

MARTIN YATES, III
1912 - 1985
FRANK W. YATES
1936 - 1986



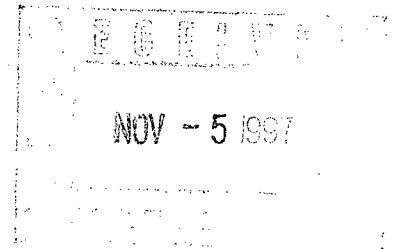
105 SOUTH FOURTH STREET
ARTESIA, NEW MEXICO 88210
TELEPHONE (505) 748-1471

DHC 11/25/97

1751

S. P. YATES
CHAIRMAN OF THE BOARD
JOHN A. YATES
PRESIDENT
PEYTON YATES
EXECUTIVE VICE PRESIDENT
RANDY G. PATTERSON
SECRETARY
DENNIS G. KINSEY
TREASURER

October 31, 1997



David Catanach
State of New Mexico
OIL CONSERVATION DIVISION
2040 S. Pacheco Street
Santa Fe, NM 87505-5472

Dear Mr. Catanach,

Enclosed is an APPLICATION FOR DOWNHOLE COMMINGLING, NMOCD Form C-107-A, for the Conoco AGK Federal #16 located in Unit H of Section 27, Township 20 South, Range 24 East, Eddy County, New Mexico. Also enclosed are ATTACHMENTS required by the application.

Yates Petroleum Corporation hereby seeks administrative approval of the application.

If additional information is needed or there are questions, please call me at (505) 748-4174. Thank you for your consideration of this matter.

Sincerely,

Ray Stall
Operations Engineer

RS/th

Enclosures

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DENNIS G. KINSEY
TREASURER

October 31, 1997

Tim Gum
State of New Mexico
OIL CONSERVATION DIVISION
811 South First Street
Artesia, NM 88210

Dear Mr. Gum,

Enclosed is an APPLICATION FOR DOWNHOLE COMMINGLING, NMOCD Form C-107-A, for the Conoco AGK Federal #16 located in Unit H of Section 27, Township 20 South, Range 24 East, Eddy County, New Mexico. Also enclosed are ATTACHMENTS required by the application.

Yates Petroleum Corporation hereby seeks administrative approval of the application.

If additional information is needed or there are questions, please call me at (505) 748-4174. Thank you for your consideration of this matter.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Ray Stall'.

Ray Stall
Operations Engineer

RS/th

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DENNIS G. KINSEY
TREASURER

October 31, 1997

Richard Manus
Bureau of Land Management
P. O. Box 1778
Carlsbad, NM 88220

Dear Mr. Manus,

This letter is to notify you that Yates Petroleum Corporation has applied to the New Mexico Oil Conservation Division for administrative approval of downhole commingling in the Conoco AGK Federal #16 located in Unit H of Section 27, Township 20 South, Range 24 East, Eddy County, New Mexico. A copy of the application, NMOCD Form C-107-A, is enclosed.

If you have any questions, or need additional information, please call me at (505) 748-4174.

Sincerely,

A handwritten signature in cursive script that reads 'Ray Stall'.

Ray Stall
Operations Engineer

RS/th

Enclosures

DISTRICT I

P.O. Box 1980, Hobbs, NM 88241-1980

State of New Mexico
Energy, Minerals and Natural Resources DepartmentForm C-107-A
New 3-12-96

DISTRICT II

811 South First St., Artesia, NM 88210-2835

OIL CONSERVATION DIVISION

2040 S. Pacheco
Santa Fe, New Mexico 87505-6429

APPROVAL PROCESS:

☒ Administrative ☐ Hearing

DISTRICT III

1000 Rio Brazos Rd, Aztec, NM 87410-1893

APPLICATION FOR DOWNHOLE COMMINGLING

EXISTING WELLBORE

☒ YES ☐ NO

Yates Petroleum Corporation

105 S. Fourth Street

Artesia, NM 88210

Operator

Address

Conoco AGK Federal

16

H-27-20S-24E

Eddy

Lease

Well No.

Unit Ltr. - Sec - Twp - Rge

County

OGRID NO. 025575Property Code 012150API NO. 30-015-29358

Spacing Unit Lease Types: (check 1 or more)

Federal ☒ State ☐ (and/or) Fee ☐

The following facts are submitted in support of downhole commingling:	Upper Zone	Intermediate Zone	Lower Zone
1. Pool Name and Pool Code	Dagger Draw Upper Penn, South 15475		Cemetery Morrow 74640
2. Top and Bottom of Pay Section (Perforations)	7631'-7730'		9181'-9191'
3. Type of production (Oil or Gas)	Gas		Gas
4. Method of Production (Flowing or Artificial Lift)	Pumping		Pumping
5. Bottomhole Pressure	a. (Current) 3050 est. (see attachment)	a.	a. (Current) 3650 est. (see attachment)
Oil Zones - Artificial Lift: Estimated Current Gas & Oil - Flowing: Measured Current All Gas Zones: Estimated Or Measured Original	b. (Original) 3050 est. (see attachment)	b.	b. (Original) 3650 measured (see attachment)
6. Oil Gravity (API) or Gas BTU Content	1148 BTU		1002 BTU
7. Producing or Shut-In?	Producing		Shut-In
Production Marginal? (yes or no)	No		Yes (see attachment)
* If Shut-In, give date and oil/gas/water rates of last production Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data	Date: Rates:	Date: Rates:	Date: 9-23-97 Rates: 0 BOPD 244 BWPD 174 MCFD
* If Producing, give date and oil/gas/water rates of recent test (within 60 days)	Date: 10-14-97 Rates: 1 BOPD 124 BWPD 665 MCFD	Date: Rates:	Date: Rates:
8. Fixed Percentage Allocation Formula - % for each zone (total of %'s to equal 100%)	Oil: 100% Gas: 79.26%	Oil: % Gas: %	Oil: 0% Gas: 20.74%

9. If allocation formula is based upon something other than current or past production, or is based upon some other method, submit attachments with supporting data and/or explaining method and providing rate projections or other required data.

10. Are all working, overriding, and royalty interests identical in all commingled zones?

☒ Yes ☐ No

If not, have all working, overriding, and royalty interests been notified by certified mail?

☐ Yes ☐ No

Have all offset operators been given written notice of the proposed downhole commingling?

☒ Yes ☐ No11. Will cross-flow occur? ☒ Yes ☐ No If yes, are fluids compatible, will the formations not be damaged, will any cross-flowed production be recovered, and will the allocation formula be reliable. ☒ Yes ☐ No (If No, attach explanation) (See attachment)

12. Are all produced fluids from all commingled zones compatible with each other? ☒ Yes ☐ No (See attachment)

13. Will the value of production be decreased by commingling? ☐ Yes ☒ No (If Yes, attach explanation)

14. If this well is on, or communitized with, state or federal lands, either the ~~Commissioner of Public Lands~~ or the United States Bureau Land Management has been notified in writing of this application. ☒ Yes ☐ No

15. NMOCD Reference Cases for Rule 303(D) Exceptions: ORDER NO(S). _____

16. ATTACHMENTS:

- * C-102 for each zone to be commingled showing its spacing unit and acreage dedication.
- * Production curve for each zone for at least one year. (If not available, attach explanation.)
- * For zones with no production history, estimated production rates and supporting data.
- * Data to support allocation method or formula.
- * Notification list of all offset operators.
- * Notification list of working, overriding, and royalty interests for uncommon interest cases.
- * Any additional statements, data, or documents required to support commingling.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Ray Stall TITLE Operations Engineer DATE 11-3-97

TYPE OR PRINT NAME Ray Stall TELEPHONE NO. (505) 748-1471

Conoco AGK #16 Attachment

5. Morrow BHP was measured during initial completion operations at 3650 psi after four days of shut-in time. Adjusted to Canyon depth this pressure is 3050 psi. This zone is not capable of flowing. Morrow producing BHP was measured at 147 psi during the four days that it was being pump tested (September 19-22, 1997).

Original Canyon BHP was not measured. This well is on the Southwestern edge of the field and nearest Canyon production is 1/2 mile away. Accordingly, original Canyon is estimated to have a pressure gradient similar to the Morrow, 0.397 psi/ft, and original Canyon BHP is estimated to be 3050 psi.
(7680 ft to middle Canyon perf x 0.397 psi/ft = 3050 psi).

This zone is not capable of flowing. Recent Canyon BHP has been measured at 168 psi while pump testing.

7. The small amount of gas production from the Morrow cannot independently support the expenses of pumping its relatively large amount of water. These small Morrow reserves will not be produced without commingling.
11. Some minor amount of cross-flow might occur during shut-in but is not expected to cause problems or waste. Cross-flow is not expected to occur at producing conditions because of the pressure drawdown described in item 5 above.
12. The attached Baker Petrolite report contains results of water analyses for Morrow and Canyon samples taken from this well. Also contained are calculated scaling tendencies for combining the two waters at a ratio of 36% Canyon and 64% Morrow to match the water producing rates of the individual pump tests of the two formations. This report concludes that commingling water from these two zones should not present any problems.

Middle Seven Rivers

District I
PO Box 1980, Hobbs, NM 88241-1980
District II
PO Drawer DD, Artesia, NM 88211-0719
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
PO Box 2088
Santa Fe, NM 87504-2088

Form C-102
Revised February 10, 1994
Instructions on back
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-29358	² Pool Code 15475	³ Pool Name Dagger Draw Upper Penn, South
⁴ Property Code 012150	⁵ Property Name Conoco AGK Federal	⁶ Well Number 1
⁷ OGRID No. 025575	⁸ Operator Name Yates Petroleum Corporation	⁹ Elevation 3704

¹⁰ Surface Location

UL or lot no. H	Section 27	Township 20S	Range 24E	Lot Ida	Feet from the 1980	North/South line North	Feet from the 660	East/West line East	County Eddy
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¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Ida	Feet from the	North/South line	Feet from the	East/West line	County
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¹² Dedicated Acres 320	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

¹⁶					¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.
					Signature Tina Huerta
					Printed Name Operations Technician
					Title
					Date
					¹⁸ SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.
					REFER TO ORIGINAL PLAT
					Date of Survey
					Signature and Seal of Professional Surveyer:
					Certificate Number

Production curves for each zone are not available. The Dagger Draw Upper Penn,
South has not produced.

District I
PO Box 1980, Hobbs, NM 88241-1980
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PO Drawer DD, Artesia, NM 88211-0719
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1000 Rio Brazos Rd., Aztec, NM 87410
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-29358		Pool Code 74640	Pool Name Cemetery Morrow
Property Code 012150	Property Name Conoco AGK Federal		Well Number 1
OGRID No. 025575	Operator Name Yates Petroleum Corporation		Elevation 3704

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	27	20S	24E		1980	North	660	East	Eddy

¹¹ Bottom Hole Location If Different From Surface

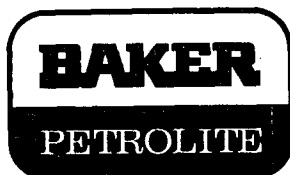
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

¹² Dedicated Acres 320	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
--------------------------------------	-------------------------------	----------------------------------	-------------------------

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					Signature Tina Huerta
					Printed Name Operations Technician
					Title
					Date
					¹⁸ SURVEYOR CERTIFICATION <i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i>
					REFER TO ORIGINAL PLAT
					Date of Survey
					Signature and Seal of Professional Surveyor:
					Certificate Number

Production curves for each zone are not available. The Cemetery Morrow has produced for 2 months.



A Baker Hughes company

Baker Petrolite

422 West Main Street
Artesia, NM 88210-2041 USA
Phone: (505) 746-3588
Fax: (505) 746-3580
Web site: www.bakerhughes.com/bpci

Reply to:
P.O. Box 1140
Artesia, NM 88211-1140 USA

October 22, 1997

Mr. Ray Stall
Yates Petroleum Corporation
105 South Fourth Street
Artesia, NM 88210

Re: Commingled Water Analysis & Scaling Tendencies-Conoco "AGK" #16

Dear Ray,

Attached are individual water analyses and a commingled analysis for water from the Canyon and Morrow zones of the Conoco "AGK" #16.

The commingled water was mixed at a ration of 36% Canyon and 64% Morrow to match current water production volumes.

Water from the Canyon and Morrow zones both show tendencies for calcium carbonate scaling, with the morrow zone having the highest tendency. Commingling of the two waters actually reduces the tendency for calcium carbonate scaling. Calcium sulfate scaling tendencies are negative in the commingled sample.

Commingling of water from these two zones should not present any problems.

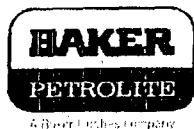
Should you have any questions, please call.

Sincerely,

BAKER PETROLITE

A handwritten signature in cursive script that reads "Andy R. Miller".

Andy R. Miller
District Manager



Baker Petrolite
P.O. Box 60180
Midland, TX 79711-0180

Canyon

Water Analysis Report from Petrolite Corporation

YATES PETROLEUM

CONOCO
WELL #16
WELLHEAD

ARTESIA, NEW MEXICO

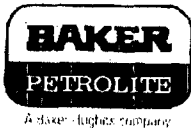
Summary		Analysis 19066					
Anion/Cation Ratio	1.00	Anions	mg/L	meq/L	Cations	mg/L	meq/L
TDS (mg/L or g/m ³)	24,742	Chloride	13,206	372	Sodium	6,504	283
Density (g/cm ³ or tonne/m ³)	1.010	Bicarbonate	647	10.6	Magnesium	705	58.0
Chemical Treatment		Carbonate	0.00	0.00	Calcium	1,680	83.8
Sample Condition		Sulfate	2,000	41.6	Strontium	N/A	N/A
		Phosphate	N/A	N/A	Barium	N/A	N/A
Sampling Date	10/17/97	Borate	N/A	N/A	Iron	N/A	N/A
Sampled by		Silicate	N/A	N/A	Potassium	N/A	N/A
Submitted by	ANDY MILLER	Hydrogen Sulfide		130 PPM	Aluminum	N/A	N/A
Analysis Date	10/21/97	pH at time of sampling		7.40	Chromium	N/A	N/A
Sample analysis number	19066	pH at time of analysis			Copper	N/A	N/A
		pH used in Calculations		7.40	Lead	N/A	N/A
					Manganese	N/A	N/A
					Nickel	N/A	N/A

Predictions of Saturation Index and Amount of Scale in lb/1000bbl												
Pressure (psi)		Temp.	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
CO2	Total	°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
0.24	0.00	80	1.23	82	-0.05		-0.11		N/A		N/A	
0.34	0.00	100	1.31	91	-0.07		-0.07		N/A		N/A	
0.46	0.00	120	1.39	101	-0.08		0.01	13	N/A		N/A	
0.60	0.00	140	1.47	110	-0.08		0.10	166	N/A		N/A	

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.

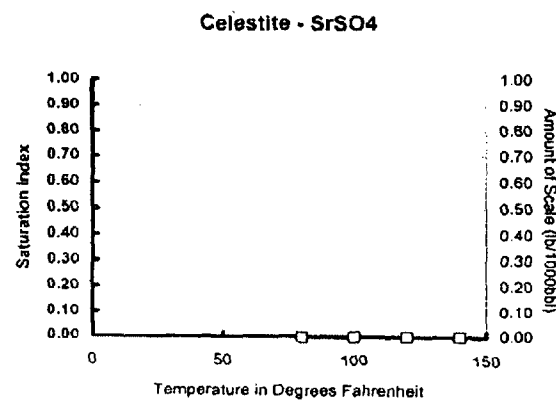
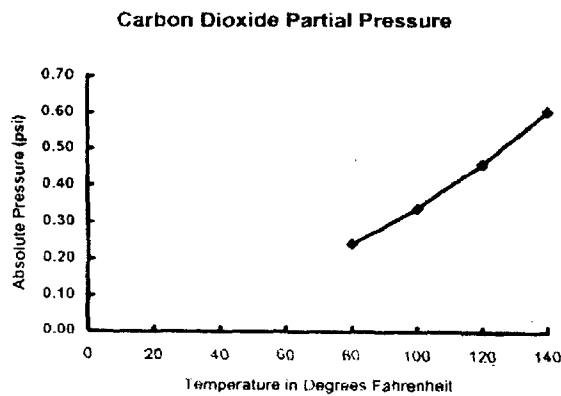
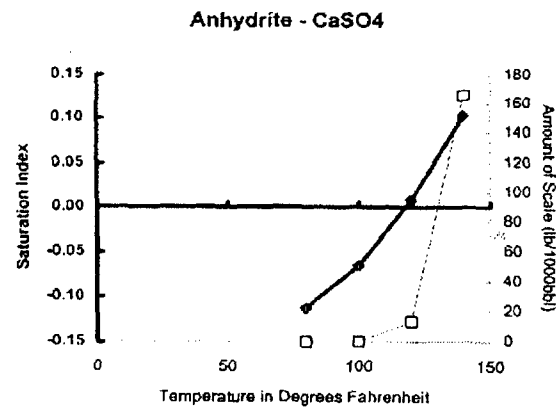
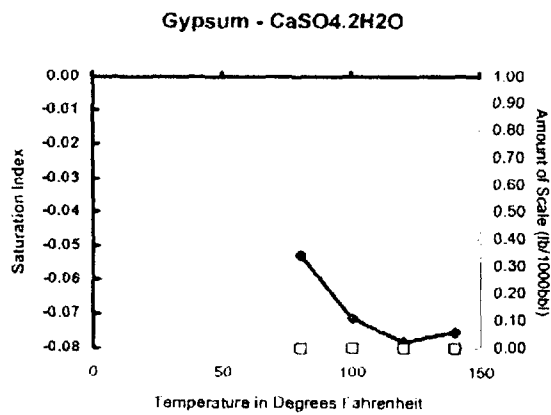
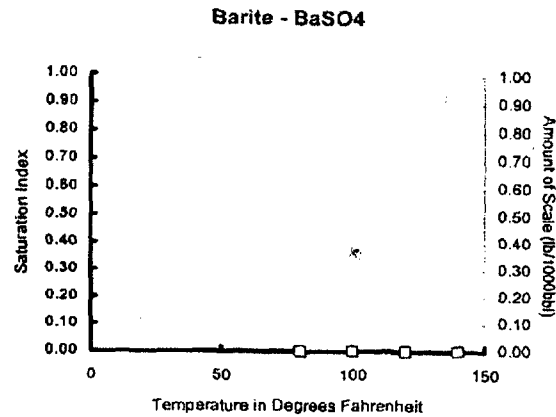
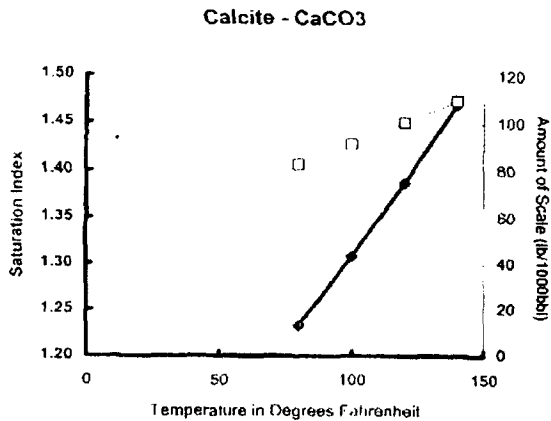
Note 3: CO₂ Pressure is absolute pressure. Total Pressure is gauge pressure.



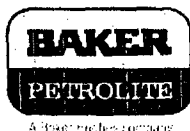
Baker Petrolite
P.O. Box 60180
Midland, TX 79711-0180

Scale Predictions from Petrolite Corporation

Analysis: 19066



Note: Ranges of scale axes vary from graph to graph.



Baker Petrolite
P.O. Box 60180
Midland, TX 79711-0180

Water Analysis Report from Petrolite Corporation

YATES PETROLEUM

CONOCO
WELL AGK #16
WELL

ARTESIA, NEW MEXICO

MORROW

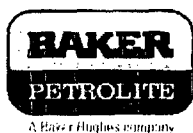
Summary		Analysis: 19067					
Anion/Cation Ratio	1.00	Anions	mg/L	meq/L	Cations	mg/L	meq/L
TDS (mg/L or g/m ³)	111,405	Chloride	66,412	1,873	Sodium	37,827	1,645
Density (g/cm ³ or tonne/m ³)	1.050	Bicarbonate	2,091	34.3	Magnesium	1,203	99.0
Chemical Treatment		Carbonate	0.00	0.00	Calcium	3,165	158
Sample Condition		Sulfate	357	7.43	Strontium	N/A	N/A
		Phosphate	N/A	N/A	Barium	N/A	N/A
Sampling Date	9/18/97	Borate	N/A	N/A	Iron	350	12.5
Sampled by		Silicate	N/A	N/A	Potassium	N/A	N/A
Submitted by	ANDY MILLER	Hydrogen Sulfide			Aluminum	N/A	N/A
Analysis Date	10/21/97	pH at time of sampling		6.47	Chromium	N/A	N/A
Sample analysis number	19067	pH at time of analysis			Copper	N/A	N/A
		pH used in Calculations		6.47	Lead	N/A	N/A
					Manganese	N/A	N/A
					Nickel	N/A	N/A

Predictions of Saturation Index and Amount of Scale in lb/1000bbl								
Pressure (psi)		Temp.	Calcite CaCO ₃		Gypsum CaSO ₄ ·2H ₂ O		Anhydrite CaSO ₄	
CO ₂	Total	°F	Index	Amount	Index	Amount	Index	Amount
5.5	0.00	80	0.99	297	-0.90		-0.92	N/A
6.9	0.00	100	1.09	323	-0.96		-0.91	N/A
8.5	0.00	120	1.18	348	-1.01		-0.88	N/A
10.0	0.00	140	1.29	372	-1.04		-0.82	N/A
								Barite BaSO ₄
								Index Amount

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.

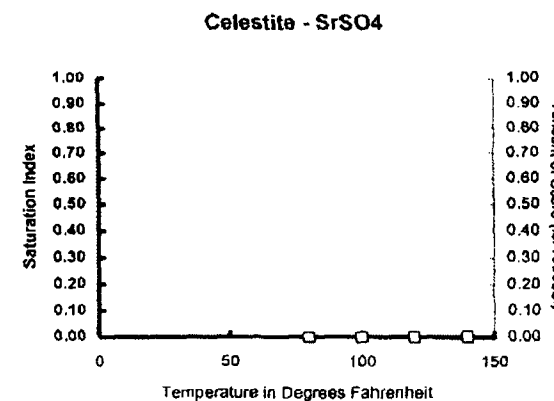
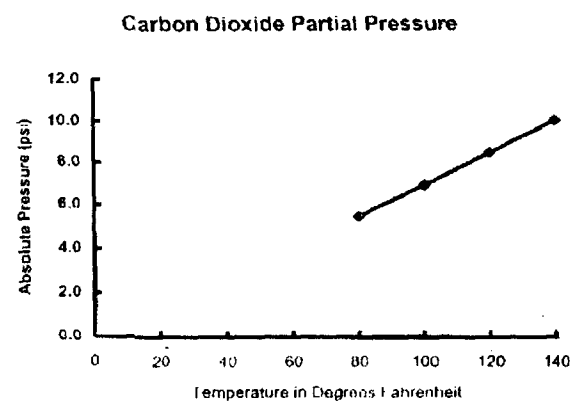
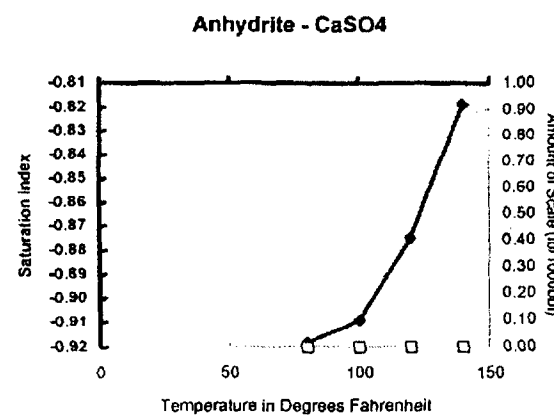
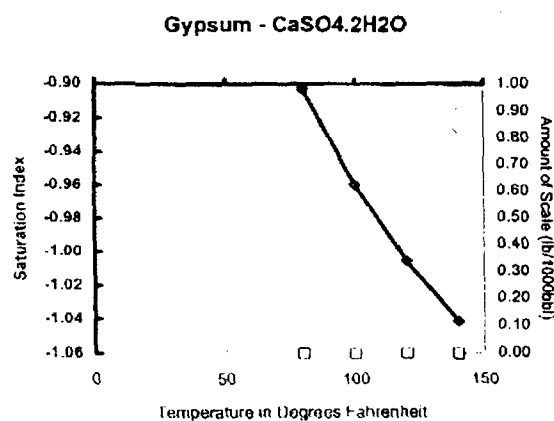
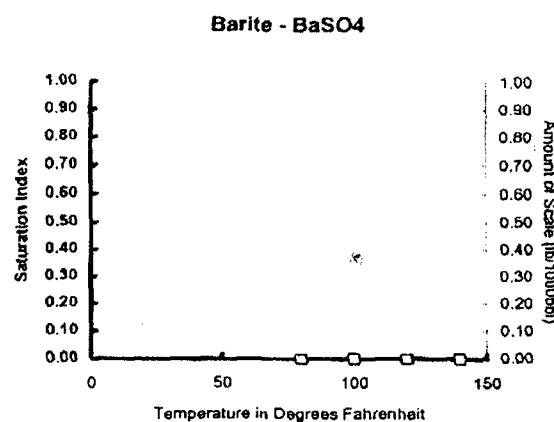
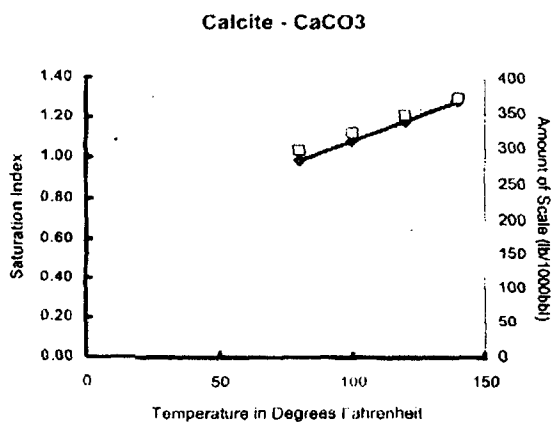
Note 3: CO₂ Pressure is absolute pressure. Total Pressure is gauge pressure.



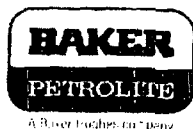
Baker Petrolite
P.O. Box 60180
Midland, TX 79711-0180

Scale Predictions from Petrolite Corporation

Analysis: 19067



Note: Ranges of scale axes vary from graph to graph.

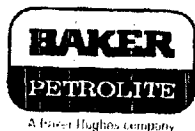


Baker Petrolite
P.O. Box 60180
Midland, TX 79711-0180

Analysis: 19068

Water Analysis Report from Petrolite Corporation

Summary of Mixing Waters									
Sample Number	19066.00	19067.00							
Company	YATES	YATES							
Lease	CONOCO	CONOCO							
Well	WELL #16	AGK#16							
Sample Location	W/H	WELL							
Anions (mg/L)									
Chloride	13,206	66,412							
Bicarbonate	647	2,091							
Carbonate	0.00	0.00							
Sulfate	2,000	357							
Phosphate	0.00	0.00							
Borate	0.00	0.00							
Silicate	0.00	0.00							
Cations (mg/L)									
Sodium	6,504	37,827							
Magnesium	705	1,203							
Calcium	1,680	3,165							
Strontium									
Barium									
Iron		350							
Potassium	0.00	0.00							
Aluminum	0.00	0.00							
Chromium	0.00	0.00							
Copper	0.00	0.00							
Lead	0.00	0.00							
Manganese	0.00	0.00							
Nickel	0.00	0.00							
Anion/Cation Ratio	1.00	1.00							
TDS (mg/L)	24,742	111,405							
Density (g/cm)	1.01	1.05							
Sampling Date	10/17/97	9/18/97							
Sampled by									
Submitted by									
Analysis Date	10/21/97	10/21/97							
pH at time of sampling	7.40	6.47							
pH at time of analysis									
pH used in Calculations	7.40	6.47							



Baker Petrolite
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Midland, TX 79711-0180

Analysis: 19068

Water Analysis Report from Petrolite Corporation

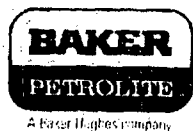
Mixes at 60°F and 0 psi

Predictions of Saturation Index and Amount of Scale in lb/1000bbl												
Mix Waters		CO2	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
19066	19067	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
36%	64%	2.44	0.81	186	-0.43		-0.52		N/A		N/A	

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: CO2 Pressure is absolute pressure. Total Pressure is gauge pressure.



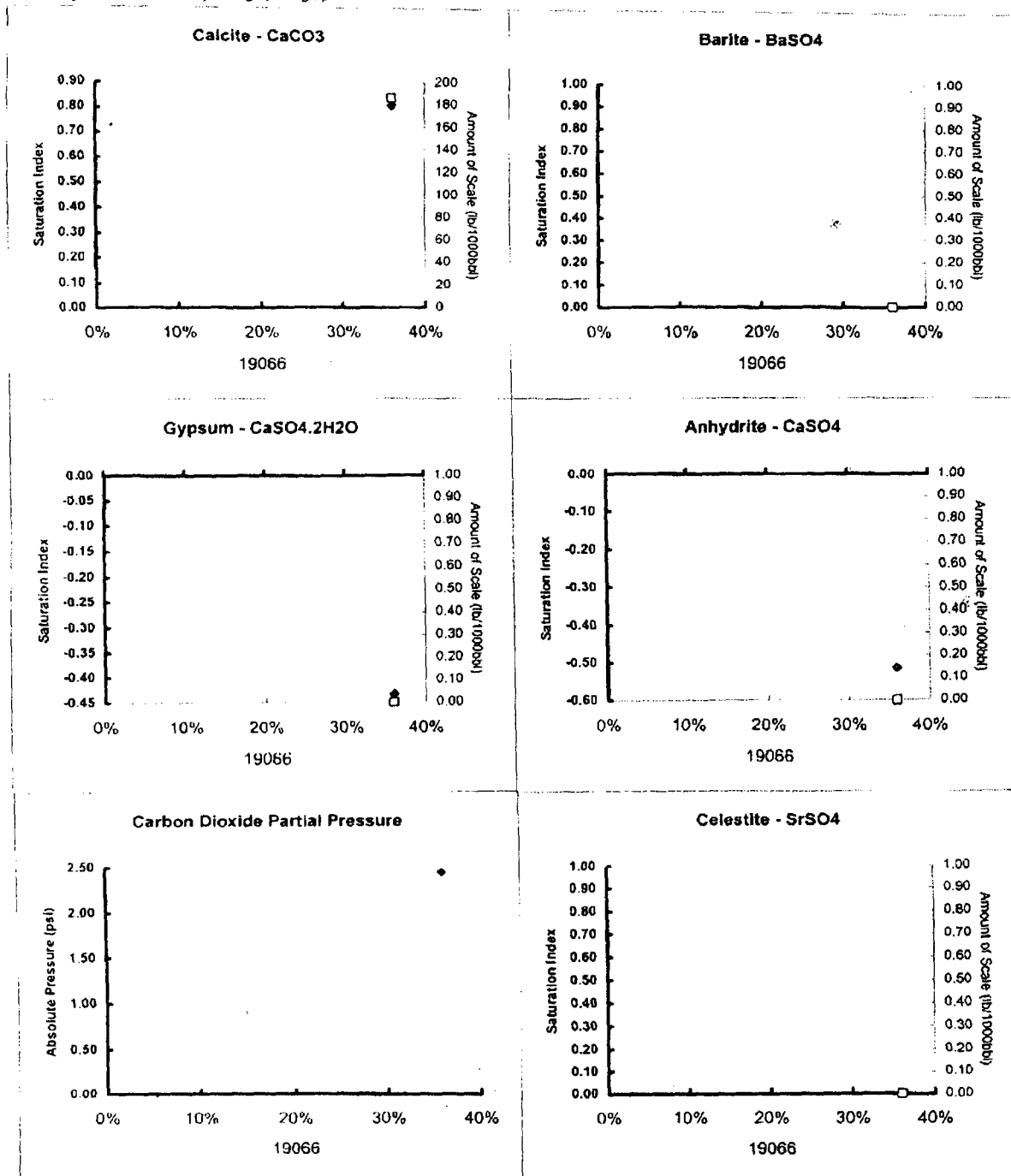
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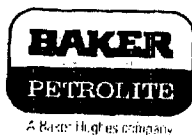
Analysis: 19068

Petrolite Corporation's Scale Predictions for Mixtures

19066 with 19067 at 60°F and 0 psi

Note: Ranges of scale axes vary from graph to graph.





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Analysis: 19068

Water Analysis Report from Petrolite Corporation

Mixes at 80°F and 0 psi

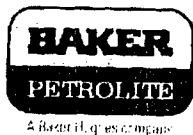
Predictions of Saturation Index and Amount of Scale in lb/1000bbl

Mix Waters		CO2	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
19066	19067	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
36%	64%	3.25	0.91	208	-0.49		-0.52		N/A		N/A	

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: CO2 Pressure is absolute pressure. Total Pressure is gauge pressure.



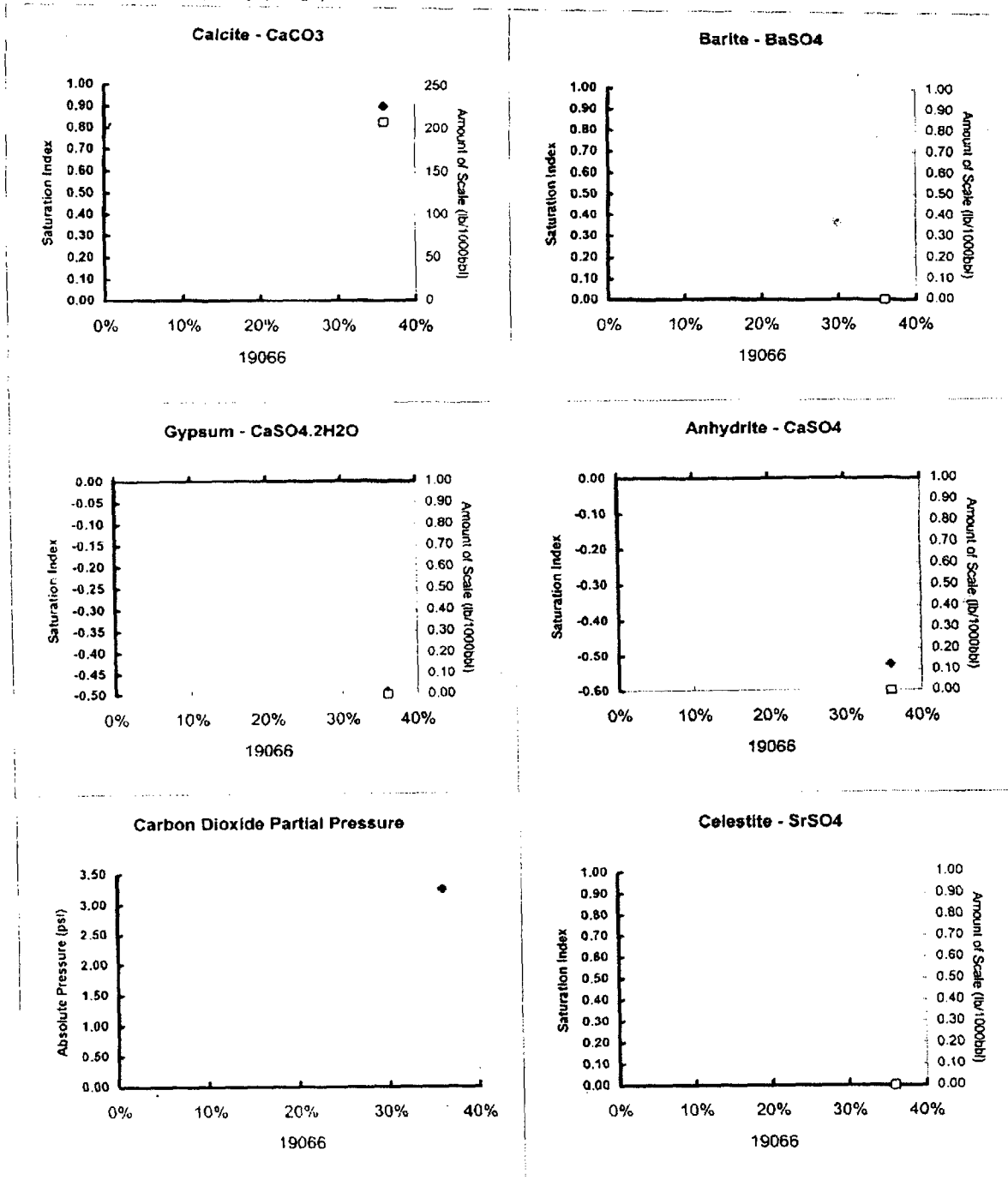
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Analysis: 19068

Petrolite Corporation's Scale Predictions for Mixtures

19066 with 19067 at 80°F and 0 psi

Note: Ranges of scale axes vary from graph to graph.





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Analysis: 19068

Water Analysis Report from Petrolite Corporation

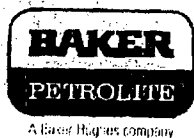
Mixes at 100°F and 0 psi

Predictions of Saturation Index and Amount of Scale in lb/1000bbl												
Mix Waters		CO2	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
19066	19067	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
36%	64%	4.16	1.01	230	-0.54		-0.50		N/A		N/A	

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: CO2 Pressure is absolute pressure. Total Pressure is gauge pressure.

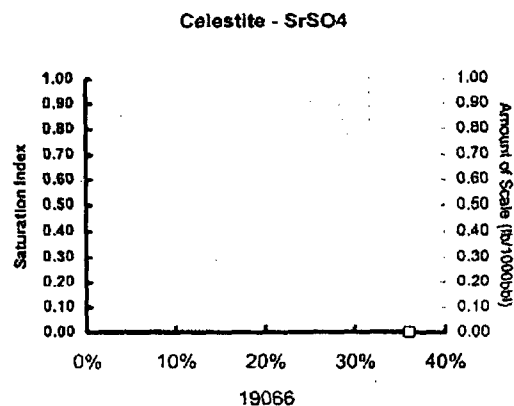
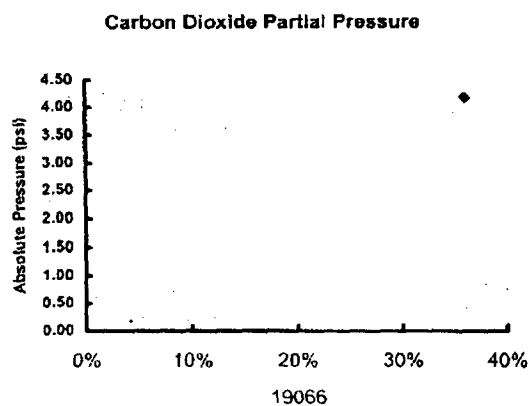
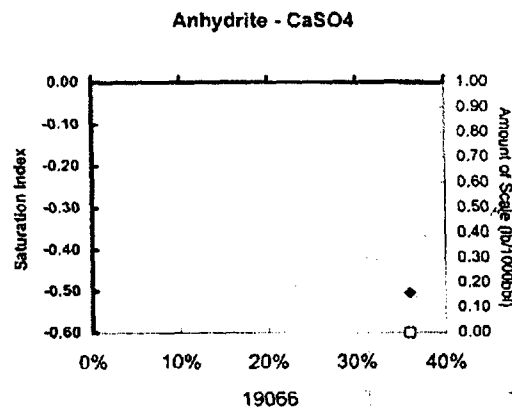
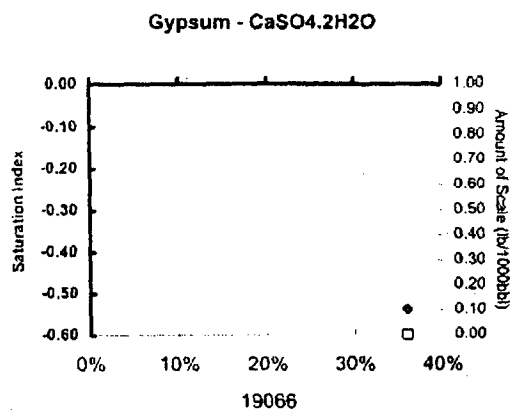
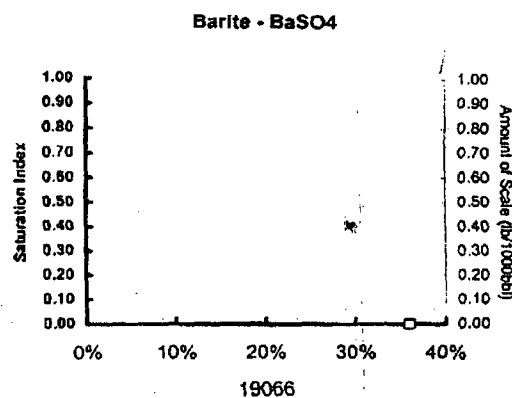
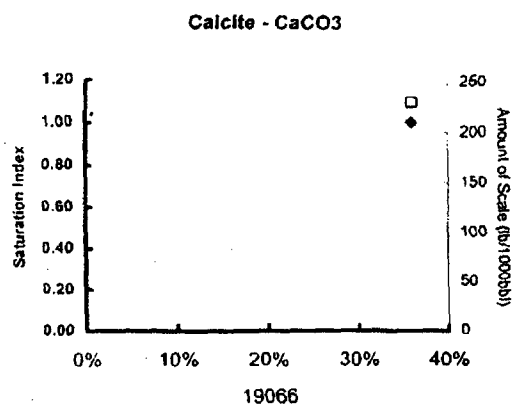


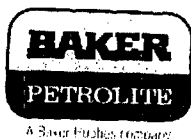
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Analysis: 19068**Petrolite Corporation's Scale Predictions for Mixtures**

19068 with 19067 at 100°F and 0 psi

Note: Ranges of scale axes vary from graph to graph.





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Analysis: 19068

Water Analysis Report from Petrolite Corporation

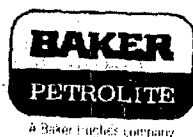
Mixes at 120°F and 0 psi

Predictions of Saturation Index and Amount of Scale in lb/1000bbl												
Mix Waters		CO2	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
19066	19067	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
36%	64%	5.14	1.11	251	-0.57		-0.46		N/A		N/A	

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.

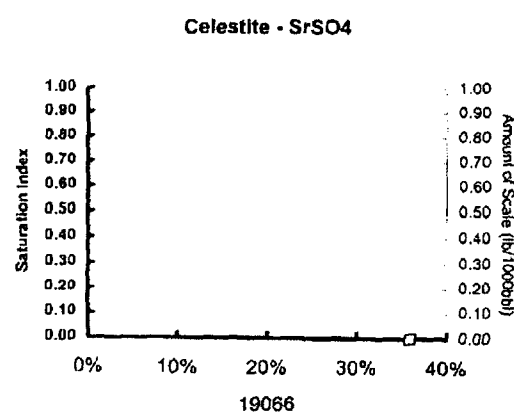
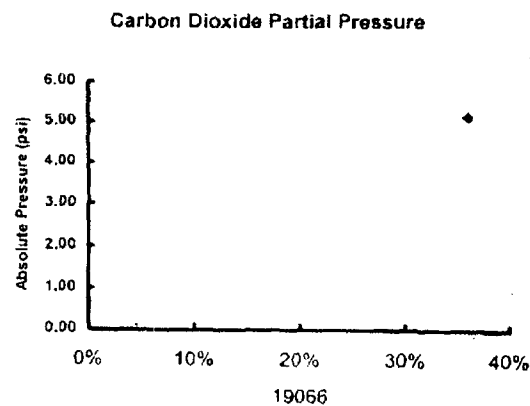
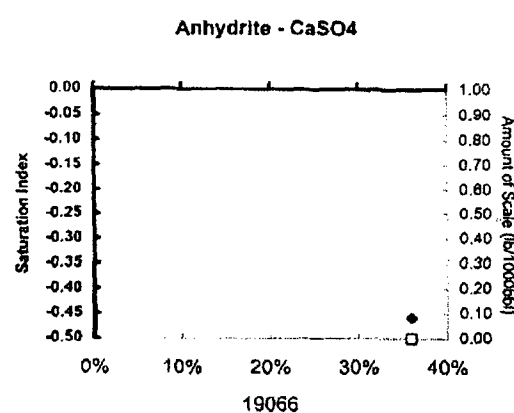
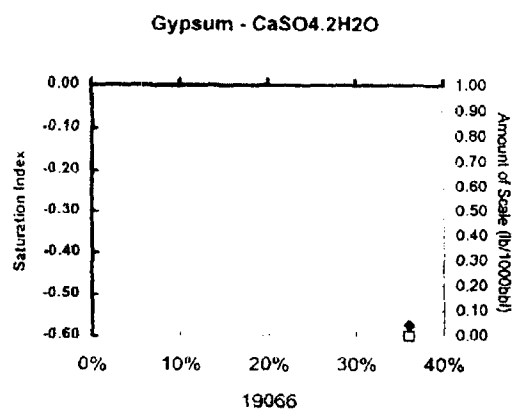
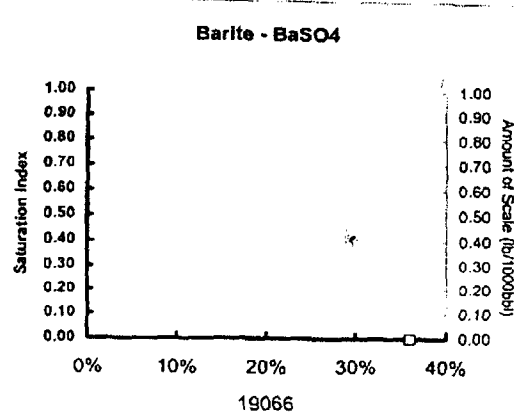
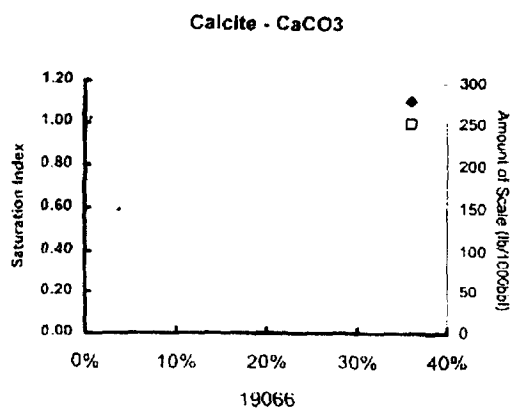
Note 3: CO2 Pressure is absolute pressure. Total Pressure is gauge pressure.

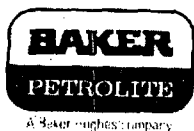


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Analysis: 19068**Petrolite Corporation's Scale Predictions for Mixtures****19066 with 19067 at 120°F and 0 psi**

Note: Ranges of scale axes vary from graph to graph.





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Analysis: 19068

Water Analysis Report from Petrolite Corporation

Mixes at 140°F and 0 psi

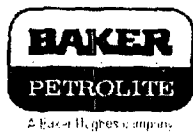
Predictions of Saturation Index and Amount of Scale in lb/1000bbl

Mix Waters		CO2	Calcite CaCO3		Gypsum CaSO4.2H2O		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4	
19066	19067	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
36%	64%	6.18	1.22	272	-0.60		-0.39		N/A		N/A	

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: CO2 Pressure is absolute pressure. Total Pressure is gauge pressure.



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Analysis: 19068**Petrolite Corporation's Scale Predictions for Mixtures**

19066 with 19067 at 140°F and 0 psi

Note: Ranges of scale axes vary from graph to graph.

