

DATE IN 09/06/13	SUSPENSE	ENGINEER PRG	LOGGED IN 09/10/13	TYPE SWD	APPROV NO PPRG1326955869
------------------	----------	--------------	--------------------	----------	--------------------------

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
 - Engineering Bureau -
 1220 South St. Francis Drive, Santa Fe, NM 87505



SWD-971-B

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
 [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
 [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
 [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
 [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
 [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication
☐ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☒ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify Amend Administrative Order SWD-971-A

Amendment SWD
 Minor Mod

Salty Dog #5
 30-045-32900

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or ☐ Does Not Apply

- [A] ☐ Working, Royalty or Overriding Royalty Interest Owners
 [B] ☐ Offset Operators, Leaseholders or Surface Owner
 [C] ☐ Application is One Which Requires Published Legal Notice
 [D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
 [E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or.
 [F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

BRIAN BENTSON
 Print or Type Name

[Signature]
 Signature

PRODUCTION ENGINEER
 Title

9/6/2013
 Date

brian.bentson@xtoenergy.com
 e-mail Address



A Subsidiary of ExxonMobil

382 CR 3100 Aztec, NM 87410
(505)333-3100 FAX: (505)333-3280

September 5, 2013

Mr. Phillip Goetze
New Mexico Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, NM 87505

Subject: Request to amend the current SWD Order (SWD-971-A)
Salty Dog #5
Sec 16, T29N, R14W
San Juan County, NM

Dear Mr. Goetze:

XTO Energy Inc. requests modifications to the previously approved Administrative Order SWD-971-A dated February 8, 2006. XTO requests the allowable zones and wells for disposal be updated to include all produced water from XTO operated wells completed in the Fruitland Coal, Pictured Cliffs, and Mancos formations.

Fruitland Coal, Pictured Cliffs Formations with Salty Dog #5

Produced water from other XTO operated wells in the Fruitland Coal and Pictured Cliffs formations show similar water chemistry to the current disposal water in the Salty Dog #5. The analysis of the produced water mixture is attached as the "Salty Dog #5 DownHole SAT Water Analysis Report". This mixture contains both produced water from the Fruitland Coal and Pictured Cliffs formations that is being disposed of at the Salty Dog #5 as well as samples from other XTO operated wells completed in the Fruitland Coal and Pictured Cliffs formations. The report shows no major adverse effects of adding additional produced water from XTO operated wells in the Fruitland Coal and Pictured Cliffs formations. Due to the moderate level of calcium and bicarbonate in the mixture, there will be a slight tendency to precipitate calcium carbonate scale. However, this tendency is acceptable and can easily be managed.

Mancos with Salty Dog #5

A sample was also taken from a well producing from the Mancos formation and combined with the produced water currently being disposed of at the Salty Dog #5. The analysis of the produced water mixture is attached as the "Salty Dog #5 & XTO Meadows DownHole SAT Water Analysis Report. Due to the low concentrations of calcium and bicarbonate in the Mancos water sample, the Mancos formation will actually clean up the mixture currently going into the Salty Dog SWD #5. This is shown by the Langelier Saturation Index which shows that the mixture of Mancos, Pictured Cliffs and Fruitland Coal formation waters would be undersaturated at reservoir temperature. This will improve the scaling tendencies for produced water being disposed of in the Salty Dog #5.

Salty Dog #5 Capacity

The Salty Dog #5 has an average injection pressure of 1,620 psig and an average injection volume of 2,264 BWPD. A data table showing daily injection volumes and pressures show that the Salty Dog #5 can withstand an increase in injection volume without increasing the injection pressure beyond our limit of 2,000 psig. On September 1st, 2013 the Salty Dog #5 disposed of only 2,201 bbls at an average injection pressure of 1,699 psig. The previous day (August 31st, 2013) the Salty Dog #5 disposed of 4,181 bbls and saw an average injection pressure of 1,687 psig. This shows that the Salty Dog #5 is capable of accepting the additional water volumes XTO plans on disposing of without exceeding any requirements under the current order.

Sincerely,

Brian Bentson
Production Engineer
XTO Energy Inc.

Attachments:

Salty Dog #5 DownHole SAT Water Analysis Report

Salty Dog #5 and XTO Meadows DownHole SAT Water Analysis Report

Salty Dog #5 Daily Injection Volumes and Pressures Table

Salty Dog #5 Plot of Daily Injection Volumes and Pressures

cc: Mr. Charlie Perrin - NMOCD

DownHole SAT™ Water Analysis Report



Calculations by the
French Creek Engine

SYSTEM IDENTIFICATION

Salty Dog #5

Sample ID#: 0
ID:

Sample Date: 08-20-2013 at 1534
Report Date: 08-20-2013

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	810.60
Magnesium(as Mg)	298.10
Barium(as Ba)	181.70
Strontium(as Sr)	105.20
Sodium(as Na)	20750
Potassium(as K)	64.24
Iron(as Fe)	26.89
Manganese(as Mn)	0.183
Zinc(as Zn)	1.33

ANIONS

Chloride(as Cl)	33522
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	0.00
Bicarbonate(as HCO ₃)	719.71
Carbonate(as CO ₃)	4.28
Phosphate(as P)	0.00
H ₂ S (as S)	1.00

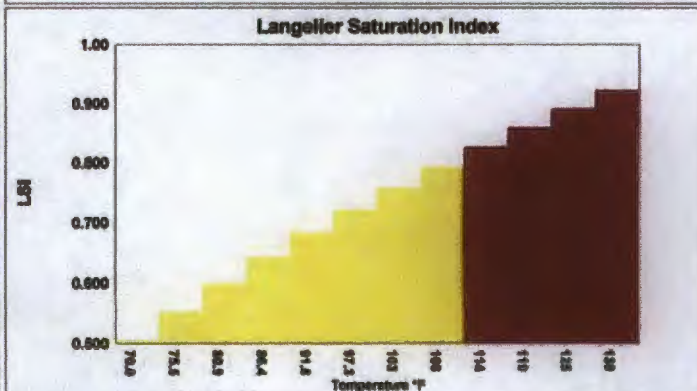
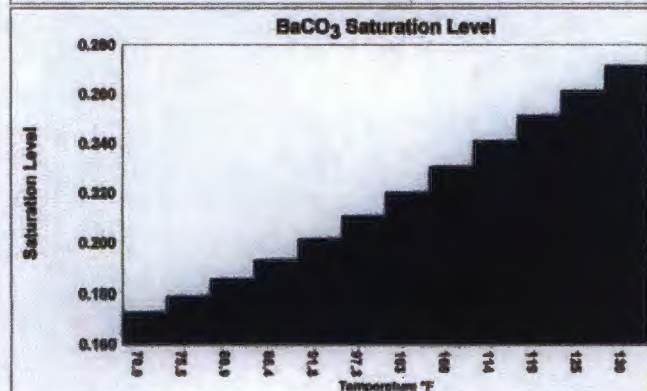
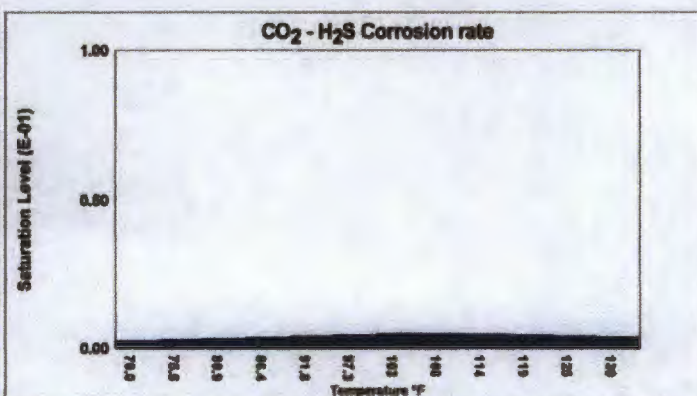
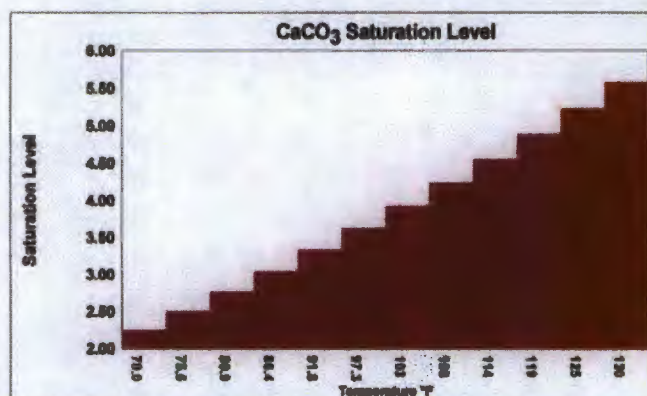
PARAMETERS

Temperature(°F)	77.00
Sample pH	6.88

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (psig)	Calcite CaCO ₃		Anhydrite CaSO ₄		Gypsum CaSO ₄ *2H ₂ O		Barite BaSO ₄		Celestite SrSO ₄		Siderite FeCO ₃		Mackawenite FeS		CO ₂ (mpy)	CO ₂ mole %
70.00	0.00	2.25	0.567	0.00	-3280	0.00	-2722	0.00	-0.569	0.00	-418.89	100.38	1.17	< 0.001	-0.108	0.00262	0.0265
75.45	0.00	2.50	0.655	0.00	-3261	0.00	-2751	0.00	-0.647	0.00	-419.10	116.16	1.25	< 0.001	-0.110	0.00298	0.0265
80.91	0.00	2.76	0.742	0.00	-3229	0.00	-2776	0.00	-0.731	0.00	-418.10	133.53	1.34	< 0.001	-0.112	0.00335	0.0265
86.36	0.00	3.04	0.827	0.00	-3185	0.00	-2796	0.00	-0.821	0.00	-416.17	152.50	1.42	< 0.001	-0.113	0.00372	0.0265
91.82	0.00	3.33	0.910	0.00	-3130	0.00	-2814	0.00	-0.916	0.00	-413.51	173.08	1.50	< 0.001	-0.115	0.00408	0.0265
97.27	0.00	3.62	0.990	0.00	-3064	0.00	-2827	0.00	-1.01	0.00	-410.31	195.22	1.57	< 0.001	-0.117	0.00445	0.0265
102.73	0.00	3.92	1.07	0.00	-2989	0.00	-2837	0.00	-1.12	0.00	-406.70	218.85	1.65	< 0.001	-0.119	0.00481	0.0265
108.18	0.00	4.23	1.14	0.00	-2912	0.00	-2846	0.00	-1.23	0.00	-403.03	244.16	1.72	< 0.001	-0.121	0.00475	0.0265
113.64	0.00	4.55	1.22	0.00	-2839	0.00	-2856	0.00	-1.35	0.00	-399.64	271.55	1.80	< 0.001	-0.124	0.00452	0.0265
119.09	0.00	4.88	1.29	0.00	-2770	0.00	-2867	0.00	-1.48	0.00	-396.52	301.08	1.88	< 0.001	-0.126	0.00428	0.0265
124.55	0.00	5.23	1.37	0.00	-2705	0.00	-2880	0.00	-1.61	0.00	-393.65	332.78	1.95	< 0.001	-0.129	0.00401	0.0265
130.00	0.00	5.58	1.44	0.00	-2644	0.00	-2894	0.00	-1.77	0.00	-391.04	366.64	2.03	< 0.001	-0.131	0.00371	0.0265
		xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L	xSAT	mg/L		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO₃}/K_{sp}. CO₂ (mole %) refers to CO₂ in the gas phase.
mg/L scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.



DownHole SAT™ Water Analysis Report



Calculations by the
French Creek Engine

SYSTEM IDENTIFICATION

1. Salty Dog #5
2. XTO Meadows

Mixed Water Analysis

TDS = 33966

Sample ID#: 0
ID:

Sample Date: 09-04-2013 at 1324
Report Date: 09-04-2013

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	483.50
Magnesium(as Mg)	161.46
Barium(as Ba)	94.01
Strontium(as Sr)	64.29
Sodium(as Na)	12350
Potassium(as K)	47.42
Iron(as Fe)	103.39
Manganese(as Mn)	2.36
Zinc(as Zn)	0.670

ANIONS

Chloride(as Cl)	20018
Bromine(as Br)	0.00
Dissolved CO ₂ (as CO ₂)	0.00
Bicarbonate(as HCO ₃)	535.60
Carbonate(as CO ₃)	0.681
Phosphate(as P)	0.00
H ₂ S (as S)	0.500

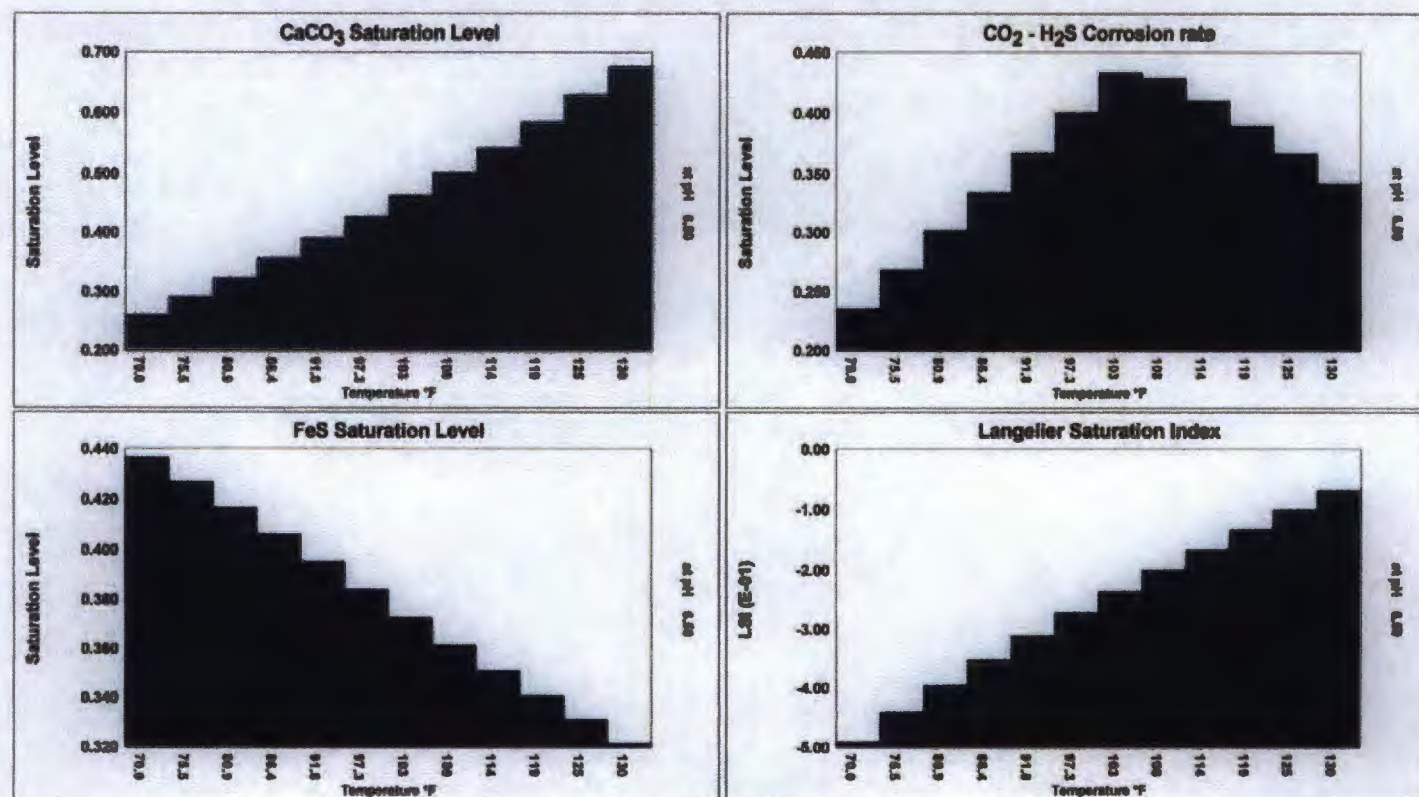
PARAMETERS

Temperature(°F)	77.00
Sample pH	6.24

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (psig)	Calcite CaCO ₃	Anhydrite CaSO ₄	Gypsum CaSO ₄ *2H ₂ O	Barite BaSO ₄	Celestite SrSO ₄	Siderite FeCO ₃	Mackawenite FeS	CO ₂ (mpy)	CO ₂ mole %
70.00	0.00	0.260 -0.489	0.00 -3290	0.00 -2748	0.00 -0.767	0.00 -372.50	85.00 0.197	0.436 -0.0511	0.236	14.70
75.45	0.00	0.291 -0.450	0.00 -3270	0.00 -2773	0.00 -0.871	0.00 -372.43	98.63 0.212	0.427 -0.0527	0.269	14.70
80.91	0.00	0.322 -0.413	0.00 -3238	0.00 -2793	0.00 -0.983	0.00 -371.32	113.67 0.226	0.417 -0.0544	0.302	14.70
86.36	0.00	0.355 -0.378	0.00 -3194	0.00 -2810	0.00 -1.10	0.00 -369.42	130.17 0.240	0.406 -0.0562	0.335	14.70
91.82	0.00	0.391 -0.344	0.00 -3140	0.00 -2823	0.00 -1.23	0.00 -366.89	148.24 0.254	0.395 -0.0581	0.368	14.70
97.27	0.00	0.426 -0.313	0.00 -3076	0.00 -2833	0.00 -1.36	0.00 -363.90	167.72 0.268	0.384 -0.0601	0.401	14.70
102.73	0.00	0.463 -0.282	0.00 -3004	0.00 -2839	0.00 -1.49	0.00 -360.57	188.76 0.281	0.373 -0.0622	0.434	14.70
108.18	0.00	0.502 -0.254	0.00 -2929	0.00 -2845	0.00 -1.63	0.00 -357.17	211.50 0.294	0.361 -0.0644	0.429	14.70
113.64	0.00	0.542 -0.226	0.00 -2858	0.00 -2851	0.00 -1.79	0.00 -354.01	236.35 0.308	0.351 -0.0666	0.410	14.70
119.09	0.00	0.585 -0.199	0.00 -2792	0.00 -2859	0.00 -1.96	0.00 -351.07	263.31 0.322	0.341 -0.0688	0.390	14.70
124.55	0.00	0.629 -0.172	0.00 -2729	0.00 -2868	0.00 -2.14	0.00 -348.35	292.75 0.337	0.331 -0.0711	0.367	14.70
130.00	0.00	0.676 -0.146	0.00 -2669	0.00 -2877	0.00 -2.33	0.00 -345.83	324.67 0.352	0.322 -0.0734	0.343	14.70
		xSAT mg/L	xSAT mg/L	xSAT mg/L	xSAT mg/L	xSAT mg/L	xSAT mg/L	xSAT mg/L		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. {Ca}{CO₃}/K_{sp}. CO₂ (mole %) refers to CO₂ in the gas phase.
mg/L scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.



Salty Dog #5 Injection Volumes Pressures

Date	Injection Volume (bbls)	Injection Pressure (psig)	Date	Injection Volume (bbls)	Injection Pressure (psig)
9/4/2013	1,929.0	1,587.0	7/21/2013	1,749.0	1,661.0
9/3/2013	2,211.0	1,694.0	7/20/2013	2,363.0	1,570.0
9/2/2013	2,136.0	1,699.0	7/19/2013	2,335.0	1,577.0
9/1/2013	2,201.0	1,699.0	7/18/2013	0.0	1,679.0
8/31/2013	4,181.0	1,687.0	7/17/2013	2,932.0	1,691.0
8/30/2013	0.0	1,671.0	7/16/2013	4,711.0	1,688.0
8/29/2013	1,777.0	1,671.0	7/15/2013	2,842.0	1,679.0
8/28/2013	1,456.0	1,654.0	7/14/2013	2,338.0	1,679.0
8/27/2013	1,699.0	1,534.0	7/13/2013	2,412.0	1,577.0
8/26/2013	1,213.0	1,534.0	7/12/2013	2,261.0	1,581.0
8/25/2013	1,811.0	1,665.0	7/11/2013	2,558.0	1,689.0
8/24/2013	3,138.0	1,655.0	7/10/2013	2,557.0	1,691.0
8/23/2013	1,583.0	1,521.0	7/9/2013	2,601.0	1,702.0
8/22/2013	1,317.0	1,521.0	7/8/2013	2,753.0	1,583.0
8/21/2013	1,046.0	1,522.0	7/7/2013	2,580.0	1,579.0
8/20/2013	1,403.0	1,532.0	7/6/2013	4,981.0	1,686.0
8/19/2013	1,581.0	1,645.0	7/5/2013	2,640.0	1,691.0
8/18/2013	1,709.0	1,619.0	7/4/2013	2,584.0	1,690.0
8/17/2013	4,704.0	1,531.0	7/3/2013	2,631.0	1,695.0
8/16/2013	1,548.0	1,533.0	7/2/2013	2,688.0	1,685.0
8/15/2013	1,360.0	1,527.0	7/1/2013	2,464.0	1,573.0
8/14/2013	615.0	1,632.0	6/30/2013	2,595.0	1,580.0
8/13/2013	1,000.0	1,612.0	6/29/2013	4,234.0	1,684.0
8/12/2013	1,611.0	1,629.0	6/28/2013	1,884.0	1,557.0
8/11/2013	1,402.0	1,609.0	6/27/2013	2,877.0	1,584.0
8/10/2013	1,377.0	1,625.0	6/26/2013	2,305.0	1,697.0
8/9/2013	1,729.0	1,625.0	6/25/2013	3,055.0	1,692.0
8/8/2013	3,673.0	1,607.0	6/24/2013	2,730.0	1,583.0
8/7/2013	1,733.0	1,495.0	6/23/2013	2,924.0	1,681.0
8/6/2013	1,190.0	1,500.0	6/22/2013	2,935.0	1,077.0
8/5/2013	2,161.0	1,646.0	6/21/2013	2,480.0	1,555.0
8/4/2013	2,291.0	1,646.0	6/20/2013	1,178.0	1,647.0
8/3/2013	4,183.0	1,532.0	6/19/2013	819.0	1,548.0
8/2/2013	1,859.0	1,647.0	6/18/2013	1,109.0	1,573.0
8/1/2013	1,724.0	1,644.0	6/17/2013	1,480.0	1,586.0
7/31/2013	2,267.0	1,650.0	6/16/2013	2,679.0	1,600.0
7/30/2013	2,436.0	1,542.0	6/15/2013	2,289.0	1,724.0
7/29/2013	2,511.0	1,531.0	6/14/2013	1,959.0	1,727.0
7/28/2013	2,052.0	1,659.0	6/13/2013	3,922.0	1,722.0
7/27/2013	2,437.0	1,656.0	6/12/2013	2,448.0	1,721.0
7/26/2013	2,361.0	1,642.0	6/11/2013	2,392.0	1,621.0
7/25/2013	1,285.0	1,499.0	6/10/2013	2,845.0	1,619.0
7/24/2013	1,140.0	1,506.0	6/9/2013	3,315.0	1,724.0
7/23/2013	1,878.0	1,658.0	6/8/2013	3,046.0	1,621.0
7/22/2013	1,884.0	1,552.0	6/7/2013	3,424.0	1,735.0
			6/6/2013	3,075.0	1,726.0
			6/5/2013	2,565.0	1,726.0

Salty Dog #5 Injection Pressures & Volumes

