

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	_____	_____	_____	_____	_____



DownHole R_x

WATER CHEMISTRY

LINN OPERATING
KENT MILBURN
GRANT KS

LEIGH 1 SWDW
TANK BATTERY

Report Date: 12-31-2018 Sampled: 12-12-2018
Sample #: 3076 at 0000

Sample ID: 208723

CATIONS

Calcium (as Ca)	669.50
Magnesium (as Mg)	243.70
Barium (as Ba)	0.0540
Strontium (as Sr)	15.05
Sodium (as Na)	6357
Potassium (as K)	53.69
Lithium (as Li)	0.536
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.256
Iron (as Fe)	1.21
Manganese (as Mn)	0.459
Zinc (as Zn)	0.271
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	11800
Sulfate (as SO ₄)	25.00
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	90.00
Bicarbonate (as HCO ₃)	61.00
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)	2.00
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	0.291

PARAMETERS

Calculated T.D.S.	19268
Molar Conductivity	28238
Resistivity	35.41
Sp.Gr.(g/mL)	1.01
Pressure(atm)	1.00
pCO ₂ (atm)	0.0275
pH ₂ S(atm)	0.00123
Temperature (°F)	44.00
pH	5.00

COMMENTS

GRANT KS

JACAM LABORATORIES

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



JACAM LABORATORIES

DownHole R_x

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
KENT MILBURN
GRANT KS

LEIGH 1 SWDW
TANK BATTERY

Report Date:	12-31-2018	Sampled:	12-12-2018
Sample #:	3076	at	0000
Sample ID:	208723		

SATURATION LEVEL

Calcite (CaCO ₃)	0.00146
Aragonite (CaCO ₃)	0.00130
Witherite (BaCO ₃)	< 0.001
Strontianite (SrCO ₃)	< 0.001
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	< 0.001
Anhydrite (CaSO ₄)	0.00489
Gypsum (CaSO ₄ *2H ₂ O)	0.00864
Barite (BaSO ₄)	0.0956
Celestite (SrSO ₄)	0.00913
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)	0.00345
Halite (NaCl)	0.00132
Thenardite (Na ₂ SO ₄)	< 0.001
Iron sulfide (FeS)	< 0.001

MOMENTARY EXCESS (Lbs/1000 Barrels)

Calcite (CaCO ₃)	-0.166
Aragonite (CaCO ₃)	-0.185
Witherite (BaCO ₃)	-12.41
Strontianite (SrCO ₃)	-1.81
Calcium oxalate (CaC ₂ O ₄)	-0.0595
Magnesite (MgCO ₃)	-0.643
Anhydrite (CaSO ₄)	-869.74
Gypsum (CaSO ₄ *2H ₂ O)	-667.45
Barite (BaSO ₄)	-0.296
Celestite (SrSO ₄)	-109.59
Fluorite (CaF ₂)	-7.94
Calcium phosphate	>-0.001
Hydroxyapatite	-247.01
Silica (SiO ₂)	-24.89
Brucite (Mg(OH) ₂)	< 0.001
Magnesium silicate	-80.50
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0745
Halite (NaCl)	-163008
Thenardite (Na ₂ SO ₄)	-57425
Iron sulfide (FeS)	-2.36

SIMPLE INDICES

Langelier	-2.78
Ryznar	10.56
Puckorius	8.55
Larson-Skold Index	338.16
Stiff Davis Index	-3.05
Oddo-Tomson	-3.23

BOUND IONS

Calcium	669.50	666.64
Barium	0.0540	0.0540
Carbonate	0.00165	< 0.001
Phosphate	0.00	0.00
Sulfate	25.00	18.30

TOTAL

FREE

OPERATING CONDITIONS

Temperature (°F)	44.00
Time(secs)	0.00

DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
LEIGH 1 SWDW
KENT MILBURN
TANK BATTERY
GRANT KS

Sample ID#: 3076
ID: 208723
Report Date: 12-31-2018
Sample Date: 12-12-2018
at 0000

WATER CHEMISTRY

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Srontium(as Sr)	15.05
Sodium(as Na)	6357
Potassium(as K)	53.69
Lithium(as Li)	0.536
Iron(as Fe)	1.21
Field Iron(as Fe)	0.00
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.256
Manganese(as Mn)	0.459
Zinc(as Zn)	0.271
Lead(as Pb)	0.00

ANIONS

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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)	2.00
Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	0.291

PARAMETERS

Temperature(°F)	44.00
Sample pH	5.00
T.D.S.	19268
Conductivity:	28238
Resistivity:	35.41

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	0.00170	-0.157	0.00472	-883.97	0.00831	-680.37	0.0789	-0.364	0.00862	-112.47	0.00422	-0.0677	0.00128	-2.35	0.219	0.0275
65.45	0.00	0.00244	-0.137	0.00448	-896.26	0.00764	-707.03	0.0504	-0.579	0.00791	-116.08	0.00676	-0.0534	0.00129	-2.37	0.867	0.0275
80.91	0.00	0.00333	-0.121	0.00450	-876.17	0.00715	-724.54	0.0342	-0.852	0.00771	-115.95	0.0103	-0.0427	0.00129	-2.40	0.559	0.0275
96.36	0.00	0.00435	-0.108	0.00474	-829.09	0.00681	-733.54	0.0244	-1.18	0.00775	-113.83	0.0149	-0.0347	0.00128	-2.43	0.732	0.0275
111.82	0.00	0.00548	-0.0973	0.00521	-761.63	0.00708	-698.81	0.0182	-1.54	0.00789	-110.96	0.0207	-0.0285	0.00125	-2.46	0.831	0.0275
127.27	0.00	0.00679	-0.0887	0.00596	-680.69	0.00776	-640.30	0.0138	-1.99	0.00799	-108.49	0.0281	-0.0237	0.00123	-2.49	0.848	0.0275
142.73	0.00	0.00830	-0.0816	0.00705	-592.73	0.00843	-590.72	0.0105	-2.51	0.00803	-106.49	0.0374	-0.0199	0.00123	-2.53	0.845	0.0275
158.18	0.00	0.0100	-0.0758	0.00859	-503.37	0.00905	-548.65	0.00805	-3.14	0.00803	-104.91	0.0490	-0.0169	0.00122	-2.57	0.787	0.0275
173.64	0.00	0.0119	-0.0710	0.0108	-417.11	0.00964	-513.00	0.00622	-3.86	0.00798	-103.74	0.0632	-0.0144	0.00122	-2.61	0.730	0.0275
189.09	0.00	0.0140	-0.0670	0.0138	-337.30	0.0102	-482.85	0.00484	-4.68	0.00789	-102.95	0.0803	-0.0125	0.00122	-2.66	0.392	0.0275
204.55	0.00	0.0163	-0.0638	0.0181	-266.18	0.0107	-457.51	0.00379	-5.61	0.00776	-102.52	0.101	-0.0108	0.00122	-2.70	0.277	0.0275
220.00	0.171	0.0186	-0.0628	0.0239	-209.39	0.0109	-444.90	0.00294	-6.75	0.00749	-103.84	0.123	-0.00972	0.00139	-2.77	0.274	0.0323

	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	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.

