

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 1411 SWD
DUMP VALVE

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

Sample ID: 208781

CATIONS

Calcium (as Ca)	5262
Magnesium (as Mg)	1545
Barium (as Ba)	0.240
Strontium (as Sr)	142.20
Sodium (as Na)	84572
Potassium (as K)	835.80
Lithium (as Li)	8.53
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	4.92
Manganese (as Mn)	0.738
Zinc (as Zn)	0.480
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	166400
Sulfate (as SO ₄)	1275
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	70.00
Bicarbonate (as HCO ₃)	24.40
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)	13.23

PARAMETERS

Calculated T.D.S.	243872
Molar Conductivity	451834
Resistivity	2.21
Sp.Gr.(g/mL)	1.17
Pressure(atm)	1.00
pCO ₂ (atm)	0.00203
pH ₂ S(atm)	0.00358
Temperature (°F)	53.60
pH	6.84

COMMENTS

HAMILTON KS



DownHole R_x

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
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HAMILTON KS

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DUMP VALVE

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SATURATION LEVEL

Calcite (CaCO ₃)	0.139
Aragonite (CaCO ₃)	0.123
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	0.00328
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.0418
Anhydrite (CaSO ₄)	0.568
Gypsum (CaSO ₄ *2H ₂ O)	0.728
Barite (BaSO ₄)	0.960
Celestite (SrSO ₄)	0.252
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)	0.0425
Halite (NaCl)	0.346
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	1.44

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.0127
Aragonite (CaCO ₃)	-0.0146
Witherite (BaCO ₃)	-25.98
Strontianite (SrCO ₃)	-0.906
Calcium oxalate (CaC ₂ O ₄)	-0.00588
Magnesite (MgCO ₃)	-0.0395
Anhydrite (CaSO ₄)	-123.18
Gypsum (CaSO ₄ *2H ₂ O)	-69.50
Barite (BaSO ₄)	-0.00596
Celestite (SrSO ₄)	-147.43
Fluorite (CaF ₂)	-2.34
Calcium phosphate	>-0.001
Hydroxyapatite	-218.44
Silica (SiO ₂)	-19.36
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-74.41
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0526
Halite (NaCl)	-54871
Thenardite (Na ₂ SO ₄)	-87201
Iron sulfide (FeS)	0.0828

SIMPLE INDICES

Langelier	-0.103
Ryznar	7.05
Puckorius	7.81
Larson-Skold Index	18093
Stiff Davis Index	-0.200
Oddo-Tomson	-1.19

BOUND IONS

Calcium	5262	5088
Barium	0.240	0.240
Carbonate	1.11	0.00352
Phosphate	0.00	0.00
Sulfate	1275	344.61

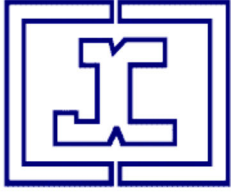
TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F) 53.60
Time(secs) 0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
HCU 1411 SWD
JEFF SULLIVAN
DUMP VALVE
HAMILTON KS

Sample ID#: 3076
ID: 208781
Report Date: 01-02-2019
Sample Date: 12-13-2018
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	5262
Magnesium(as Mg)	1545
Barium(as Ba)	0.240
Strontium(as Sr)	142.20
Sodium(as Na)	84572
Potassium(as K)	835.80
Lithium(as Li)	8.53
Iron(as Fe)	4.92
Field Iron(as Fe)	5.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.738
Zinc(as Zn)	0.480
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	166400
Sulfate(as SO ₄)	1275
Bromine(as Br)	0.00
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Bicarbonate(as HCO ₃)	24.40
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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)	13.23

PARAMETERS

Temperature(°F)	53.60
Sample pH	6.84
T.D.S.	243872
Conductivity:	451834
Resistivity:	2.21

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	0.130	-0.0132	0.585	-117.00	0.752	-62.20	1.08	0.0111	0.262	-142.52	0.0386	-0.0558	7.28	0.340	0.0201	0.00203
65.45	0.00	0.170	-0.0111	0.529	-136.92	0.658	-91.50	0.658	-0.0738	0.228	-158.99	0.0566	-0.0433	6.14	0.322	0.0377	0.00203
80.91	0.00	0.205	-0.00952	0.507	-140.57	0.587	-115.51	0.424	-0.193	0.212	-166.31	0.0763	-0.0342	5.14	0.301	0.0121	0.00203
96.36	0.00	0.230	-0.00836	0.510	-130.60	0.534	-134.35	0.289	-0.349	0.203	-168.46	0.0942	-0.0275	4.29	0.277	0.0159	0.00203
111.82	0.00	0.237	-0.00759	0.537	-110.78	0.532	-128.24	0.206	-0.546	0.197	-168.37	0.107	-0.0226	3.59	0.251	0.0167	0.00203
127.27	0.00	0.229	-0.00710	0.590	-85.11	0.560	-108.62	0.149	-0.809	0.191	-168.92	0.113	-0.0190	3.03	0.223	0.0140	0.00203
142.73	0.00	0.209	-0.00683	0.672	-57.17	0.585	-93.48	0.109	-1.16	0.185	-170.29	0.112	-0.0164	2.57	0.194	0.0113	0.00203
158.18	0.00	0.181	-0.00668	0.790	-29.75	0.607	-81.79	0.0803	-1.61	0.178	-172.46	0.105	-0.0145	2.19	0.164	0.00568	0.00203
173.64	0.00	0.152	-0.00662	0.958	-4.69	0.625	-72.79	0.0599	-2.20	0.171	-175.38	0.0947	-0.0131	1.86	0.132	0.00983	0.00203
189.09	0.00	0.124	-0.00660	1.19	17.00	0.640	-65.94	0.0451	-2.96	0.163	-179.06	0.0826	-0.0120	1.58	0.0985	0.00666	0.00203
204.55	0.00	0.0995	-0.00661	1.52	35.03	0.652	-60.83	0.0342	-3.92	0.156	-183.52	0.0703	-0.0111	1.34	0.0637	0.00682	0.00203
220.00	0.171	0.0763	-0.00690	1.97	50.21	0.653	-60.33	0.0259	-5.19	0.147	-192.70	0.0568	-0.0109	1.28	0.0509	0.00977	0.00237
		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.

