

UPPER PENN



LABORATORIES, INC.

3312 Bankhead Hwy
Midland, Texas 79701
(815) 689-7252
FAR # (815) 689-0190

WATER ANALYSIS REPORT

SAMPLE

Oil Co. : Marathon Oil Company
Lease : Indian Hills State Com
Well No. : 8
Job No. : 9407010

Sample Loc. : Separator Sight Glass
Date Sampled : 08-July-1994
Attention : Noel Garza
Analysis No. : 07010-1

ANALYSIS

MG/L	EQ. WT.	*MEQ/L
100	100	100
200	200	200
300	300	300
400	400	400
500	500	500
600	600	600
700	700	700
800	800	800
900	900	900
1000	1000	1000
1100	1100	1100
1200	1200	1200
1300	1300	1300
1400	1400	1400
1500	1500	1500
1600	1600	1600
1700	1700	1700
1800	1800	1800
1900	1900	1900
2000	2000	2000
2100	2100	2100
2200	2200	2200
2300	2300	2300
2400	2400	2400
2500	2500	2500
2600	2600	2600
2700	2700	2700
2800	2800	2800
2900	2900	2900
3000	3000	3000
3100	3100	3100
3200	3200	3200
3300	3300	3300
3400	3400	3400
3500	3500	3500
3600	3600	3600
3700	3700	3700
3800	3800	3800
3900	3900	3900
4000	4000	4000
4100	4100	4100
4200	4200	4200
4300	4300	4300
4400	4400	4400
4500	4500	4500
4600	4600	4600
4700	4700	4700
4800	4800	4800
4900	4900	4900
5000	5000	5000
5100	5100	5100
5200	5200	5200
5300	5300	5300
5400	5400	5400
5500	5500	5500
5600	5600	5600
5700	5700	5700
5800	5800	5800
5900	5900	5900
6000	6000	6000
6100	6100	6100
6200	6200	6200
6300	6300	6300
6400	6400	6400
6500	6500	6500
6600	6600	6600
6700	6700	6700
6800	6800	6800
6900	6900	6900
7000	7000	7000
7100	7100	7100
7200	7200	7200
7300	7300	7300
7400	7400	7400
7500	7500	7500
7600	7600	7600
7700	7700	7700
7800	7800	7800
7900	7900	7900
8000	8000	8000
8100	8100	8100
8200	8200	8200
8300	8300	8300
8400	8400	8400
8500	8500	8500
8600	8600	8600
8700	8700	8700
8800	8800	8800
8900	8900	8900
9000	9000	9000
9100	9100	9100
9200	9200	9200
9300	9300	9300
9400	9400	9400
9500	9500	9500
9600	9600	9600
9700	9700	9700
9800	9800	9800
9900	9900	9900
10000	10000	10000

- | | | | | |
|----|------------------------------------|----------|--------|-------|
| 1. | pH | | | 7.350 |
| 2. | Specific Gravity | 60/60 F. | | 1.009 |
| 3. | CaCO ₃ Saturation Index | @ 80 F. | +0.248 | |
| | | @ 140 F. | +0.948 | |

Dissolved Gases

- | | |
|---------------------|----------------|
| 4. Hydrogen Sulfide | 64.8 |
| 5. Carbon Dioxide | Not Determined |
| 6. Dissolved Oxygen | Not Determined |

Cations

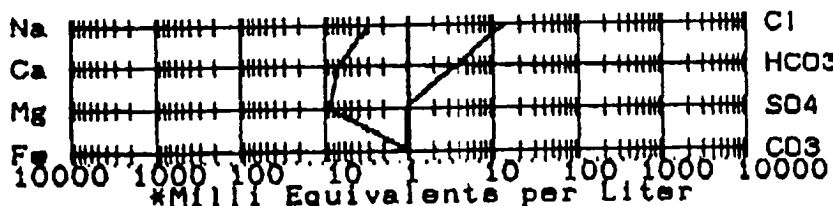
- | | | | | | | | |
|-----|-----------|---------------------|----------------|---|------|---|------|
| 7. | Calcium | (Ca ⁺⁺) | 140 | / | 20.1 | = | 6.97 |
| 8. | Magnesium | (Mg ⁺⁺) | 109 | / | 12.2 | = | 8.93 |
| 9. | Sodium | (Na ⁺) | 87 | / | 23.0 | = | 2.91 |
| 10. | Barium | (Ba ⁺⁺) | Not Determined | | | | |

Analysis

- | | | | | | | |
|-----|-----------------------------------|-------|------|------|---|-------|
| 11. | Hydroxyl (OH^-) | 0 | / | 17.0 | = | 0.00 |
| 12. | Carbonate (CO_3^{--}) | 0 | / | 30.0 | = | 0.00 |
| 13. | Bicarbonate (HCO_3^-) | 244 | / | 61.1 | = | 3.99 |
| 14. | Sulfate (SO_4^{--}) | 43 | / | 48.8 | = | 0.88 |
| 15. | Chloride (Cl^-) | 496 | / | 35.5 | = | 13.97 |
| 16. | Total Dissolved Solids | 1,099 | | | | |
| 17. | Total Iron (Fe) | 0 | / | 18.2 | = | 0.02 |
| 18. | Total Hardness As CaCO_3 | 801 | | | | |
| 19. | Resistivity @ 75 F. (Calculated) | 4.997 | /cm. | | | |

LOGARITHMIC WATER PATTERN

*BQ/L.



Calculated Calcium Sulfate solubility in this brine is 2,259 mg/L. at 90 F.

PROBABLE MINERAL COMPOSITION

COMPOUND EQ. WT. X $\mu\text{mg/L}$ = mg/L .

Ca(HCO ₃) ₂	81.04	3.99	324
CaSO ₄	68.07	0.88	60
CaCl ₂	55.50	2.09	116
Mg(HCO ₃) ₂	73.17	0.00	0
MgSO ₄	60.19	0.00	0
MgCl ₂	47.62	6.93	425
NaHCO ₃	84.00	0.00	0
NaSO ₄	71.03	0.00	0
NaCl	58.48	2.95	172

ATTACHED

Remarks and Comments: