



**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	_____	_____	_____	_____	_____
	<b>TOTAL</b>	_____	_____	_____	_____	_____



OSAGE RESOURCES  
RYAN KLAUSMEYER  
BARBER KS

FACILITY #5  
OUTLET

Report Date: 08-11-2015      Sampled: 07-24-2015  
Sample #: 2046                                  at 0000

Sample ID: 105120

**CATIONS**

Calcium (as Ca)	15330
Magnesium (as Mg)	2590
Barium (as Ba)	3.64
Strontium (as Sr)	716.50
Sodium (as Na)	53337
Potassium (as K)	759.80
Lithium (as Li)	10.02
Ammonia (as NH <sub>3</sub> )	0.00
Aluminum (as Al)	1.94
Iron (as Fe)	27.79
Manganese (as Mn)	1.08
Zinc (as Zn)	0.0820
Lead (as Pb)	0.00

**ANIONS**

Chloride (as Cl)	129600
Sulfate (as SO <sub>4</sub> )	75.00
Bromine (as Br)	0.00
Dissolved CO <sub>2</sub> (as CO <sub>2</sub> )	160.00
Bicarbonate (as HCO <sub>3</sub> )	36.60
Carbonate (as CO <sub>3</sub> )	0.00
Oxalic acid (as C <sub>2</sub> O <sub>4</sub> )	0.00
Silica (as SiO <sub>2</sub> )	0.00
Phosphate(as PO <sub>4</sub> )	0.00
H <sub>2</sub> S (as H <sub>2</sub> S)	0.500
Fluoride (as F)	0.00
Nitrate (as NO <sub>3</sub> )	0.00
Boron (as B)	11.82

**PARAMETERS**

Calculated T.D.S.	195633
Molar Conductivity	314944
Resistivity	3.18
Sp.Gr.(g/mL)	1.14
Pressure(atm)	1.00
pCO <sub>2</sub> (atm)	0.00742
pH <sub>2</sub> S(atm)	< 0.001
Temperature (°F)	120.00
pH	6.30

**COMMENTS**

BARBER KS

**JACAM LABORATORIES**

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



OSAGE RESOURCES	FACILITY #5
RYAN KLAUSMEYER	OUTLET
BARBER KS	
Report Date: 08-11-2015	Sampled: 07-24-2015
Sample #: 2046	at 0000
Sample ID: 105120	

**SATURATION LEVEL**

Calcite (CaCO <sub>3</sub> )	0.400
Aragonite (CaCO <sub>3</sub> )	0.338
Witherite (BaCO <sub>3</sub> )	< 0.001
Strontianite (SrCO <sub>3</sub> )	0.0123
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	0.00
Magnesite (MgCO <sub>3</sub> )	0.121
Anhydrite (CaSO <sub>4</sub> )	0.0562
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	0.0600
Barite (BaSO <sub>4</sub> )	0.110
Celestite (SrSO <sub>4</sub> )	0.0411
Fluorite (CaF <sub>2</sub> )	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO <sub>2</sub> )	0.00
Brucite (Mg(OH) <sub>2</sub> )	< 0.001
Magnesium silicate	0.00
Iron hydroxide (Fe(OH) <sub>3</sub> )	< 0.001
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	0.00
Siderite (FeCO <sub>3</sub> )	0.448
Halite (NaCl)	0.119
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	< 0.001
Iron sulfide (FeS)	0.166

**MOMENTARY EXCESS (Lbs/1000 Barrels)**

Calcite (CaCO <sub>3</sub> )	-0.00238
Aragonite (CaCO <sub>3</sub> )	-0.00310
Witherite (BaCO <sub>3</sub> )	-28.77
Strontianite (SrCO <sub>3</sub> )	-0.188
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	-0.00302
Magnesite (MgCO <sub>3</sub> )	-0.00968
Anhydrite (CaSO <sub>4</sub> )	-85.13
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	-89.92
Barite (BaSO <sub>4</sub> )	-8.02
Celestite (SrSO <sub>4</sub> )	-127.60
Fluorite (CaF <sub>2</sub> )	-1.95
Calcium phosphate	>-0.001
Hydroxyapatite	-354.20
Silica (SiO <sub>2</sub> )	-53.50
Brucite (Mg(OH) <sub>2</sub> )	0.00321
Magnesium silicate	-114.32
Iron hydroxide (Fe(OH) <sub>3</sub> )	< 0.001
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	>-0.001
Siderite (FeCO <sub>3</sub> )	-0.00226
Halite (NaCl)	-106488
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	-89552
Iron sulfide (FeS)	-0.262

**SIMPLE INDICES**

Langelier	0.441
Ryznar	5.42
Puckorius	5.15
Larson-Skold Index	7619
Stiff Davis Index	0.786
Oddo-Tomson	-0.539

**BOUND IONS**

Calcium	15330
Barium	3.64
Carbonate	1.64
Phosphate	0.00
Sulfate	75.00

**TOTAL**

**FREE**

15306
3.64
0.00273
0.00
10.31

**OPERATING CONDITIONS**

Temperature (°F)	120.00
Time(secs)	0.00

# DownHole SAT™ Water Analysis Report



JACAM LABORATORIES

## SYSTEM IDENTIFICATION

OSAGE RESOURCES  
 FACILITY #5  
 RYAN KLAUSMEYER  
 OUTLET  
 BARBER KS

Sample ID#: 2046  
 ID: 105120  
 Report Date: 08-11-2015  
 Sample Date: 07-24-2015  
 at 0000

## WATER CHEMISTRY

### CATIONS

Calcium(as Ca)	15330
Magnesium(as Mg)	2590
Barium(as Ba)	3.64
Strontium(as Sr)	716.50
Sodium(as Na)	53337
Potassium(as K)	759.80
Lithium(as Li)	10.02
Iron(as Fe)	27.79
Field Iron(as Fe)	0.00
Ammonia(as NH <sub>3</sub> )	0.00
Aluminum(as Al)	1.94
Manganese(as Mn)	1.08
Zinc(as Zn)	0.0820
Lead(as Pb)	0.00

### ANIONS

Chloride(as Cl)	129600
Sulfate(as SO <sub>4</sub> )	75.00
Bromine(as Br)	0.00
Dissolved CO <sub>2</sub> (as CO <sub>2</sub> )	160.00
Bicarbonate(as HCO <sub>3</sub> )	36.60
Carbonate(as CO <sub>3</sub> )	0.00
Silica(as SiO <sub>2</sub> )	0.00
Phosphate(as PO <sub>4</sub> )	0.00
H <sub>2</sub> S (as H <sub>2</sub> S)	0.500
Fluoride(as F)	0.00
Nitrate(as NO <sub>3</sub> )	0.00
Boron(as B)	11.82

### PARAMETERS

Temperature(°F)	120.00
Sample pH	6.30
T.D.S.	195633
Conductivity:	314944
Resistivity:	3.18

## SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (atm)	Calcite CaCO <sub>3</sub>		Anhydrite CaSO <sub>4</sub>		Gypsum CaSO <sub>4</sub> *2H <sub>2</sub> O		Barite BaSO <sub>4</sub>		Celestite SrSO <sub>4</sub>		Siderite FeCO <sub>3</sub>		Mackawenite FeS		CO <sub>2</sub> (mpy)	pCO <sub>2</sub> (atm)
50.00	0.00	0.146	-0.00537	0.0581	-108.02	0.0819	-84.77	0.682	-0.800	0.0546	-124.91	0.102	-0.00933	0.554	-0.114	0.0623	0.00742
65.45	0.00	0.193	-0.00448	0.0525	-112.27	0.0716	-91.60	0.414	-2.18	0.0476	-133.04	0.152	-0.00695	0.512	-0.130	0.147	0.00742
80.91	0.00	0.247	-0.00374	0.0503	-110.20	0.0640	-96.89	0.267	-3.73	0.0443	-134.55	0.216	-0.00516	0.466	-0.148	0.0668	0.00742
96.36	0.00	0.306	-0.00313	0.0508	-102.87	0.0583	-100.66	0.183	-5.37	0.0426	-132.48	0.297	-0.00379	0.418	-0.169	0.0874	0.00742
111.82	0.00	0.367	-0.00262	0.0536	-91.86	0.0582	-95.45	0.131	-7.06	0.0416	-129.09	0.391	-0.00273	0.373	-0.191	0.0920	0.00742
127.27	0.00	0.429	-0.00219	0.0591	-78.86	0.0615	-85.54	0.0951	-8.92	0.0406	-126.50	0.503	-0.00189	0.333	-0.215	0.0779	0.00742
142.73	0.00	0.491	-0.00183	0.0675	-65.32	0.0645	-77.64	0.0700	-10.97	0.0394	-124.84	0.627	-0.00121	0.297	-0.239	0.0634	0.00742
158.18	0.00	0.547	-0.00154	0.0798	-52.36	0.0672	-71.36	0.0520	-13.23	0.0381	-124.06	0.759	>-0.001	0.266	-0.264	0.0621	0.00742
173.64	0.00	0.590	-0.00134	0.0972	-40.70	0.0695	-66.36	0.0390	-15.73	0.0368	-124.12	0.887	>-0.001	0.237	-0.292	0.0606	0.00742
189.09	0.00	0.617	-0.00121	0.122	-30.71	0.0715	-62.44	0.0295	-18.49	0.0355	-125.01	0.998	>-0.001	0.211	-0.322	0.0292	0.00742
204.55	0.00	0.621	-0.00117	0.156	-22.46	0.0731	-59.42	0.0226	-21.55	0.0341	-126.74	1.08	< 0.001	0.187	-0.356	0.0225	0.00742
220.00	0.171	0.590	-0.00128	0.203	-16.45	0.0739	-59.22	0.0173	-25.37	0.0325	-133.13	1.10	< 0.001	0.185	-0.392	0.0300	0.00869

  

	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}{CO<sub>3</sub>}/K<sub>sp</sub>. pCO<sub>2</sub> (atm) is the partial pressure of CO<sub>2</sub> in the gas phase. Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.

