

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	_____	_____	_____	_____	_____



Comprehensive Oilfield Water Analysis

Chemical Customer:	GeoChem KS	Analysis Number:	230718003
Production Customer:	Prairie Wolf	Date Sampled:	July 14, 2023
Lease(Field):	Hansen 1 SWD	Date Received:	July 18, 2023
Sample Point:	Wellhead	Date Completed:	July 26, 2023

PHYSICAL PROPERTIES

pH:	5.90 <i>(Lab)</i>	Total Hardness:	505 <i>mg/l</i>
Density:	1.1184 <i>g/cc</i>	Total Dissolved Solids:	157,863 <i>mg/l</i>
Specific Gravity:	9.327 <i>lbs/gal</i>	Dissolved H ₂ S:	0 <i>ppm</i>
System Temperature:	62 <i>°F</i>	Dissolved CO ₂ :	40.00 <i>mg/L</i>
System Pressure:	0 <i>psi</i>	Total Ionic Strength:	2748.877
Dissolved O ₂ :	nr <i>ppm</i>	Resistivity:	0.0000 <i>ohm meter @ 75F</i>
BOPD:	BWPD:	Gas Flow:	<i>MMSCFD</i>

BRINE COMPOSITION

CATIONS			ANIONS		
	Concentration			Concentration	
	mg/L	meq/L		mg/L	meq/L
Barium	4.03	0	Chloride	97,501	2747
Calcium	14,560.00	726	Carbonate	0	0
Iron	28.94	1	Bicarbonate <i>(Lab)</i>	85.0	1
Magnesium	976.00	80	Sulfate	2.06	0
Manganese	0.046	0			
Potassium	0.00	0			
Sodium	44,658	1942			
Strontium	48.41	1			
Total Cations	60,275	2750	Total Anions	97,588	2748
		<i>Ionic Balance</i>			<i>100.07%</i>

SCALE INDEX

Temperature (°F)	CaCO3	BaSO4	FeCO3	CaSO4
100	0.29	0.02	0.29	0.01

A scaling index greater than 1.000 indicates scaling. Calculations are based on a constant pressure of note or 1 atm if no pressure reported

Greg Swindle

Chemist

July 26, 2023

Date

Geo-Chemicals
517 E 30TH AVE STE D
HUTCHINSON, KS 67502



DownHole SAT(tm)

SURFACE WATER CHEMISTRY INPUT

Prairie Wolf
Hansen 1 SWD Wellhead

Report Date: 07-26-2023 Sampled: 07-14-2023 at 1038
Sample #: 0 Sample ID: 230718003

CATIONS

Calcium (as Ca)	14560
Magnesium (as Mg)	976.00
Barium (as Ba)	3.87
Strontium (as Sr)	50.09
Sodium (as Na)	44658
Potassium (as K)	0.00
Lithium (as Li)	5.39
Ammonia (as NH ₃)	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	28.63
Manganese (as Mn)	0.0460
Zinc (as Zn)	0.00
Lead (as Pb)	0.00

ANIONS

Chloride (as Cl)	97501
Sulfate (as SO ₄)	1.97
Bromine (as Br)	0.00
Dissolved CO ₂ (as CO ₂)	53.26
Bicarbonate (as HCO ₃)	85.00
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)	0.00
Fluoride (as F)	0.00
Nitrate (as NO ₃)	0.00
Boron (as B)	0.00

PARAMETERS

Calculated T.D.S.	171181
Molar Conductivity	130837
Resistivity	7.64
Sp.Gr.(g/mL)	1.118
Pressure(psia)	1.00
pCO ₂ (atm)	0.0297
pH ₂ S(atm)	0.00
Temperature (°F)	62.00
pH	5.90

CORROSION RATE PREDICTION

CO ₂ - H ₂ S Rate(mpy)	0.292
--	-------

FRENCH CREEK SOFTWARE, INC.
1220 VALLEY FORGE ROAD, SUITE 21, VALLEY FORGE, PA 19460



DownHole SAT(tm)

SURFACE WATER DEPOSITION POTENTIAL INDICATORS

Prairie Wolf
Hansen 1 SWD

Wellhead

Report Date: 07-26-2023 Sampled: 07-14-2023 at 1038
Sample #: 0 Sample ID: 230718003

SATURATION RATIO as IAP/Ksp

Calcite (CaCO ₃)	0.29
Aragonite (CaCO ₃)	0.28
Witherite (BaCO ₃)	0.00
Strontianite (SrCO ₃)	0.00
Calcium oxalate (CaC ₂ O ₄)	0.00
Magnesite (MgCO ₃)	0.02
Anhydrite (CaSO ₄)	0.00
Gypsum (CaSO ₄ *2H ₂ O)	0.00
Barite (BaSO ₄)	0.02
Celestite (SrSO ₄)	0.00
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)	0.12
Strengite (FePO ₄ *2H ₂ O)	0.00
Siderite (FeCO ₃)	0.29
Halite (NaCl)	0.11
Thenardite (Na ₂ SO ₄)	0.00
Iron sulfide (FeS)	0.00

FREE ION MOMENTARY EXCESS (ppm)

Calcite (CaCO ₃)	-0.0126
Aragonite (CaCO ₃)	-0.0132
Witherite (BaCO ₃)	-72.93
Strontianite (SrCO ₃)	-6.25
Calcium oxalate (CaC ₂ O ₄)	-0.00775
Magnesite (MgCO ₃)	-0.215
Anhydrite (CaSO ₄)	-348.92
Gypsum (CaSO ₄ *2H ₂ O)	-278.08
Barite (BaSO ₄)	-15.60
Celestite (SrSO ₄)	-773.86
Fluorite (CaF ₂)	-4.73
Calcium phosphate	>-0.001
Hydroxyapatite	-781.37
Silica (SiO ₂)	-73.95
Brucite (Mg(OH) ₂)	-0.728
Magnesium silicate	-245.20
Iron hydroxide (Fe(OH) ₃)	< 0.001
Strengite (FePO ₄ *2H ₂ O)	>-0.001
Siderite (FeCO ₃)	-0.0148
Halite (NaCl)	-294581
Thenardite (Na ₂ SO ₄)	-247836
Iron sulfide (FeS)	-1.48

SIMPLE INDICES

Langelier	0.0985
Ryznar	5.70
Puckorius	4.36
Larson-Skold Index	1976
Stiff Davis Index	-0.220
Oddo-Tomson	-1.06

BOUND IONS

Calcium	16284
Barium	4.33
Carbonate	0.367
Phosphate	0.00
Sulfate	2.20

TOTAL

FREE

16253
4.33
0.00306
0.00
0.438

OPERATING CONDITIONS

Temperature (°F)	62.00
Time(mins)	3.00

DownHole SAT™ Water Analysis Report



SYSTEM IDENTIFICATION

Prairie Wolf

Hansen 1 SWD
Wellhead

Sample ID#: 0
ID 230718003

Sample Date: 07-14-2023 at 1038
Report Date: 07-26-2023

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	14560
Magnesium(as Mg)	976.00
Barium(as Ba)	3.87
Strontium(as Sr)	50.09
Sodium(as Na)	44658
Potassium(as K)	0.00
Lithium(as Li)	5.39
Iron(as Fe)	28.63
Ammonia(as NH ₃)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.0460
Zinc(as Zn)	0.00
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	97501
Sulfate(as SO ₄)	1.97
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	53.26
Bicarbonate(as HCO ₃)	85.00
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)	0.00
Fluoride(as F)	0.00
Nitrate(as NO ₃)	0.00
Boron(as B)	0.00

PARAMETERS

Temperature(°F)	62.00	Sample pH	5.90
Conductivity	130837	Sp.Gr.(g/mL)	1.118
Resistivity	7.64	T.D.S.	171181

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (psia)	Calcite CaCO ₃	Anhydrite CaSO ₄	Gypsum CaSO ₄ *2H ₂ O	Barite BaSO ₄	Celestite SrSO ₄	Siderite FeCO ₃	Mackinawite FeS							
70.00	50.00	0.309	-0.0116	0.00170	-351.86	0.00235	-288.61	0.0161	-17.79	< 0.001	-783.40	0.325	-0.0124	0.00	-1.51
86.36	500.00	0.435	-0.00910	0.00153	-359.94	0.00193	-324.05	0.00955	-23.12	< 0.001	-808.47	0.531	-0.00715	0.00	-1.58
102.73	950.00	0.570	-0.00670	0.00147	-348.41	0.00163	-355.94	0.00609	-28.71	< 0.001	-820.67	0.801	-0.00255	0.00	-1.65
119.09	1400.00	0.714	-0.00437	0.00149	-321.72	0.00160	-339.29	0.00405	-34.76	< 0.001	-830.39	1.15	0.00160	0.00	-1.73
135.45	1850.00	0.874	-0.00191	0.00158	-285.44	0.00156	-326.45	0.00275	-41.69	< 0.001	-843.84	1.60	0.00570	0.00	-1.83
151.82	2300.00	1.05	< 0.001	0.00175	-244.89	0.00152	-319.23	0.00189	-49.66	< 0.001	-861.64	2.17	0.00986	0.00	-1.93
168.18	2750.00	1.22	0.00345	0.00200	-204.35	0.00145	-317.58	0.00131	-58.85	< 0.001	-884.59	2.88	0.0142	0.00	-2.04
184.55	3200.00	1.40	0.00637	0.00234	-166.75	0.00136	-324.66	< 0.001	-69.53	< 0.001	-913.65	3.74	0.0188	0.00	-2.17
200.91	3650.00	1.57	0.00944	0.00282	-133.72	0.00124	-342.86	< 0.001	-82.03	< 0.001	-950.07	4.75	0.0238	0.00	-2.31
217.27	4100.00	1.69	0.0125	0.00342	-109.49	0.00109	-386.34	< 0.001	-98.50	< 0.001	-1013	5.83	0.0295	0.00	-2.52
233.64	4550.00	1.80	0.0158	0.00422	-86.22	< 0.001	-437.83	< 0.001	-116.59	< 0.001	-1072	7.10	0.0355	0.00	-2.71
250.00	5000.00	1.88	0.0192	0.00525	-67.56	< 0.001	-517.36	< 0.001	-138.37	< 0.001	-1144	8.46	0.0420	0.00	-2.92
		xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L

Saturation Ratios (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. mg/L scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.

