

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

Form U3C
June 2015
Form must be Typed
Form must be completed
on a per well basis

**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
JEFF SULLIVAN
HAMILTON KS

HCU 1820 D SWD
HOLDING TANK

Report Date: 01-02-2019 Sampled: 12-13-2018
Sample #: 3076 at 0000

Sample ID: 208778

CATIONS

Calcium (as Ca)	5322
Magnesium (as Mg)	1606
Barium (as Ba)	0.221
Strontium (as Sr)	126.50
Sodium (as Na)	65509
Potassium (as K)	459.50
Lithium (as Li)	6.30
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	67.81
Manganese (as Mn)	0.885
Zinc (as Zn)	0.932
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	128400
Sulfate (as SO ₄)	1400
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	160.00
Bicarbonate (as HCO ₃)	42.70
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)	5.00
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	12.36

PARAMETERS

Calculated T.D.S.	194526
Molar Conductivity	322140
Resistivity	3.10
Sp.Gr.(g/mL)	1.13
Pressure(atm)	1.00
pCO ₂ (atm)	0.00496
pH ₂ S(atm)	0.00346
Temperature (°F)	53.80
pH	6.66

COMMENTS

HAMILTON KS



LINN OPERATING
JEFF SULLIVAN
HAMILTON KS

HCU 1820 D SWD
HOLDING TANK

Report Date: 01-02-2019 Sampled: 12-13-2018
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SATURATION LEVEL

Calcite (CaCO ₃)	0.201
Aragonite (CaCO ₃)	0.178
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.00605
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.0571
Anhydrite (CaSO ₄)	0.596
Gypsum (CaSO ₄ *2H ₂ O)	0.829
Barite (BaSO ₄)	1.33
Celestite (SrSO ₄)	0.337
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)	1.20
Halite (NaCl)	0.176
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	11.21

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.0159
Aragonite (CaCO ₃)	-0.0185
Witherite (BaCO ₃)	-25.24
Strontianite (SrCO ₃)	-0.960
Calcium oxalate (CaC ₂ O ₄)	-0.00798
Magnesite (MgCO ₃)	-0.0557
Anhydrite (CaSO ₄)	-140.62
Gypsum (CaSO ₄ *2H ₂ O)	-49.11
Barite (BaSO ₄)	0.0324
Celestite (SrSO ₄)	-108.38
Fluorite (CaF ₂)	-2.76
Calcium phosphate	>-0.001
Hydroxyapatite	-252.68
Silica (SiO ₂)	-21.65
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-80.89
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	< 0.001
Halite (NaCl)	-86099
Thenardite (Na ₂ SO ₄)	-85707
Iron sulfide (FeS)	0.499

SIMPLE INDICES

Langelier	-0.126
Ryznar	6.91
Puckorius	7.00
Larson-Skold Index	6624
Stiff Davis Index	-0.423
Oddo-Tomson	-1.28

BOUND IONS

Calcium	5322	5132
Barium	0.221	0.221
Carbonate	0.866	0.00690
Phosphate	0.00	0.00
Sulfate	1400	445.47

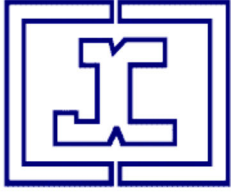
TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F) 53.80
Time(secs) 0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
HCU 1820 D SWD
JEFF SULLIVAN
HOLDING TANK
HAMILTON KS

Sample ID#: 3076
ID: 208778
Report Date: 01-02-2019
Sample Date: 12-13-2018
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	5322
Magnesium(as Mg)	1606
Barium(as Ba)	0.221
Strontium(as Sr)	126.50
Sodium(as Na)	65509
Potassium(as K)	459.50
Lithium(as Li)	6.30
Iron(as Fe)	67.81
Field Iron(as Fe)	250.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.885
Zinc(as Zn)	0.932
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	128400
Sulfate(as SO ₄)	1400
Bromine(as Br)	0.00
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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)	5.00
Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	12.36

PARAMETERS

Temperature(°F)	53.80
T.D.S.	194526
Conductivity:	322140
Sample pH	6.66
Resistivity:	3.10

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	0.185	-0.0168	0.614	-132.73	0.858	-40.13	1.51	0.0442	0.351	-103.63	1.08	< 0.001	57.46	2.71	0.0270	0.00496
65.45	0.00	0.252	-0.0136	0.558	-156.88	0.753	-74.31	0.920	-0.0114	0.308	-118.98	1.64	0.00208	50.19	2.47	0.0326	0.00496
80.91	0.00	0.325	-0.0110	0.536	-161.23	0.675	-102.38	0.596	-0.0886	0.287	-126.20	2.36	0.00352	43.36	2.23	0.00403	0.00496
96.36	0.00	0.395	-0.00890	0.541	-149.03	0.617	-124.46	0.408	-0.190	0.276	-128.77	3.18	0.00462	37.18	2.01	0.0169	0.00496
111.82	0.00	0.455	-0.00735	0.572	-124.84	0.616	-118.31	0.292	-0.317	0.270	-129.27	4.02	0.00534	31.82	1.81	0.0177	0.00496
127.27	0.00	0.500	-0.00625	0.630	-93.52	0.651	-96.87	0.212	-0.485	0.263	-130.29	4.84	0.00573	27.36	1.65	0.0149	0.00496
142.73	0.00	0.522	-0.00558	0.720	-59.41	0.683	-80.39	0.156	-0.708	0.255	-132.01	5.51	0.00579	23.62	1.51	0.0121	0.00496
158.18	0.00	0.519	-0.00532	0.850	-25.92	0.710	-67.73	0.115	-0.999	0.246	-134.37	5.93	0.00552	20.43	1.40	0.0126	0.00496
173.64	0.00	0.490	-0.00538	1.03	4.69	0.734	-58.03	0.0863	-1.38	0.237	-137.35	6.04	0.00500	17.68	1.29	0.0130	0.00496
189.09	0.00	0.444	-0.00567	1.29	31.17	0.753	-50.69	0.0652	-1.86	0.227	-140.95	5.86	0.00434	15.28	1.20	0.00655	0.00496
204.55	0.00	0.387	-0.00608	1.65	53.16	0.769	-45.21	0.0496	-2.48	0.218	-145.17	5.44	0.00363	13.16	1.12	0.00549	0.00496
220.00	0.171	0.319	-0.00686	2.14	71.79	0.772	-44.35	0.0377	-3.30	0.205	-153.13	4.76	0.00294	12.69	1.23	0.00748	0.00581

	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels	Lbs per xSAT 1000 Barrels
50.00							
65.45							
80.91							
96.36							
111.82							
127.27							
142.73							
158.18							
173.64							
189.09							
204.55							
220.00							

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.

