SWD-671-D
Minor Modification / new produced water source

Chevron

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2014 MAY -2 P 2:55

Sean Heaster
Petroleum Engineer

MidContinent Business Unit
Chevron North America
Exploration and Production Company
15 Smith Road
Midland, TX 79705
Office: 432-687-7366
Cell: 432-640-9031
SHeaster@chevron.com

May 28, 2014

Mr. Phillip Goetze
New Mexico Oil Conservation Division
1220 South San Francis Drive
Santa Fe, New Mexico 87504

RE: Water compatibility analysis between the SV Chipshot No. 2 and Easley 6 No. 1.
Engineering and Geologic Services Bureau

As per the request of Maxey Brown, Hobbs District Supervisor, Chevron U.S.A. Inc. is providing a produced water compatibility analysis conducted between two producing wells. The subject wells, SV Chipshot No. 2 (API # 30-025-33806) and Easley 6 No. 1 (API # 30-025-34093), will be disposed down the SV Big Bertha No. 1 (API # 30-025-33883) SWD well. The SV Chipshot No. 2 currently produces from the Wolfcamp formation, while the Easley 6 No. 1 produces from the Strawn formation.

The results conclude that "when the waters are mixed, scaling tendencies for calcium carbonate and barium sulfate decrease in the Chipshot #2 water, while the strontium sulfate tendencies remain virtually the same."

Attached is the water compatibility study conducted on the subject wells by Baker Hughes Petrolite.

If additional information is required, you may contact me at 432-687-7366 or email me at SHeaster@chevron.com.

Sincerely,

Sean Heaster
Petroleum Engineer

Heaster, Sean P

From: Gray, Tim W <Tim.Gray@bakerhughes.com>
Sent: Wednesday, May 14, 2014 8:44 AM
To: Heaster, Sean P; Moschetti, Nick (NMOS); Acosta, Daniel E (Danny)
Cc: Day, Jeffrey D
Subject: FW: Chevron (RUSH) COMPATIBILITY & H2O ANALYSIS
Attachments: Chevron (Compatibility).pdf; EASLEY 1-6 WA.pdf; S.V. CHIPSHOT 2 WA.pdf

Gentlemen,

Attached are individual water analyses and compatibility study on produced waters from the Chipshot #2 and Easley #1-6. To answer one of the questions I had, it does not look like the wells are from the same formation as chloride content and water chemistries are vastly different. However, the good news is when you mix the waters, the scaling tendencies for Calcium carbonate and Barium sulfate decrease in the Chipshot water, while the Strontium sulfate tendencies remain virtually the same. Additionally, we have WCW-9049 combination scale/corrosion inhibitor being injected into both water. It looks like the mixing of waters will actually lower the scaling tendencies of the water being pumped down the Big Bertha SWD.

Respectfully,

Tim Gray
Baker Petrolte

-----Original Message-----
From: Munoz, Michelle L
Sent: Tuesday, May 13, 2014 5:39 PM
To: Gray, Tim W
Subject: Chevron (RUSH) COMPATIBILITY & H2O ANALYSIS

Michelle Muńoz | Dept. Administrator
BHI Permian Basin Area Lab
Office/Lab: 432.681-8623 | Fax: 432.681-8679 michelle.munoz@bakerhughes.com
http://www.bakerhughes.com | Advancing Reservoir Performance

North Permian Basin Region
P.O. Box 740
Sundown, TX 79372-0740
(806) 229-8121
Lab Team Leader - Sheila Hernandez
(432) 681-8300

Water Analysis Report by Baker Petrolite

Company:	CHEVRON MID CONTINENT LP	Sales RDT:	33506
Region:	PERMIAN BASIN	Account Manager:	TIM GRAY (575) 910-9390
Area:	BUCKEYE, NM	Sample #:	668315
Lease/Platform:	S.V. CHIPSHOT	Analysis ID #:	141604
Entity (or well #):	2	Analysis Cost:	$90.00
Formation:	UNKNOWN		
Sample Point:	PRODUCTION HEATER		

Summary	
Sampling Date:	05/06/14
Analysis Date:	05/13/14
Analyst:	SANDRA SANCHEZ
TDS (mg/l or g/m3):	146384.2
Density (g/cm3, tonne/m3):	1.107
Anion/Cation Ratio:	1.0214722
Carbon Dioxide:	20 PPM
Oxygen:	
Comments:	
TEMPERATURE 77℉	

Analysis of Sample 668315 @ 75 ℉

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**87544.0**	**2469.3**	**Sodium:**	**50138.0**	**2180.88**
Bicarbonate:	**390.0**	**6.39**	**Magnesium:**	**997.0**	**82.02**
Carbonate:	**0.0**	**0.**	**Calcium:**	**5337.0**	**266.32**
Sulfate:	**1077.0**	**22.42**	**Strontium:**	**218.0**	**4.98**
Phosphate:			**Barium:**	**0.7**	**0.01**
Borate:			**Iron:**	**8.0**	**0.29**
Silicate:			Potassium:	673.0	17.21
			Aluminum:		
Hydrogen Sulfide:		0 PPM	Chromium:		
pH at time of sampling:		6.56	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**6.56**	Manganese:	1.500	0.05
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
℉	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.56	29.20	-0.28	0.00	-0.29	0.00	0.06	14.60	0.67	0.30	0.77
100	0	0.65	34.37	-0.35	0.00	-0.28	0.00	0.03	9.12	0.47	0.30	0.96
120	0	0.73	39.24	-0.40	0.00	-0.25	0.00	0.02	6.39	0.31	0.30	1.18
140	0	0.82	44.41	-0.44	0.00	-0.20	0.00	0.02	6.39	0.16	0.00	1.4

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

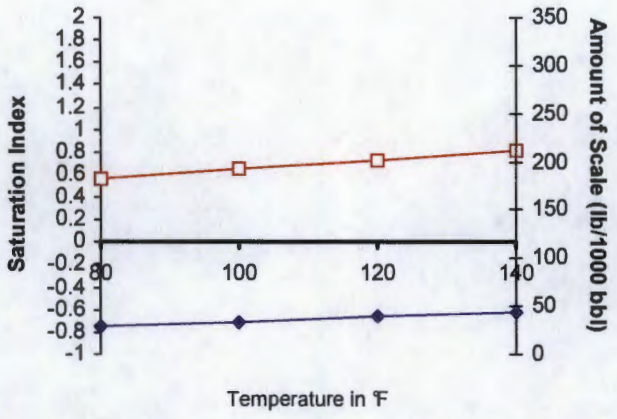
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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

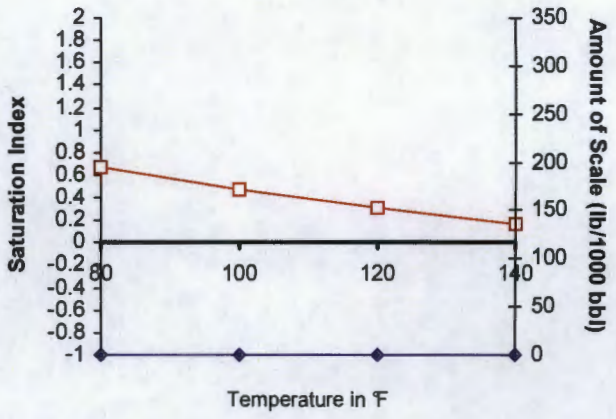
Scale Predictions from Baker Petrolite

Analysis of Sample 668315 @ 75 ℉ for CHEVRON MID C ONTINENT LP, 05/13/14

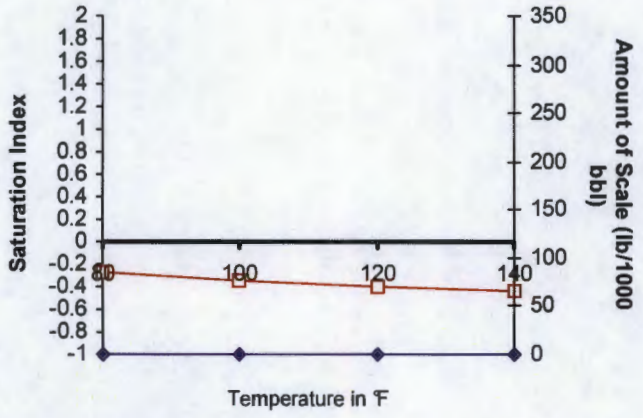
Calcite - CaCO3



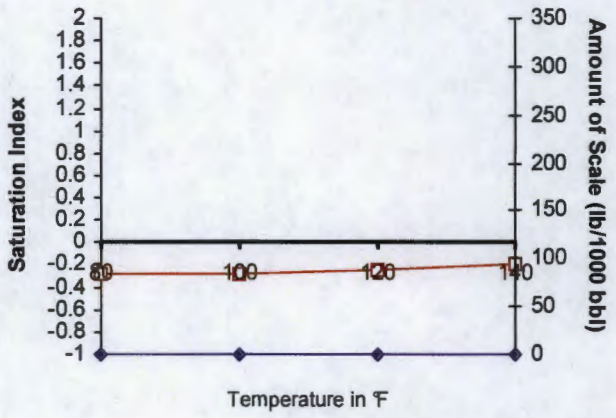
Barite - BaSO4



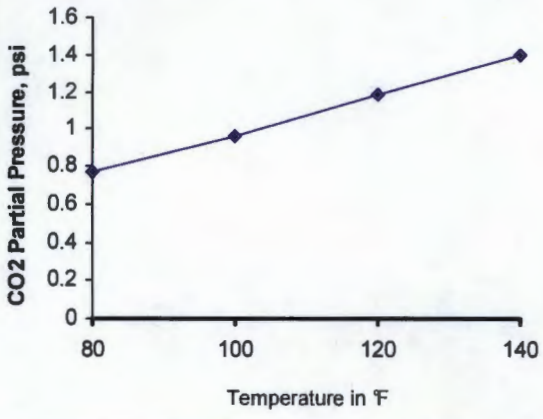
Gypsum - CaSO4*2H20



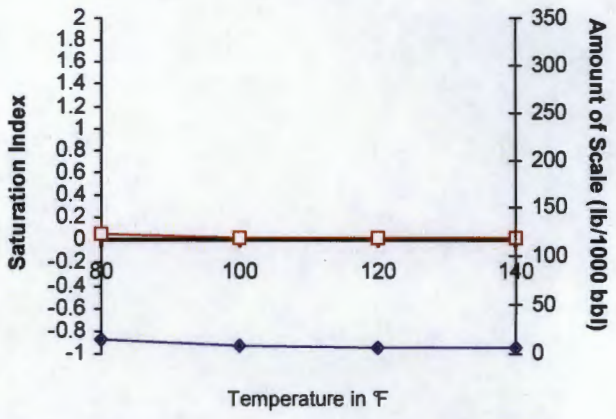
Anhydrite - CaSO4



Carbon Dioxide Partial Pressure



Celestite - SrSO4



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Water Analysis Report by Baker Petrolite

Company:	CHEVRON MID CONTINENT LP	Sales RDT:	33506
Region:	PERMIAN BASIN	Account Manager:	TIM GRAY (575) 910-9390
Area:	BUCKEYE, NM	Sample #:	668314
Lease/Platform:	EASLEY UNIT	Analysis ID #:	141603
Entity (or well #):	1-6	Analysis Cost:	$90.00
Formation:	UNKNOWN		
Sample Point:	PRODUCTION		

Summary	
Sampling Date:	05/06/14
Analysis Date:	05/13/14
Analyst:	SANDRA SANCHEZ
TDS (mg/l or g/m3):	43423.9
Density (g/cm3, tonne/m3):	1.034
Anion/Cation Ratio:	0.9206700
Carbon Dioxide:	30 PPM
Oxygen:	
Comments:	
TEMPERATURE 77℉	

Analysis of Sample 668314 @ 75 ℉

Anions	mg/l	meq/l
Chloride:	**26375.0**	**743.94**
Bicarbonate:	**158.6**	**2.6**
Carbonate:	**0.0**	**0.**
Sulfate:	**897.0**	**18.68**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		17 PPM
pH at time of sampling:		6.25
pH at time of analysis:		
pH used in Calculation:		**6.25**

Cations	mg/l	meq/l
Sodium:	**14657.0**	**637.54**
Magnesium:	**238.0**	**19.58**
Calcium:	**798.0**	**39.82**
Strontium:	**93.0**	**2.12**
Barium:	**0.2**	**0.**
Iron:	**14.0**	**0.51**
Potassium:	193.0	4.94
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:	0.100	0.
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
℉	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.89	0.00	-0.80	0.00	-0.85	0.00	0.06	8.06	0.51	0.00	0.83
100	0	-0.77	0.00	-0.83	0.00	-0.82	0.00	0.06	7.39	0.34	0.00	1.06
120	0	-0.64	0.00	-0.85	0.00	-0.76	0.00	0.06	8.06	0.19	0.00	1.31
140	0	-0.51	0.00	-0.87	0.00	-0.68	0.00	0.08	10.07	0.07	0.00	1.57

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

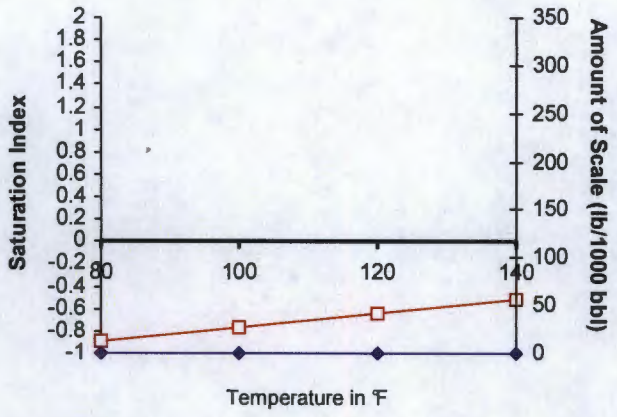
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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

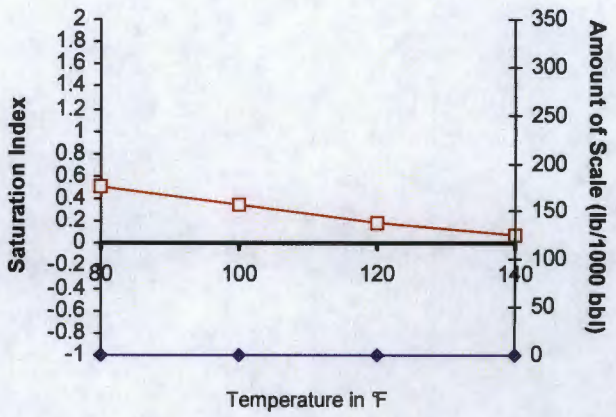
Scale Predictions from Baker Petrolite

Analysis of Sample 668314 @ 75 ℉ for CHEVRON MID C ONTINENT LP, 05/13/14

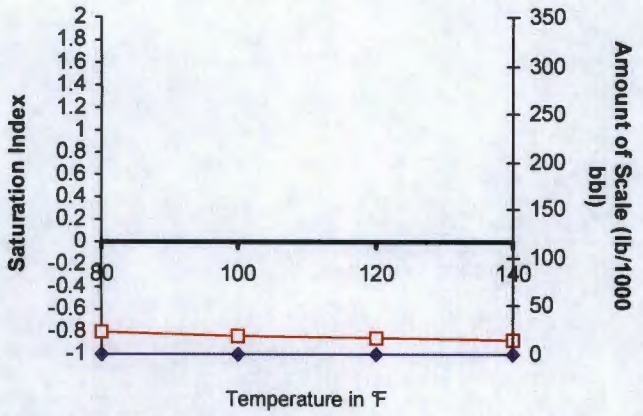
Calcite - CaCO3



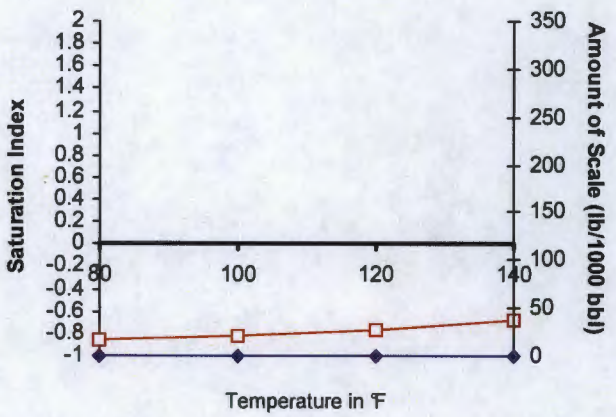
Barite - BaSO4



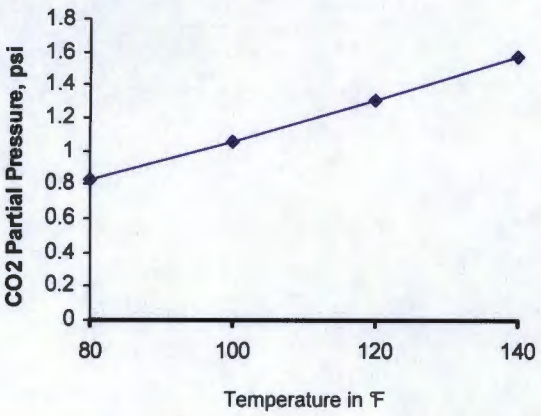
Gypsum - CaSO4*2H20



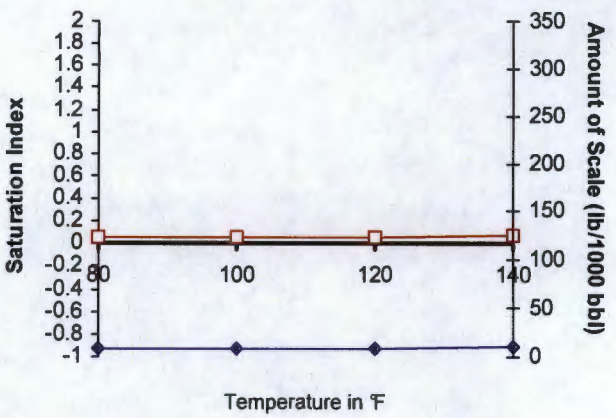
Anhydrite - CaSO4



Carbon Dioxide Partial Pressure



Celestite - SrSO4



Individual Water Analyses

Summary of Mixing Waters		
Sample Number	***668314***	***668315***
Company	CHEVRON MID CONTINENTY LP	CHEVRON MID CONTINENTY LP
Lease	EASLEY UNIT	S.V. CHIPSHOT
Well	1-6	2
Sample Location	PRODUCTION	PRODUCTION HEATER
Anions (mg/L)		
Chloride	26,375	87,544
Bicarbonate	159	390
Sulfate	897	1,077
Cations (mg/L)		
Sodium	14,657	50,138
Magnesium	238	997
Calcium	798	5,337
Strontium	93.0	218
Barium	0.20	0.70
Iron	14.0	8.00
Potassium	193	673
Manganese	0.10	1.50
Anion/Cation Ratio	***1.09***	***0.98***
TDS (mg/L)	43,424	146,384
Density (g/cm)	1.03	1.11
Sampling Date	5/6/14	5/6/14
Account Manager	TIM GRAY	TIM GRAY
Analyst	SANDRA SANCHEZ	SANDRA SANCHEZ
Analysis Date	5/13/14	5/13/14
pH at time of sampling	6.25	6.56
pH used in Calculations	**6.25**	**6.56**

Mixed Water Analysis Report

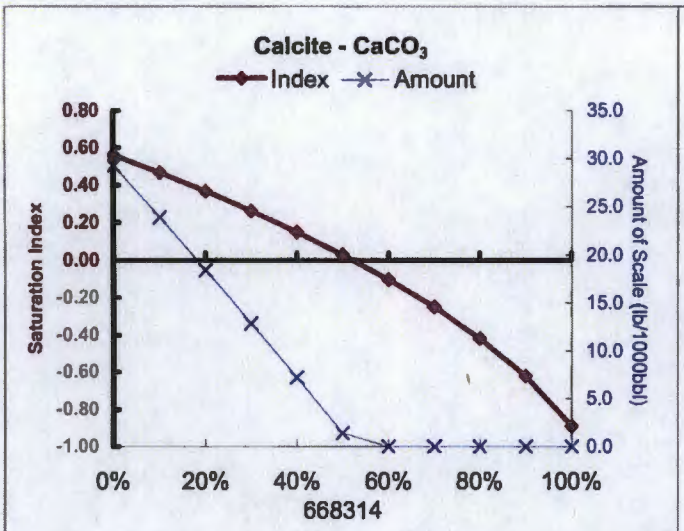
Mixes at 80°F and 0 psi

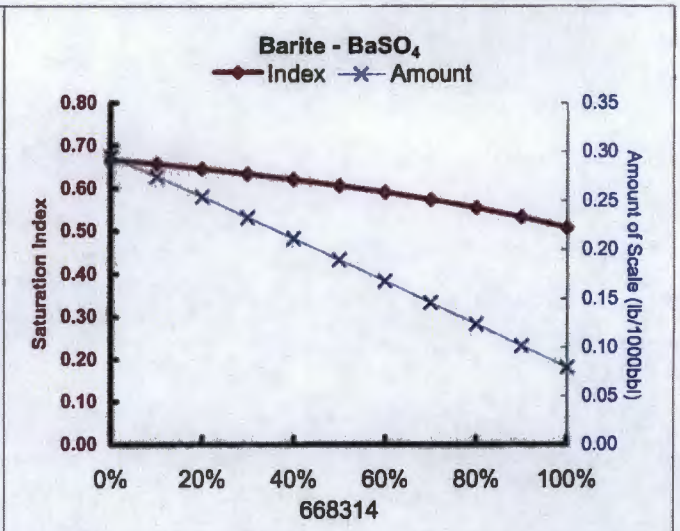
Mixes of 668314 and 668315.		Predictions of Saturation Index and Amount of Scale in lb/1000bbl										CO_2 Fugacity
		Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		
668314	668315	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
100%		-0.89		-0.80		-0.85		0.06	7.9	0.51	0.08	0.83
90%	10%	-0.62		-0.68		-0.72		0.04	6.6	0.53	0.10	0.83
80%	20%	-0.42		-0.60		-0.64		0.04	6.0	0.55	0.12	0.82
70%	30%	-0.25		-0.54		-0.57		0.03	6.0	0.57	0.15	0.82
60%	40%	-0.10		-0.49		-0.52		0.03	6.5	0.59	0.17	0.82
50%	50%	0.03	1.4	-0.45		-0.47		0.04	7.3	0.61	0.19	0.81
40%	60%	0.15	7.2	-0.41		-0.43		0.04	8.4	0.62	0.21	0.81
30%	70%	0.26	12.9	-0.38		-0.39		0.04	9.7	0.63	0.23	0.80
20%	80%	0.37	18.4	-0.34		-0.35		0.05	11.2	0.65	0.25	0.79
10%	90%	0.47	23.9	-0.31		-0.32		0.05	12.9	0.66	0.27	0.78
	100%	0.56	29.2	-0.29		-0.29		0.06	14.6	0.67	0.29	0.77

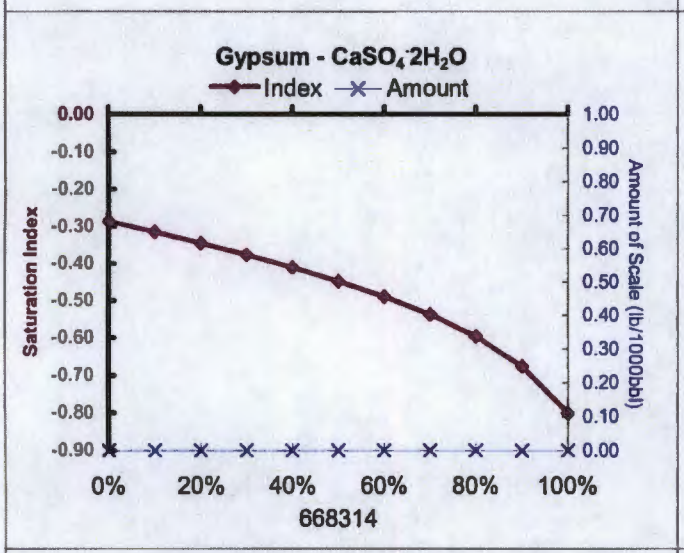
Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.
The CO_2 fugacity is calculated. Under usual conditions it is essentially the same as the CO_2 partial pressure

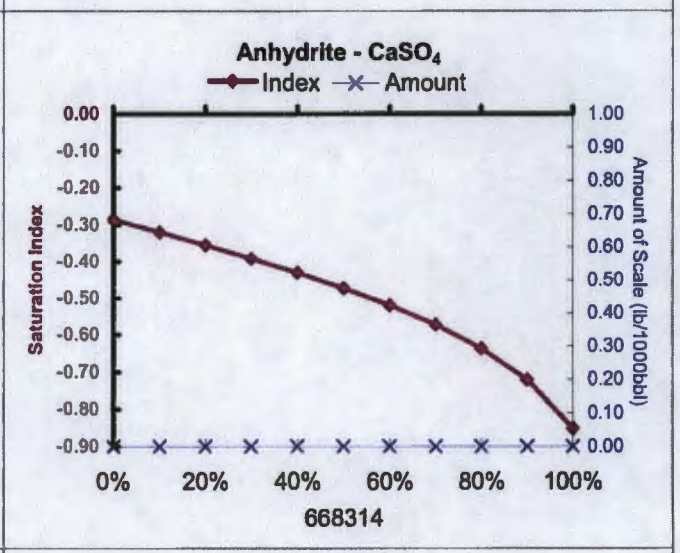
Mixture Predictions

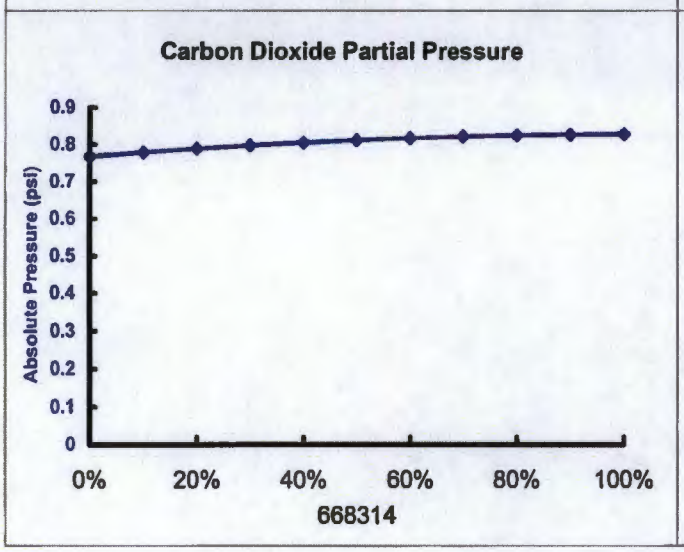
Mixes of 668314 and 668315 at 80°F and 0 psi

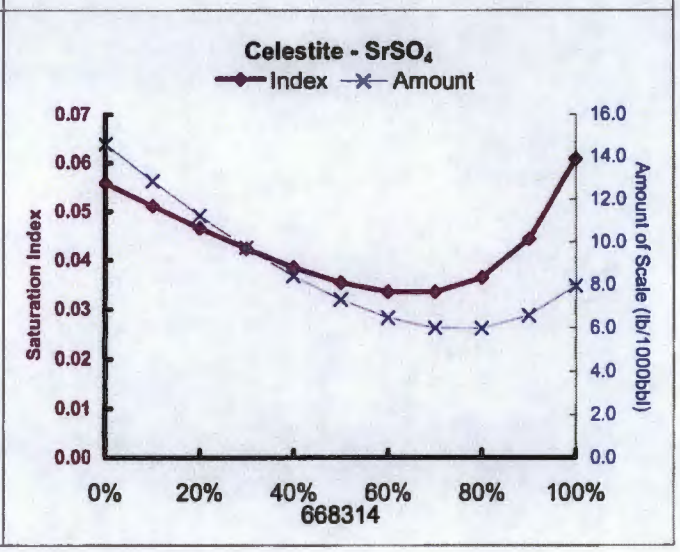












Graphs of Mixes of 668314 and 668315 at 80°F and 0 psi from Baker Petrolite

Individual Water Analyses

Summary of Mixing Waters		
Sample Number	***668314***	***668315***
Company	CHEVRON MID CONTINENTY LP	CHEVRON MID CONTINENTY LP
Lease	EASLEY UNIT	S.V. CHIPSHOT
Well	1-6	2
Sample Location	PRODUCTION	PRODUCTION HEATER
Anions (mg/L)		
Chloride	26,375	87,544
Bicarbonate	159	390
Sulfate	897	1,077
Cations (mg/L)		
Sodium	14,657	50,138
Magnesium	238	997
Calcium	798	5,337
Strontium	93.0	218
Barium	0.20	0.70
Iron	14.0	8.00
Potassium	193	673
Manganese	0.10	1.50
Anion/Cation Ratio	***1.09***	***0.98***
TDS (mg/L)	43,424	146,384
Density (g/cm)	1.03	1.11
Sampling Date	5/6/14	5/6/14
Account Manager	TIM GRAY	TIM GRAY
Analyst	SANDRA SANCHEZ	SANDRA SANCHEZ
Analysis Date	5/13/14	5/13/14
pH at time of sampling	6.25	6.56
pH used in Calculations	**6.25**	**6.56**

Mixed Water Analysis Report

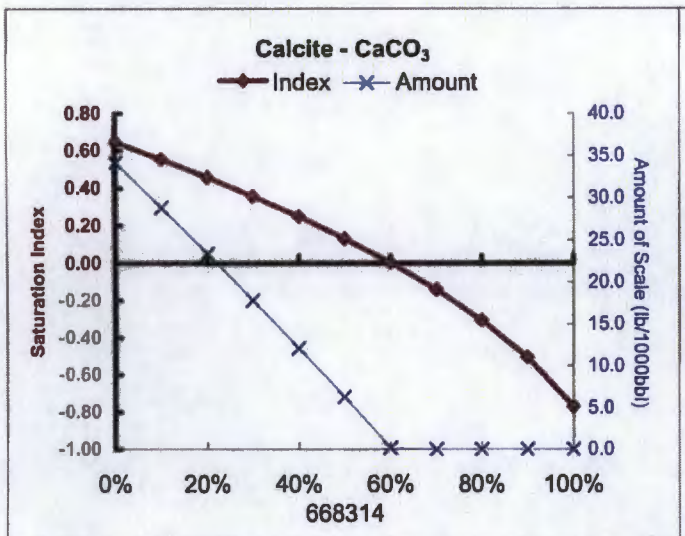
Mixes at 100°F and 0 psi

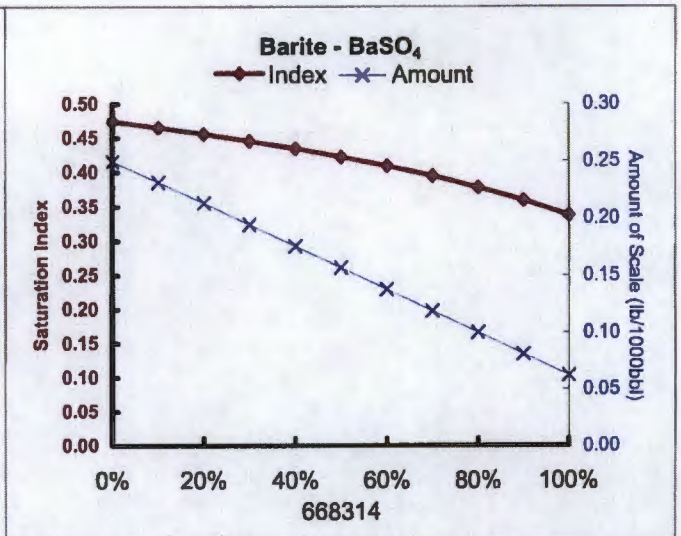
Mixes of 668314 and 668315.		Predictions of Saturation Index and Amount of Scale in lb/1000bbl										CO_2 Fugacity
		Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		
668314	668315	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
100%		-0.77		-0.83		-0.82		0.06	7.36	0.34	0.06	1.06
90%	10%	-0.50		-0.71		-0.69		0.04	5.53	0.36	0.08	1.06
80%	20%	-0.30		-0.64		-0.61		0.03	4.46	0.38	0.10	1.05
70%	30%	-0.14		-0.58		-0.55		0.02	3.97	0.39	0.12	1.05
60%	40%	0.00	0.2	-0.54		-0.50		0.02	3.93	0.41	0.14	1.04
50%	50%	0.13	6.3	-0.50		-0.46		0.02	4.24	0.42	0.16	1.03
40%	60%	0.25	12.1	-0.46		-0.42		0.02	4.84	0.43	0.18	1.02
30%	70%	0.36	17.8	-0.43		-0.38		0.02	5.67	0.45	0.19	1.01
20%	80%	0.46	23.4	-0.40		-0.35		0.03	6.68	0.46	0.21	0.99
10%	90%	0.56	28.8	-0.37		-0.31		0.03	7.83	0.47	0.23	0.98
	100%	0.65	34.2	-0.35		-0.28		0.03	9.11	0.47	0.25	0.96

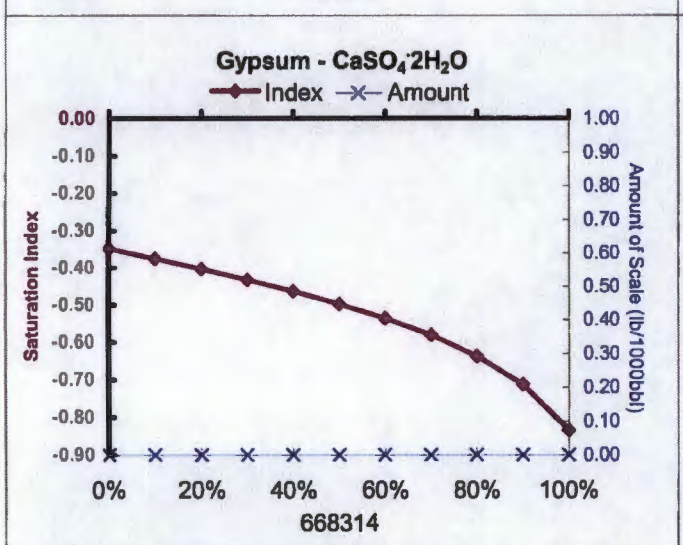
Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.
The CO_2 fugacity is calculated. Under usual conditions it is essentially the same as the CO_2 partial pressure.

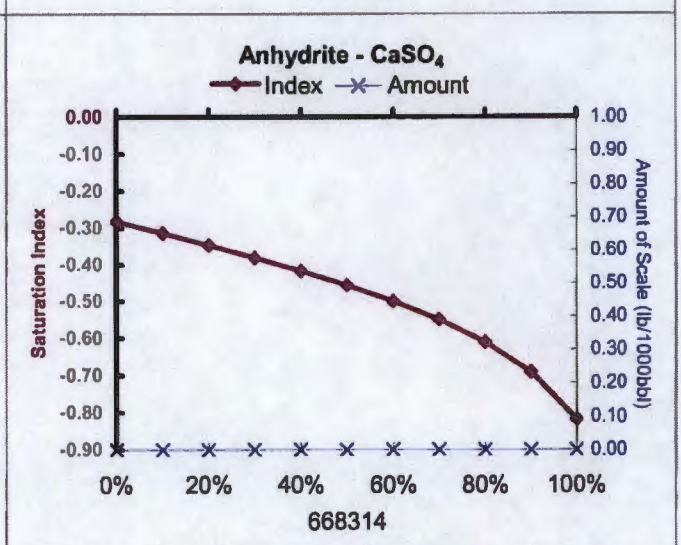
Mixture Predictions

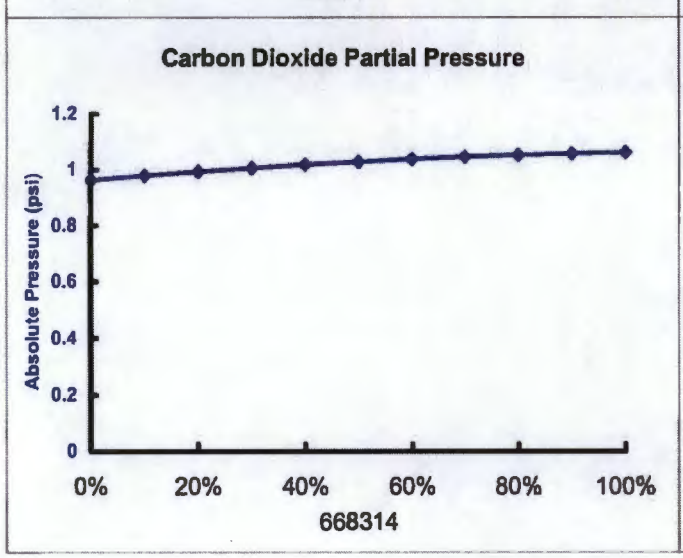
Mixes of 668314 and 668315 at 100°F and 0 psi

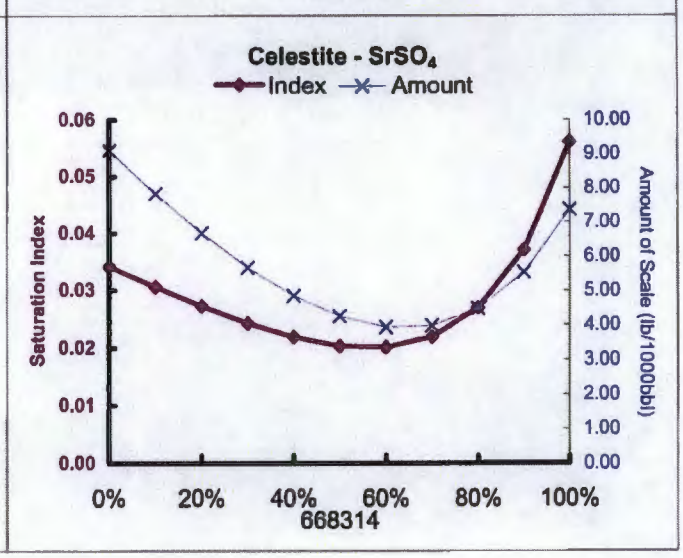












Graphs of Mixes of 668314 and 668315 at 100°F and 0 psi from Baker Petrolite

Mixed Water Analysis Report

Mixes at 120°F and 0 psi

Mixes of 668314 and 668315.		Predictions of Saturation Index and Amount of Scale in lb/1000bbl										CO_2 Fugacity
		Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		
668314	668315	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
100%		-0.64		-0.85		-0.76		0.06	8.09	0.19	0.04	1.31
90%	10%	-0.38		-0.74		-0.64		0.04	6.02	0.21	0.06	1.30
80%	20%	-0.19		-0.67		-0.56		0.03	4.66	0.23	0.07	1.29
70%	30%	-0.03		-0.61		-0.50		0.02	3.84	0.24	0.08	1.28
60%	40%	0.11	5.3	-0.57		-0.45		0.02	3.45	0.25	0.10	1.27
50%	50%	0.24	11.4	-0.54		-0.41		0.02	3.40	0.26	0.11	1.26
40%	60%	0.35	17.2	-0.50		-0.38		0.02	3.63	0.27	0.13	1.24
30%	70%	0.46	22.9	-0.48		-0.34		0.02	4.09	0.28	0.14	1.23
20%	80%	0.55	28.5	-0.45		-0.31		0.02	4.74	0.29	0.16	1.21
10%	90%	0.65	33.9	-0.42		-0.28		0.02	5.55	0.30	0.17	1.19
	100%	0.73	39.2	-0.40		-0.25		0.02	6.48	0.31	0.19	1.18

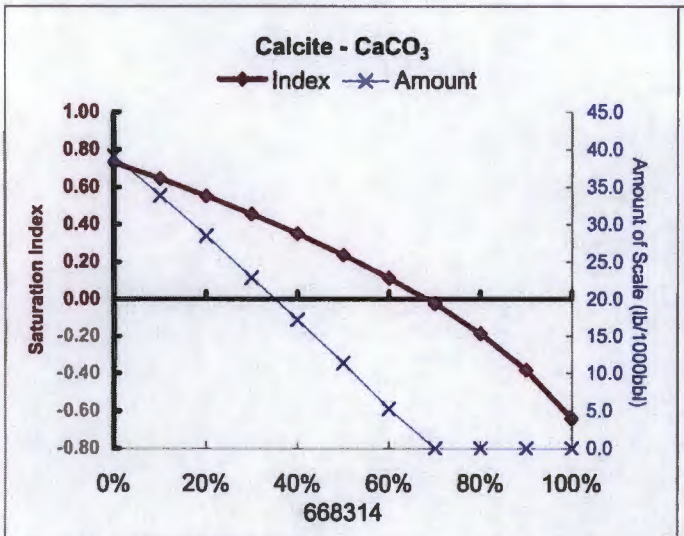
Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.

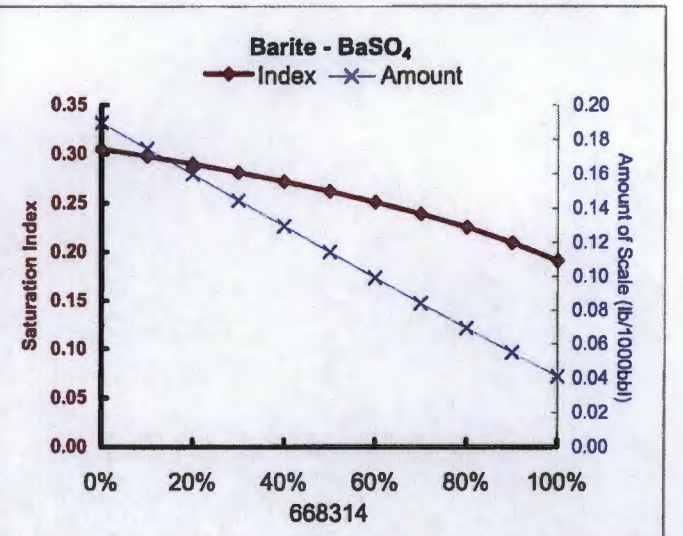
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.

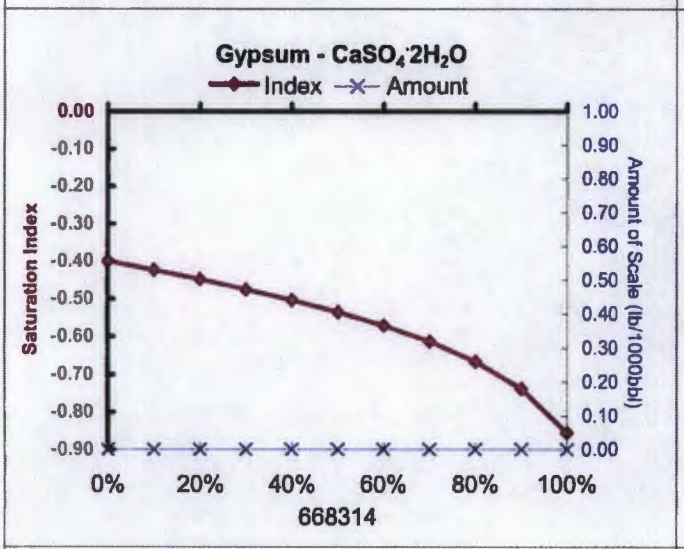
The CO_2 fugacity is calculated. Under usual conditions it is essentially the same as the CO_2 partial pressure.

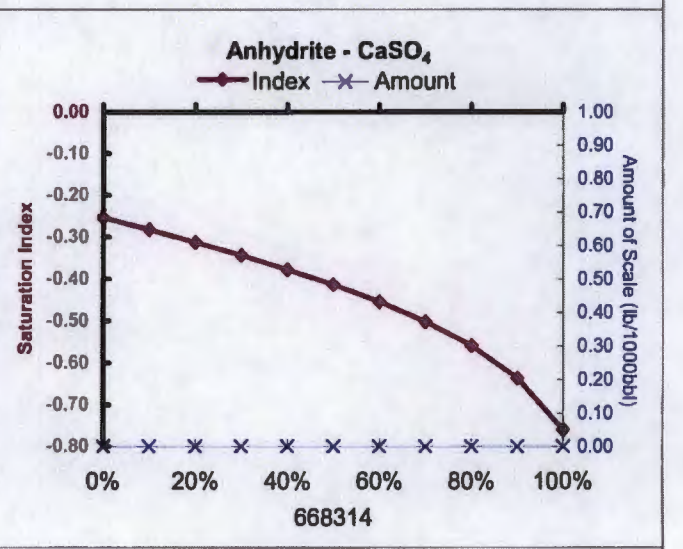
Mixture Predictions

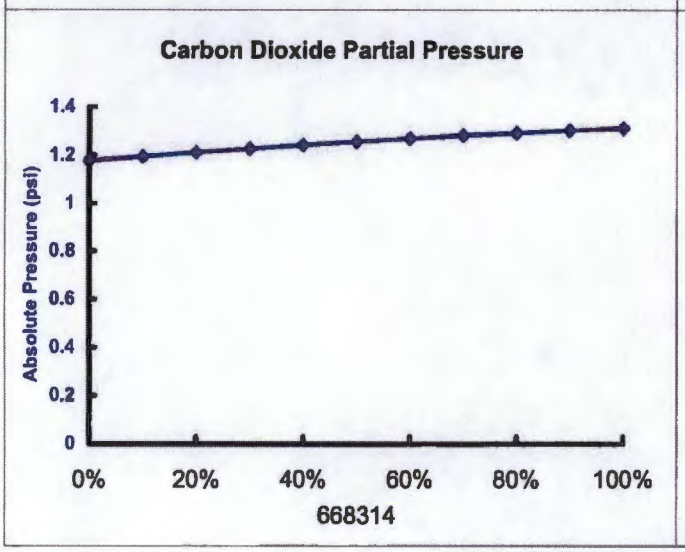
Mixes of 668314 and 668315 at 120°F and 0 psi

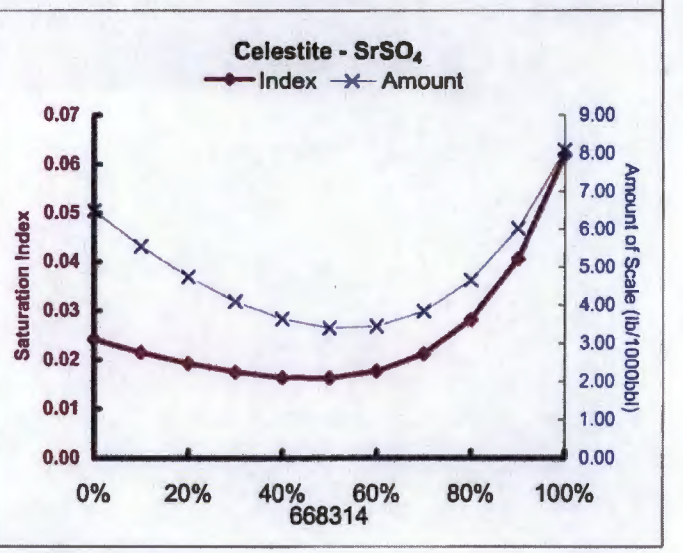












Mixed Water Analysis Report

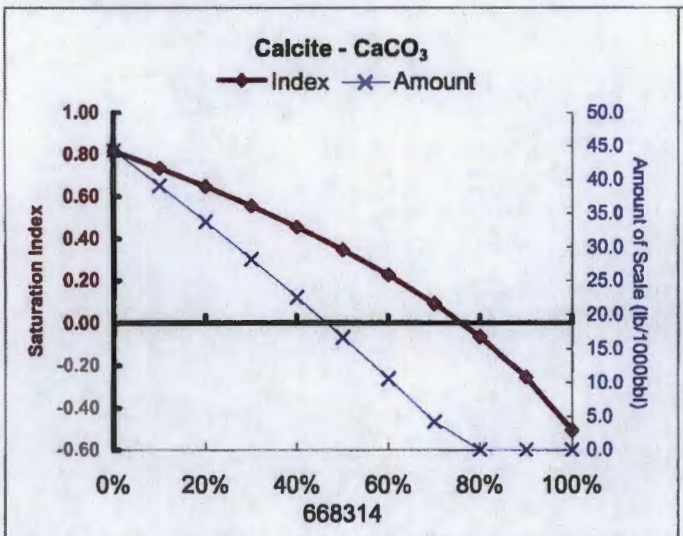
Mixes at 140°F and 0 psi

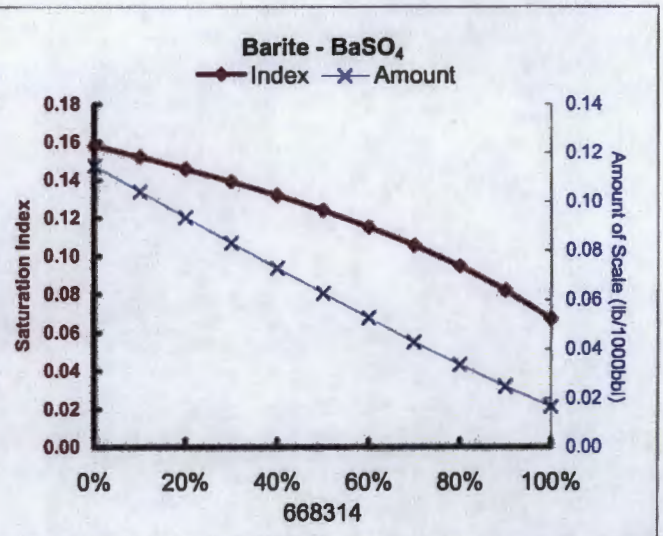
Mixes of 668314 and 668315.		Predictions of Saturation Index and Amount of Scale in lb/1000bbl										CO_2 Fugacity
		Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		
668314	668315	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
100%		-0.51		-0.87		-0.68		0.08	9.84	0.07	0.02	1.57
90%	10%	-0.25		-0.75		-0.56		0.05	7.72	0.08	0.02	1.55
80%	20%	-0.06		-0.68		-0.49		0.04	6.24	0.09	0.03	1.54
70%	30%	0.09	4.2	-0.63		-0.43		0.03	5.25	0.11	0.04	1.52
60%	40%	0.23	10.6	-0.60		-0.39		0.02	4.65	0.12	0.05	1.51
50%	50%	0.35	16.7	-0.56		-0.35		0.02	4.38	0.12	0.06	1.49
40%	60%	0.46	22.6	-0.53		-0.32		0.02	4.38	0.13	0.07	1.47
30%	70%	0.56	28.2	-0.51		-0.29		0.02	4.61	0.14	0.08	1.46
20%	80%	0.65	33.7	-0.48		-0.26		0.02	5.02	0.15	0.09	1.44
10%	90%	0.74	39.1	-0.46		-0.23		0.02	5.59	0.15	0.10	1.42
	100%	0.82	44.4	-0.44		-0.20		0.02	6.30	0.16	0.11	1.40

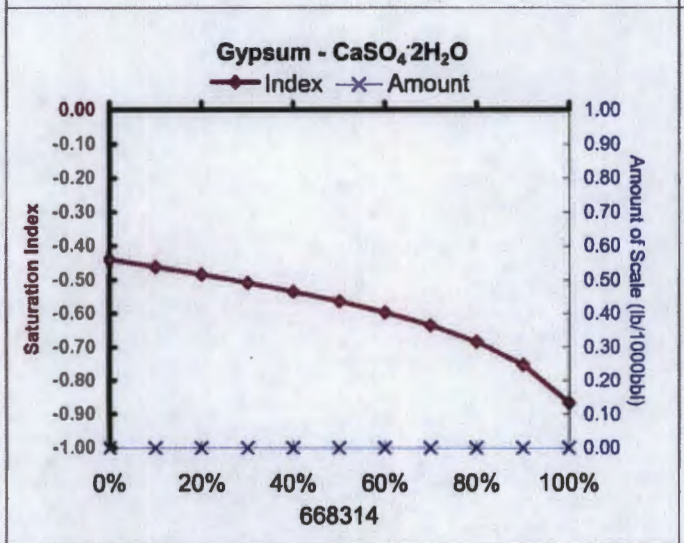
Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.
The CO_2 fugacity is calculated. Under usual conditions it is essentially the same as the CO_2 partial pressure

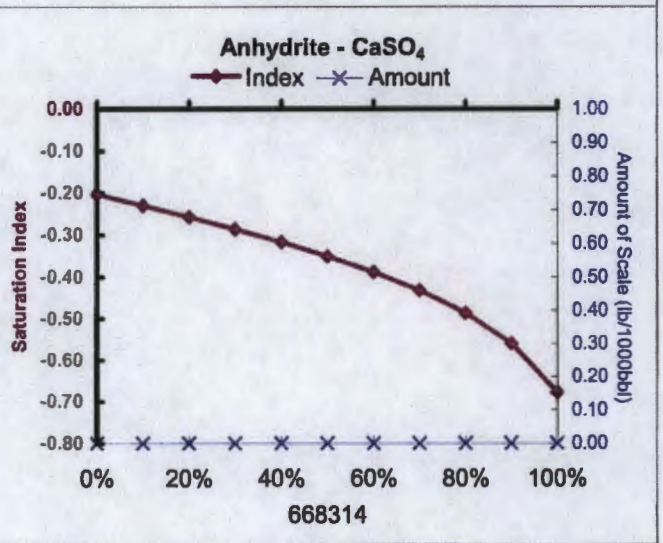
Mixture Predictions

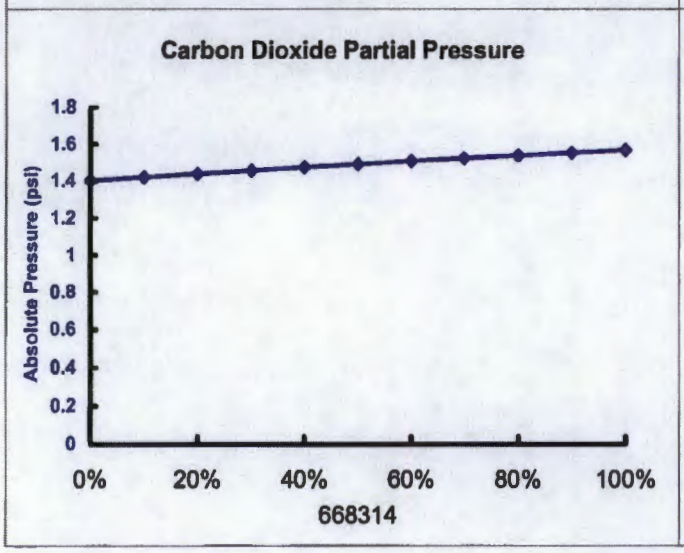
Mixes of 668314 and 668315 at 140°F and 0 psi

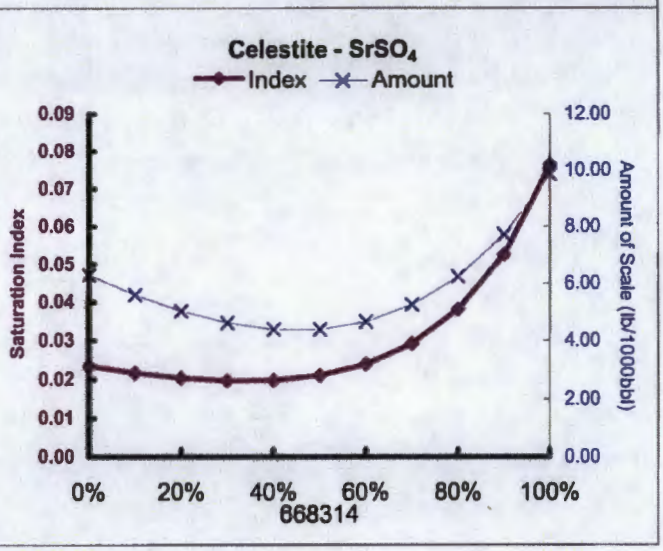












Graphs of Mixes of 668314 and 668315 at 140°F and 0 psi from Baker Petrolite

Water Analysis Report

Baker Petrolite

CHEVRON MID CONTINENTY LP
EASLEY UNIT
1-6
PRODUCTION

Account Manager
TIM GRAY

Summary of Entered Data		Sample 668314 @ 75°F					
Sampling Date	5/6/14	**Anions**	**mg/l**	**meq/l**	**Cations**	**mg/l**	**meq/l**
Analysis Date	5/13/14	**Chloride**	**26,375**	**744**	**Sodium**	**14,657**	**638**
Analyst	SANDRA SANCHEZ	**Bicarbonate**	**159**	**2.60**	**Magnesium**	**238**	**19.6**
		Carbonate	**0.00**	**0.00**	**Calcium**	**798**	**39.8**
TDS (mg/l or g/m³)	43,424	**Sulfate**	**897**	**18.7**	**Strontium**	**93.0**	**2.12**
Density (g/cm³ or tonne/m³)	1.0340	Phosphate	N/A	N/A	**Barium**	**0.20**	**0.00**
Anion/Cation Ratio	1.09	Borate	N/A	N/A	**Iron**	**14.0**	**0.50**
		Silicate	N/A	N/A	**Potassium**	**193**	**4.94**
Carbon Dioxide	30 PPM				Aluminum	N/A	N/A
		Hydrogen Sulfide		17 PPM	Chromium	N/A	N/A
					Copper	N/A	N/A
TEMPERATURE 77°F		pH at time of sampling		6.25	Lead	N/A	N/A
		pH at time of analysis			**Manganese**	**0.10**	**0.00**
		pH used in Calculations		**6.25**	Nickel	N/A	N/A

Specific ion interactions calculated for ions in bold faced type; other ions contribute to ionic strength.

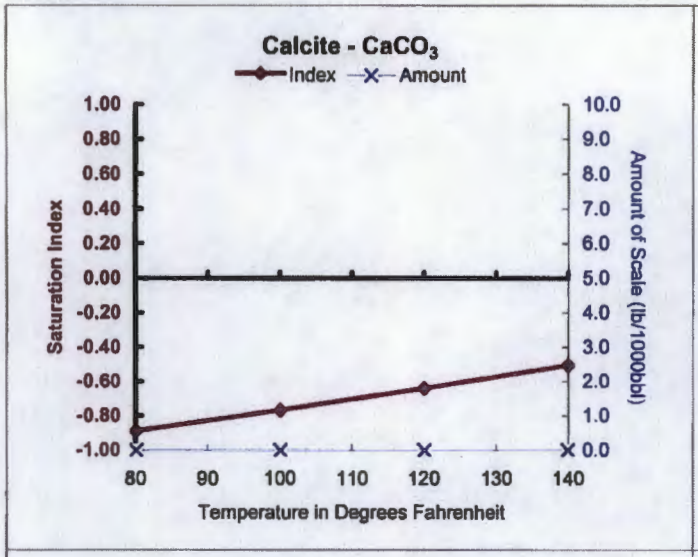
Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000bbl										CO_2
Temp.	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		Fugacity
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0.00	-0.89		-0.80		-0.85		0.06	7.99	0.51	0.08	0.83
100	0.00	-0.77		-0.83		-0.82		0.06	7.43	0.34	0.06	1.06
120	0.00	-0.64		-0.85		-0.76		0.06	8.17	0.19	0.04	1.31
140	0.00	-0.51		-0.87		-0.68		0.08	9.93	0.07	0.02	1.57

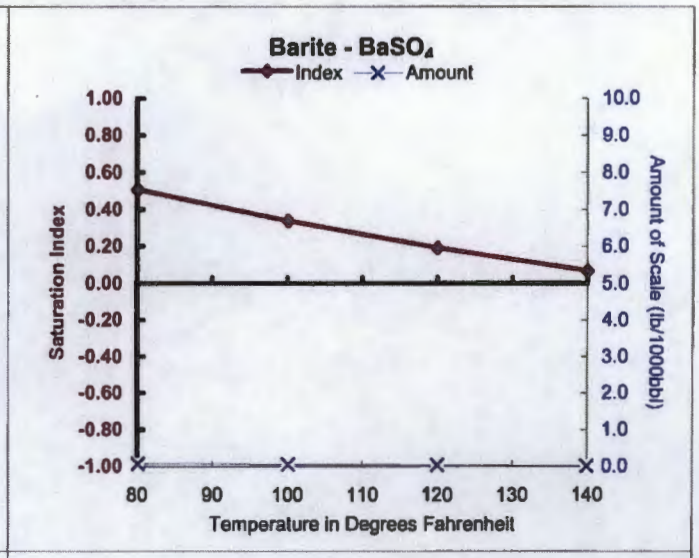
Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.
The CO_2 fugacity is reported. Under usual conditions it is essentially the same as the CO_2 partial pressure

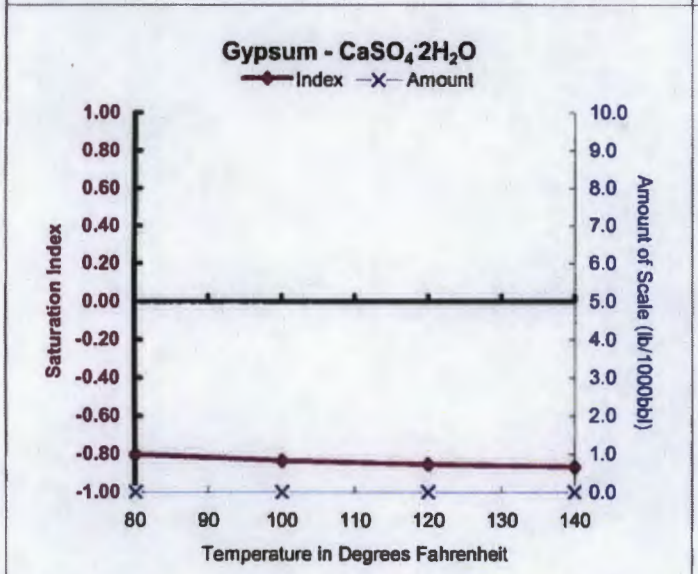
Scale Predictions

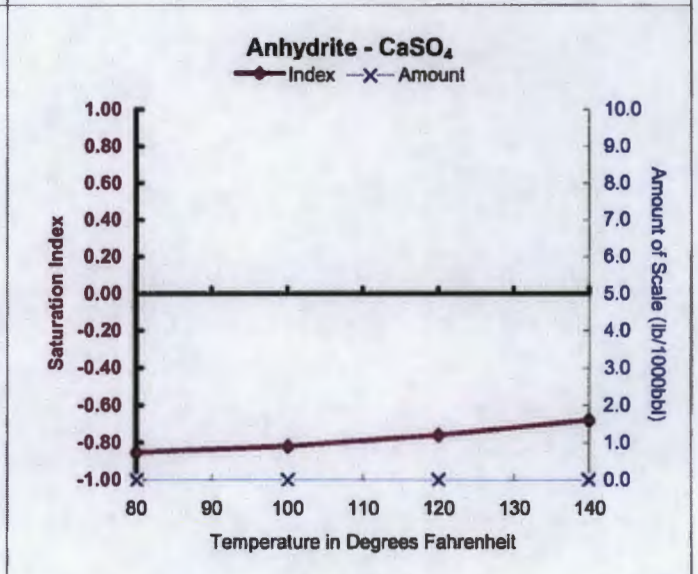
For Sample 668314 @ 75°F from CHEVRON MID CONTINENTY LP , EASLEY UNIT , 1-6 , PRODUCTION , May/13/14

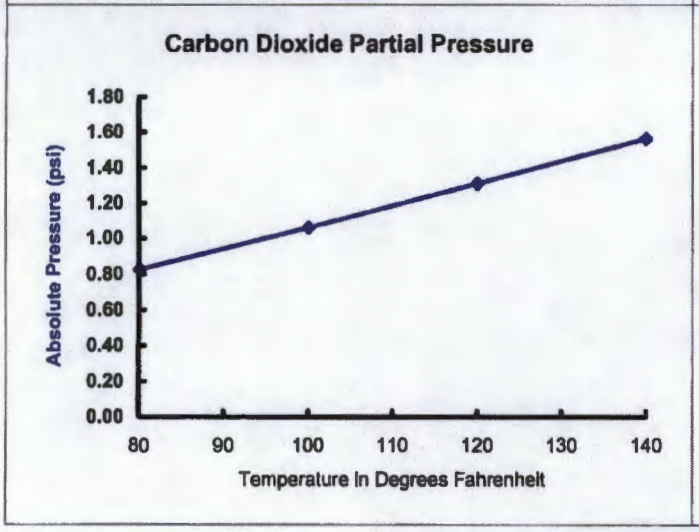
Baker Petrolite

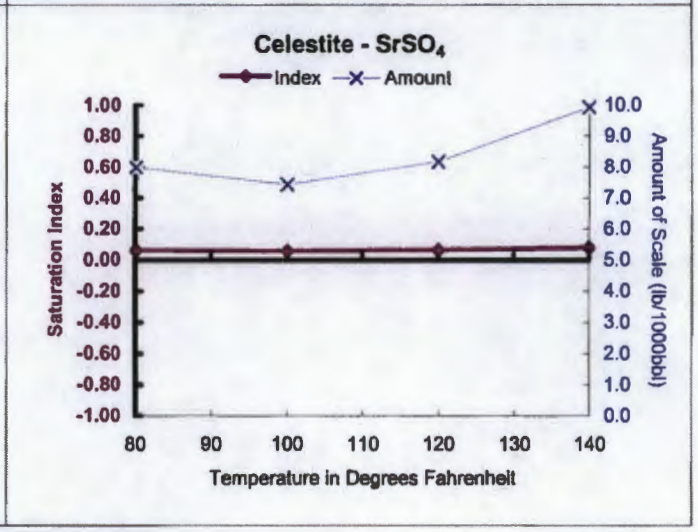












Water Analysis Report

Baker Petrolite

CHEVRON MID CONTINENTY LP
S.V. CHIPSHOT
2
PRODUCTION HEATER

Account Manager
TIM GRAY

Summary of Entered Data		Sample 668315 @ 75°F					
Sampling Date	5/6/14	**Anions**	**mg/l**	**meq/l**	**Cations**	**mg/l**	**meq/l**
Analysis Date	5/13/14	**Chloride**	**87,544**	**2,469**	**Sodium**	**50,138**	**2,181**
Analyst	SANDRA SANCHEZ	**Bicarbonate**	**390**	**6.39**	**Magnesium**	**997**	**82.0**
		Carbonate	**0.00**	**0.00**	**Calcium**	**5,337**	**266**
TDS (mg/l or g/m³)	146,384	**Sulfate**	**1,077**	**22.4**	**Strontium**	**218**	**4.98**
Density (g/cm³ or tonne/m³)	1.1070	Phosphate	N/A	N/A	**Barium**	**0.70**	**0.01**
Anion/Cation Ratio	0.98	Borate	N/A	N/A	**Iron**	**8.00**	**0.29**
		Silicate	N/A	N/A	**Potassium**	**673**	**17.2**
Carbon Dioxide	20 PPM				Aluminum	N/A	N/A
		Hydrogen Sulfide		0 PPM	Chromium	N/A	N/A
					Copper	N/A	N/A
TEMPERATURE 77°F		pH at time of sampling		6.56	Lead	N/A	N/A
		pH at time of analysis			**Manganese**	**1.50**	**0.05**
		pH used in Calculations		**6.56**	Nickel	N/A	N/A

Specific ion interactions calculated for ions in bold faced type; other ions contribute to ionic strength.

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000bbl											
Temp.	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Fugacity	
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi	
80	0.00	0.56	29.3	-0.29		-0.29		0.06	14.6	0.67	0.30	0.77	
100	0.00	0.65	34.2	-0.35		-0.28		0.03	9.1	0.47	0.25	0.96	
120	0.00	0.73	39.3	-0.40		-0.25		0.02	6.5	0.31	0.19	1.18	
140	0.00	0.82	44.5	-0.44		-0.20		0.02	6.3	0.16	0.12	1.40	

Precipitation of each scale is considered separately; total scale will be less than the sum of the amounts of the five scales.
The amount of scale indicates the severity of the problem; the index (equivalent to Stiff Davis SI) indicates how difficult it is to control the problem.
The CO_2 fugacity is reported. Under usual conditions it is essentially the same as the CO_2 partial pressure

Scale Predictions

For Sample 668315 @ 75°F from CHEVRON MID CONTINENTY LP , S.V. CHIPSHOT , 2 , PRODUCTION HEATER , May/13/14

Baker Petrolite