

North Permian Basin Region
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Water Analysis Report by Baker Petrolite

Company:	MACK ENERGY INCORPORATED	Sales RDT:	33512
Region:	PERMIAN BASIN	Account Manager:	WAYNE PETERSON (505) 910-9389
Area:	ARTESIA, NM	Sample #:	135303
Lease/Platform:	BEECH FEDERAL LEASE	Analysis ID #:	27510
Entity (or well #):	2	Analysis Cost	\$40.00
Formation:	UNKNOWN		
Sample Point:	HEATER		

Summary		Analysis of Sample 135303 @ 75 °F							
Sampling Date:	7/19/02	Anions		mg/l	meq/l	Cations		mg/l	meq/l
Analysis Date:	7/29/02	Chloride:	62308.0		1757.48	Sodium:	20377.8		886.38
Analyst:	SHEILA HERNANDEZ	Bicarbonate:	1928.8		31.61	Magnesium:	896.0		73.71
		Carbonate:	0.0		0.	Calcium:	16560.0		826.35
TDS (mg/l or g/m3):	104506.2	Sulfate	1405.0		29.25	Strontium:	118.0		2.69
Density (g/cm3, tonne/m3):	1.073	Phosphate:				Barium:	0.6		0.01
Anion/Cation Ratio:	1	Borate:				Iron:	557.0		20.13
		Silicate:				Potassium:	355.0		9.08
Carbon Dioxide:	1065 PPM	Hydrogen Sulfide:			40 PPM	Aluminum:			
Oxygen:	0 PPM	pH at time of sampling:			7	Chromium:			
Comments:		pH at time of analysis:				Lead:			
		pH used in Calculation:			7	Manganese:			
						Nickel:			

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO ₃		Gypsum CaSO ₄ *2H ₂ O		Anhydrite CaSO ₄		Celestite SrSO ₄		Barite BaSO ₄		CO ₂ Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0.1	2.01	73.40	0.23	335.03	0.20	240.76	-0.14	0.00	0.66	0.32	1.19
100	0	2.06	400.21	0.19	291.69	0.23	266.70	-0.15	0.00	0.49	0.32	1.58
120	0	2.11	410.01	0.17	261.32	0.29	312.26	-0.13	0.00	0.35	0.32	2.02
140	0	2.17	419.82	0.15	243.92	0.37	367.94	-0.11	0.00	0.23	0.00	2.5

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

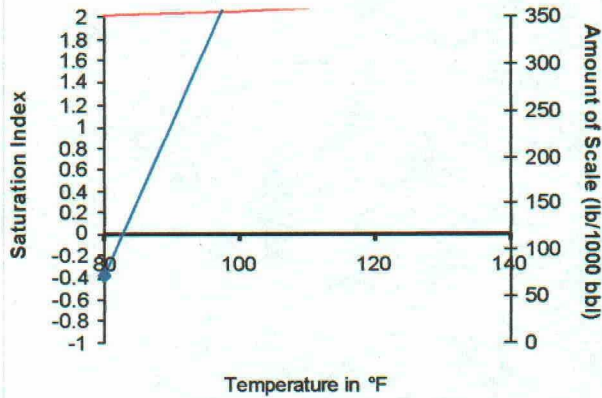
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

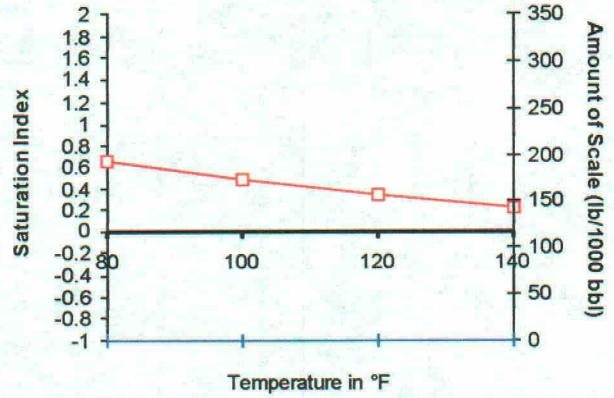
Scale Predictions from Baker Petrolite

Analysis of Sample 135303 @ 75 °F for MACK ENERGY INCORPORATED, 7/29/02

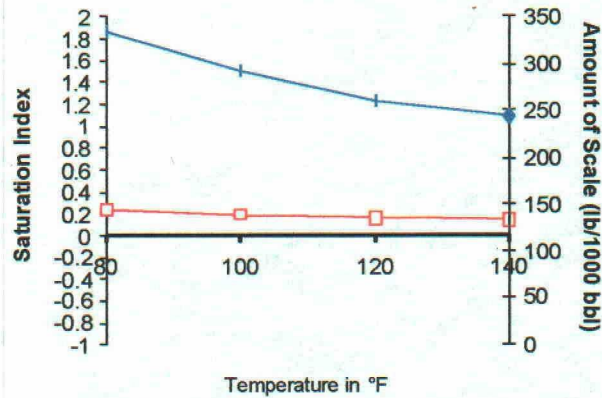
Calcite - CaCO_3



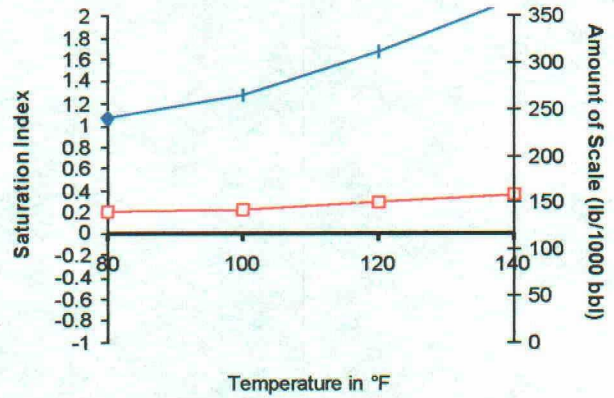
Barite - BaSO_4



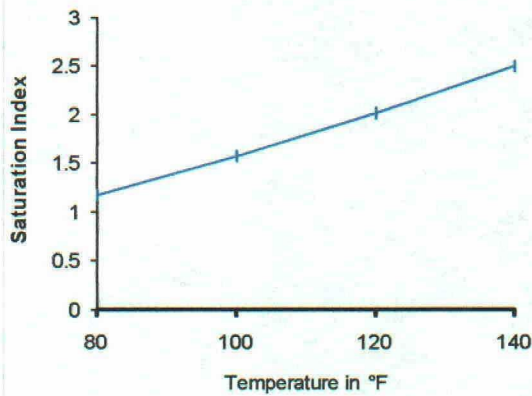
Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$



Anhydrite - CaSO_4



Carbon Dioxide Partial Pressure



Celestite - SrSO_4

