



LINN OPERATING
MICHAEL BELLOMY

SHORE B 1 SWDW
FLOWLINE

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

Sample ID: 117374

SATURATION LEVEL

Calcite (CaCO ₃)	0.0655
Aragonite (CaCO ₃)	0.0580
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.00130
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.0375
Anhydrite (CaSO ₄)	0.565
Gypsum (CaSO ₄ *2H ₂ O)	0.749
Barite (BaSO ₄)	0.780
Celestite (SrSO ₄)	0.214
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)	0.0418
Halite (NaCl)	0.260
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	0.0167

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.0135
Aragonite (CaCO ₃)	-0.0153
Witherite (BaCO ₃)	-26.16
Strontianite (SrCO ₃)	-1.05
Calcium oxalate (CaC ₂ O ₄)	-0.00582
Magnesite (MgCO ₃)	-0.0205
Anhydrite (CaSO ₄)	-120.43
Gypsum (CaSO ₄ *2H ₂ O)	-59.92
Barite (BaSO ₄)	-0.0341
Celestite (SrSO ₄)	-156.50
Fluorite (CaF ₂)	-2.35
Calcium phosphate	>-0.001
Hydroxyapatite	-231.59
Silica (SiO ₂)	-20.70
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-76.97
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0250
Halite (NaCl)	-67948
Thenardite (Na ₂ SO ₄)	-87640
Iron sulfide (FeS)	-0.685

SIMPLE INDICES

Langelier	-0.458
Ryznar	7.01
Puckorius	6.41
Larson-Skold Index	6343
Stiff Davis Index	-0.610
Oddo-Tomson	-1.57

BOUND IONS

Calcium	5925	5745
Barium	0.204	0.204
Carbonate	0.371	0.00163
Phosphate	0.00	0.00
Sulfate	1425	330.29

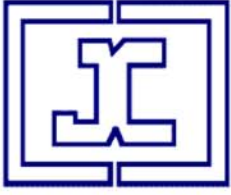
TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F)	54.60
Time(secs)	0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
SHORE B 1 SWDW
MICHAEL BELLOMY
FLOWLINE

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ID: 117374
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WATER CHEMISTRY

CATIONS

Calcium(as Ca)	5925
Magnesium(as Mg)	3359
Barium(as Ba)	0.204
Strontium(as Sr)	123.50
Sodium(as Na)	73895
Potassium(as K)	434.60
Lithium(as Li)	6.14
Iron(as Fe)	10.37
Field Iron(as Fe)	0.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	1.85
Zinc(as Zn)	1.19
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	152000
Sulfate(as SO ₄)	1425
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	105.00
Bicarbonate(as HCO ₃)	48.80
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)	0.291

PARAMETERS

Temperature(°F)	54.60
Sample pH	6.09
T.D.S.	224781
Conductivity:	402194
Resistivity:	2.49

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	0.0591	-0.0141	0.590	-111.89	0.787	-49.90	0.917	-0.0109	0.226	-149.92	0.0365	-0.0270	0.0824	-0.624	0.0869	0.0126
65.45	0.00	0.0817	-0.0122	0.522	-134.55	0.673	-81.57	0.544	-0.101	0.193	-167.84	0.0565	-0.0209	0.0781	-0.643	0.241	0.0126
80.91	0.00	0.107	-0.0106	0.489	-140.88	0.588	-107.61	0.343	-0.231	0.175	-176.53	0.0826	-0.0163	0.0729	-0.664	0.126	0.0126
96.36	0.00	0.135	-0.00927	0.481	-133.55	0.523	-128.22	0.229	-0.406	0.164	-179.92	0.115	-0.0129	0.0670	-0.689	0.165	0.0126
111.82	0.00	0.161	-0.00823	0.497	-116.32	0.510	-125.00	0.160	-0.633	0.156	-180.90	0.151	-0.0103	0.0611	-0.715	0.175	0.0126
127.27	0.00	0.188	-0.00739	0.534	-93.14	0.527	-108.79	0.113	-0.941	0.149	-182.32	0.193	-0.00826	0.0557	-0.743	0.152	0.0126
142.73	0.00	0.212	-0.00671	0.597	-67.56	0.540	-96.42	0.0812	-1.36	0.141	-184.42	0.238	-0.00671	0.0509	-0.774	0.126	0.0126
158.18	0.00	0.232	-0.00619	0.690	-42.29	0.550	-86.99	0.0589	-1.91	0.133	-187.17	0.281	-0.00551	0.0465	-0.806	0.119	0.0126
173.64	0.00	0.243	-0.00583	0.823	-19.19	0.557	-79.86	0.0432	-2.63	0.126	-190.56	0.319	-0.00461	0.0423	-0.841	0.112	0.0126
189.09	0.00	0.244	-0.00562	1.01	0.789	0.561	-74.54	0.0320	-3.56	0.118	-194.63	0.346	-0.00397	0.0384	-0.878	0.0505	0.0126
204.55	0.00	0.235	-0.00554	1.27	17.31	0.563	-70.73	0.0240	-4.76	0.111	-199.41	0.357	-0.00355	0.0346	-0.919	0.0390	0.0126
220.00	0.171	0.212	-0.00581	1.62	30.98	0.559	-71.18	0.0180	-6.31	0.104	-208.88	0.345	-0.00344	0.0350	-0.971	0.0522	0.0148
		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.

