

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	_____	_____	_____	_____	_____



JACAM LABORATORIES

DownHole R_x

WATER CHEMISTRY

LINN OPERATING
JEFF SULLIVAN
HAMILTON KS

HCU 3211 B SWD
DUMP LINE

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

Sample ID: 208779

CATIONS

Calcium (as Ca)	7376
Magnesium (as Mg)	2082
Barium (as Ba)	0.295
Strontium (as Sr)	192.80
Sodium (as Na)	73924
Potassium (as K)	785.60
Lithium (as Li)	9.39
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	16.56
Manganese (as Mn)	0.833
Zinc (as Zn)	1.70
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	150800
Sulfate (as SO ₄)	1250
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	75.00
Bicarbonate (as HCO ₃)	48.80
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)	14.89

PARAMETERS

Calculated T.D.S.	224140
Molar Conductivity	400321
Resistivity	2.50
Sp.Gr.(g/mL)	1.15
Pressure(atm)	1.00
pCO ₂ (atm)	0.00349
pH ₂ S(atm)	0.00354
Temperature (°F)	49.80
pH	6.92

COMMENTS

HAMILTON KS

JACAM LABORATORIES

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



LINN OPERATING
JEFF SULLIVAN
HAMILTON KS

HCU 3211 B SWD
DUMP LINE

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

Calcite (CaCO ₃)	0.433
Aragonite (CaCO ₃)	0.385
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.0117
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.117
Anhydrite (CaSO ₄)	0.676
Gypsum (CaSO ₄ *2H ₂ O)	0.902
Barite (BaSO ₄)	1.23
Celestite (SrSO ₄)	0.326
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)	0.344
Halite (NaCl)	0.265
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	6.27

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.00678
Aragonite (CaCO ₃)	-0.00827
Witherite (BaCO ₃)	-25.21
Strontianite (SrCO ₃)	-0.643
Calcium oxalate (CaC ₂ O ₄)	-0.00458
Magnesite (MgCO ₃)	-0.0328
Anhydrite (CaSO ₄)	-71.19
Gypsum (CaSO ₄ *2H ₂ O)	-18.49
Barite (BaSO ₄)	0.0329
Celestite (SrSO ₄)	-126.50
Fluorite (CaF ₂)	-2.05
Calcium phosphate	>-0.001
Hydroxyapatite	-224.16
Silica (SiO ₂)	-19.12
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-74.38
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0114
Halite (NaCl)	-66347
Thenardite (Na ₂ SO ₄)	-86914
Iron sulfide (FeS)	0.533

SIMPLE INDICES

Langelier	0.380
Ryznar	6.16
Puckorius	6.49
Larson-Skold Index	7364
Stiff Davis Index	0.216
Oddo-Tomson	-0.735

BOUND IONS

Calcium	7376	7169
Barium	0.295	0.295
Carbonate	1.79	0.00892
Phosphate	0.00	0.00
Sulfate	1250	308.80

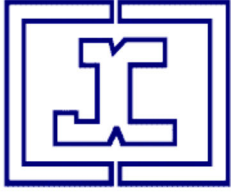
TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F) 49.80
Time(secs) 0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
 HCU 3211 B SWD
 JEFF SULLIVAN
 DUMP LINE
 HAMILTON KS

Sample ID#: 3076
 ID: 208779
 Report Date: 01-02-2019
 Sample Date: 12-13-2018
 at 0000

WATER CHEMISTRY

CATIONS

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Barium(as Ba)	0.295
Strontium(as Sr)	192.80
Sodium(as Na)	73924
Potassium(as K)	785.60
Lithium(as Li)	9.39
Iron(as Fe)	16.56
Field Iron(as Fe)	10.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.833
Zinc(as Zn)	1.70
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	150800
Sulfate(as SO ₄)	1250
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	75.00
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)	5.00
Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	14.89

PARAMETERS

Temperature(°F)	49.80
Sample pH	6.92
T.D.S.	224140
Conductivity:	400321
Resistivity:	2.50

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	0.435	-0.00675	0.675	-71.49	0.900	-18.83	1.22	0.0319	0.325	-126.80	0.345	-0.0114	33.13	1.30	0.0248	0.00349
65.45	0.00	0.572	-0.00452	0.608	-88.97	0.784	-43.36	0.740	-0.0614	0.283	-143.45	0.509	-0.00673	27.53	1.26	0.0463	0.00349
80.91	0.00	0.702	-0.00281	0.580	-93.36	0.697	-63.59	0.475	-0.192	0.262	-150.88	0.695	-0.00335	22.79	1.21	0.0172	0.00349
96.36	0.00	0.802	-0.00169	0.582	-86.80	0.633	-79.63	0.323	-0.365	0.250	-153.10	0.879	-0.00109	18.87	1.16	0.0225	0.00349
111.82	0.00	0.854	-0.00114	0.611	-72.34	0.628	-76.50	0.230	-0.584	0.243	-153.06	1.03	< 0.001	15.69	1.09	0.0232	0.00349
127.27	0.00	0.855	-0.00105	0.669	-53.20	0.660	-62.96	0.166	-0.875	0.235	-153.61	1.13	< 0.001	13.15	1.02	0.0183	0.00349
142.73	0.00	0.809	-0.00130	0.761	-32.25	0.687	-52.65	0.121	-1.26	0.226	-154.95	1.16	< 0.001	11.09	0.952	0.0145	0.00349
158.18	0.00	0.727	-0.00176	0.894	-11.67	0.712	-44.80	0.0892	-1.76	0.217	-157.03	1.13	< 0.001	9.39	0.878	0.0154	0.00349
173.64	0.00	0.626	-0.00230	1.08	7.09	0.732	-38.85	0.0664	-2.42	0.208	-159.84	1.04	< 0.001	7.96	0.802	0.0168	0.00349
189.09	0.00	0.524	-0.00283	1.35	23.29	0.748	-34.38	0.0499	-3.25	0.199	-163.36	0.929	> -0.001	6.74	0.725	0.00871	0.00349
204.55	0.00	0.428	-0.00331	1.72	36.72	0.761	-31.08	0.0379	-4.31	0.190	-167.64	0.803	> -0.001	5.69	0.648	0.00730	0.00349
220.00	0.171	0.334	-0.00392	2.22	48.42	0.764	-30.62	0.0287	-5.69	0.179	-176.42	0.658	-0.00118	5.37	0.619	0.00994	0.00408
		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.

