		
50.00	0.00	0.00506	-0.00858	0.456	-93.18	0.590	-61.94	0.387	-0.191	0.142	-198.08	< 0.001	-0.0771	0.00367	-1.64	0.0782	0.00453
65.45	0.00	0.00702	-0.00756	0.393	-107.41	0.491	-82.01	0.223	-0.418	0.118	-215.34	< 0.001	-0.0611	0.00359	-1.66	0.269	0.00453
80.91	0.00	0.00925	-0.00675	0.359	-111.09	0.418	-98.27	0.137	-0.753	0.104	-222.47	0.00145	-0.0493	0.00347	-1.69	0.109	0.00453
96.36	0.00	0.0117	-0.00610	0.345	-105.97	0.363	-110.90	0.0895	-1.21	0.0954	-223.90	0.00202	-0.0404	0.00331	-1.73	0.142	0.00453
111.82	0.00	0.0141	-0.00557	0.348	-94.52	0.346	-107.97	0.0611	-1.82	0.0889	-222.85	0.00270	-0.0337	0.00312	-1.76	0.155	0.00453
127.27	0.00	0.0168	-0.00516	0.367	-79.32	0.350	-96.58	0.0424	-2.64	0.0828	-222.42	0.00352	-0.0286	0.00295	-1.80	0.143	0.00453
142.73	0.00	0.0196	-0.00482	0.403	-62.65	0.352	-87.73	0.0299	-3.73	0.0771	-222.86	0.00448	-0.0246	0.00280	-1.84	0.128	0.00453
158.18	0.00	0.0224	-0.00455	0.458	-46.27	0.353	-80.85	0.0213	-5.15	0.0717	-224.17	0.00557	-0.0214	0.00266	-1.89	0.117	0.00453
173.64	0.00	0.0252	-0.00434	0.538	-31.30	0.352	-75.54	0.0154	-6.94	0.0666	-226.35	0.00676	-0.0189	0.00252	-1.94	0.106	0.00453
189.09	0.00	0.0275	-0.00419	0.650	-18.38	0.350	-71.50	0.0113	-9.16	0.0619	-229.44	0.00798	-0.0169	0.00237	-1.99	0.0409	0.00453
204.55	0.00	0.0293	-0.00408	0.808	-7.69	0.347	-68.52	0.00833	-11.84	0.0576	-233.49	0.00912	-0.0154	0.00223	-2.05	0.00	0.00453
220.00	0.171	0.0296	-0.00415	1.02	0.730	0.342	-68.99	0.00619	-15.16	0.0533	-243.54	0.00992	-0.0146	0.00235	-2.13	0.00	0.00530

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO<sub>3</sub>}/K<sub>sp</sub>. pCO<sub>2</sub> (atm) is the partial pressure of CO<sub>2</sub> in the gas phase. Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.

