

FULCRUM ENERGY  
NATE HYLE  
JACKSON CO

REU 0681 1-23H2  
SEPARATOR

Report Date: 02-08-2024  
Sample #: 6661

Sampled: 02-02-2024 at 0000  
Sample ID: 356007

**CATIONS**

Calcium (as Ca)	90.91
Magnesium (as Mg)	16.64
Barium (as Ba)	33.29
Strontium (as Sr)	18.05
Sodium (as Na)	15009
Potassium (as K)	27.36
Lithium (as Li)	1.11
Ammonia (as NH <sub>3</sub> )	0.00
Aluminum (as Al)	0.00
Iron (as Fe)	31.28
Manganese (as Mn)	0.260
Zinc (as Zn)	0.0820
Lead (as Pb)	0.00

**ANIONS**

Chloride (as Cl)	23000
Sulfate (as SO <sub>4</sub> )	25.00
Bromine (as Br)	0.00
Dissolved CO <sub>2</sub> (as CO <sub>2</sub> )	250.00
Bicarbonate (as HCO <sub>3</sub> )	756.40
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)	3.06
Fluoride (as F)	0.00
Nitrate (as NO <sub>3</sub> )	0.00
Boron (as B)	6.33

**PARAMETERS**

Calculated T.D.S.	39942
Molar Conductivity	48089
Resistivity	20.79
Sp.Gr.(g/mL)	1.023
Pressure(atm)	1.00
pCO <sub>2</sub> (atm)	0.119
pH <sub>2</sub> S(atm)	0.00191
Temperature (°F)	70.00
pH	6.55

**BOUND IONS**

	<b>TOTAL</b>	<b>FREE</b>
Calcium	93.00	89.94
Barium	34.06	34.06
Carbonate	1.71	0.318
Phosphate	0.00	0.00
Sulfate	25.58	20.66

**CORROSION RATE PREDICTION**

CO <sub>2</sub> - H <sub>2</sub> S Rate(mpy)	0.0774
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**COMMENTS**

JACKSON CO

**Jacam Catalyst**  
**1656 Ave Q Building 8, Sterling, KS 67579**

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**SATURATION RATIO as IAP/Ksp**

Calcite (CaCO <sub>3</sub> )	0.14
Aragonite (CaCO <sub>3</sub> )	0.13
Witherite (BaCO <sub>3</sub> )	0.02
Strontianite (SrCO <sub>3</sub> )	0.09
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	0.00
Magnesite (MgCO <sub>3</sub> )	0.02
Anhydrite (CaSO <sub>4</sub> )	0.00
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	0.00
Barite (BaSO <sub>4</sub> )	21.00
Celestite (SrSO <sub>4</sub> )	0.01
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> )	0.00
Strengite (FePO <sub>4</sub> *2H <sub>2</sub> O)	0.00
Siderite (FeCO <sub>3</sub> )	73.12
Halite (NaCl)	0.01
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	0.00
Iron sulfide (FeS)	6.94

**FREE ION MOMENTARY EXCESS (ppm)**

Calcite (CaCO <sub>3</sub> )	-3.19
Aragonite (CaCO <sub>3</sub> )	-3.42
Witherite (BaCO <sub>3</sub> )	-30.50
Strontianite (SrCO <sub>3</sub> )	-6.44
Calcium oxalate (CaC <sub>2</sub> O <sub>4</sub> )	-1.78
Magnesite (MgCO <sub>3</sub> )	-16.23
Anhydrite (CaSO <sub>4</sub> )	-4034
Gypsum (CaSO <sub>4</sub> *2H <sub>2</sub> O)	-3533
Barite (BaSO <sub>4</sub> )	41.66
Celestite (SrSO <sub>4</sub> )	-421.36
Fluorite (CaF <sub>2</sub> )	-65.85
Calcium phosphate	-0.00199
Hydroxyapatite	-922.16
Silica (SiO <sub>2</sub> )	-102.40
Brucite (Mg(OH) <sub>2</sub> )	-7.60
Magnesium silicate	-286.13
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> )	0.606
Halite (NaCl)	-489209
Thenardite (Na <sub>2</sub> SO <sub>4</sub> )	-185685
Iron sulfide (FeS)	0.939

**SIMPLE INDICES**

Langelier	-0.762
Ryznar	8.07
Puckorius	5.99
Larson-Skold Index	52.36
Stiff Davis Index	-1.31
Oddo-Tomson	-1.44

**CARBONATE PRECIPITATION POTENTIAL (ppm)**

Calcite (CaCO <sub>3</sub> )	-165.89
Aragonite (CaCO <sub>3</sub> )	-173.29
Witherite (BaCO <sub>3</sub> )	-209.92
Strontianite (SrCO <sub>3</sub> )	-75.92
Magnesite (MgCO <sub>3</sub> )	-290.95
Siderite (FeCO <sub>3</sub> )	57.84

**OPERATING CONDITIONS**

Temperature (°F)	70.00
Time(secs)	0.00



SYSTEM IDENTIFICATION

FULCRUM ENERGY
REU 0681 1-23H2
NATE HYLE
SEPARATOR
JACKSON CO

Sample ID#: 6661
ID 356007
Sample Date: 02-02-2024 at 0000
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WATER CHEMISTRY

CATIONS

Table listing cations: Calcium(as Ca), Magnesium(as Mg), Barium(as Ba), Strontium(as Sr), Sodium(as Na), Potassium(as K), Lithium(as Li), Iron(as Fe), Ammonia(as NH3), Aluminum(as Al), Manganese(as Mn), Zinc(as Zn), Lead(as Pb) with their respective concentrations.

ANIONS

Table listing anions: Chloride(as Cl), Sulfate(as SO4), Bromine(as Br), Dissolved CO2(as CO2), Bicarbonate(as HCO3), Carbonate(as CO3), Silica(as SiO2), Phosphate(as PO4), H2S (as H2S), Fluoride(as F), Nitrate(as NO3), Boron(as B) with their respective concentrations.

PARAMETERS

Table listing parameters: Temperature(°F), Conductivity, Resistivity, Sample pH, Sp.Gr.(g/mL), T.D.S. with their respective values.

SCALE AND CORROSION POTENTIAL

Table showing saturation ratios (xSAT) and precipitation/dissolution (mg/L) for Calcite, Anhydrite, Gypsum, Barite, Celestite, Siderite, and Mackinawite across a temperature range from 50.00 to 220.00 °F.

Saturation Ratios (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO3}/Ksp. 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.

