

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31325**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/08/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	50	mg/L
Oxygen	4	ppb
pH	8.77	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	280.6	mg/L
Carbonate	588	mg/L
Conductivity (Calculated)	1147	µS - cm3
Ionic Strength	0.01	
Resistivity	8.718	ohms - m
Specific Gravity	1.0001	
Total Dissolved Solids	744.106	mg/L

Cations	Result	Unit
Iron	9.98	mg/L
Manganese	0.196	mg/L
Barium	0.26	mg/L
Strontium	0.48	mg/L
Calcium	23.55	mg/L
Magnesium	11.55	mg/L
Sodium	19.49	mg/L
Potassium	1.79	mg/L
Boron	0.16	mg/L
Lithium	0.11	mg/L
Zinc	0.83	mg/L
Lead	<	mg/L
Silicon	2.80	mg/L
Aluminum	0.20	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	268	mg/L
Fluoride	71	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	130	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.11
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.71
Calcite CaCO3 PTB	16.9
Calcite CaCO3 SI	0.84
Celestite SrSO4 SI	-2.18
Gypsum CaSO4 SI	-2.72
Hemihydrate CaSO4 SI	-2.43

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Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31326**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/08/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	Inteference	mg/L
Oxygen	8	ppb
pH	8.88	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	341.6	mg/L
Carbonate	744	mg/L
Conductivity (Calculated)	1256	µS - cm3
Ionic Strength	0.01	
Resistivity	7.962	ohms - m
Specific Gravity	1.0002	
Total Dissolved Solids	902.244	mg/L

Cations	Result	Unit
Iron	96.96	mg/L
Manganese	1.364	mg/L
Barium	0.38	mg/L
Strontium	0.49	mg/L
Calcium	28.10	mg/L
Magnesium	10.53	mg/L
Sodium	40.82	mg/L
Potassium	2.00	mg/L
Boron	0.23	mg/L
Lithium	0.62	mg/L
Zinc	1.13	mg/L
Lead	0.09	mg/L
Silicon	3.04	mg/L
Aluminum	0.37	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	280	mg/L
Fluoride	68	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	102	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.13
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.78
Calcite CaCO3 PTB	22.2
Calcite CaCO3 SI	1.11
Celestite SrSO4 SI	-2.27
Gypsum CaSO4 SI	-2.75
Hemihydrate CaSO4 SI	-2.45

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Saturation Index Calculation (Tomson-Oddo Model)
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System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	3.5	mg/L
Oxygen	10	ppb
pH	7.94	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	366	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	4463	µS - cm3
Ionic Strength	0.05	
Resistivity	2.241	ohms - m
Specific Gravity	1.0019	
Total Dissolved Solids	2926.155	mg/L

Cations	Result	Unit
Iron	68.34	mg/L
Manganese	1.435	mg/L
Barium	2.09	mg/L
Strontium	5.94	mg/L
Calcium	69.68	mg/L
Magnesium	12.33	mg/L
Sodium	989.34	mg/L
Potassium	15.57	mg/L
Boron	1.82	mg/L
Lithium	0.82	mg/L
Zinc	0.64	mg/L
Lead	<	mg/L
Silicon	3.53	mg/L
Aluminum	0.24	mg/L

Anions	Result	Unit
Bromide	21	mg/L
Chloride	1366	mg/L
Fluoride	6	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	45	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.18
Barite BaSO4 PTB	1.1
Barite BaSO4 SI	0.97
Calcite CaCO3 PTB	30.0
Calcite CaCO3 SI	0.43
Celestite SrSO4 SI	-1.68
Gypsum CaSO4 SI	-2.79
Hemihydrate CaSO4 SI	-2.53

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Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31328**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	0.5	mg/L
Oxygen	3	ppb
pH	7.5	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	536	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5254	µS - cm3
Ionic Strength	0.06	
Resistivity	1.903	ohms - m
Specific Gravity	1.0021	
Total Dissolved Solids	3374.063	mg/L

Cations	Result	Unit
Iron	10.73	mg/L
Manganese	0.783	mg/L
Barium	1.45	mg/L
Strontium	6.03	mg/L
Calcium	68.74	mg/L
Magnesium	12.63	mg/L
Sodium	1115.70	mg/L
Potassium	16.93	mg/L
Boron	1.97	mg/L
Lithium	0.83	mg/L
Zinc	0.56	mg/L
Lead	<	mg/L
Silicon	1.53	mg/L
Aluminum	0.07	mg/L

Anions	Result	Unit
Bromide	25	mg/L
Chloride	1577	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	45	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.20
Barite BaSO4 PTB	0.7
Barite BaSO4 SI	0.77
Calcite CaCO3 PTB	9.4
Calcite CaCO3 SI	0.10
Celestite SrSO4 SI	-1.71
Gypsum CaSO4 SI	-2.82
Hemihydrate CaSO4 SI	-2.56

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
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Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	2	mg/L
Oxygen	12	ppb
pH	7.42	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	512.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5294	µS - cm3
Ionic Strength	0.06	
Resistivity	1.889	ohms - m
Specific Gravity	1.0018	
Total Dissolved Solids	3981.256	mg/L

Cations	Result	Unit
Iron	587.10	mg/L
Manganese	5.796	mg/L
Barium	2.91	mg/L
Strontium	6.21	mg/L
Calcium	72.20	mg/L
Magnesium	12.66	mg/L
Sodium	1138.98	mg/L
Potassium	16.71	mg/L
Boron	2.06	mg/L
Lithium	0.81	mg/L
Zinc	1.70	mg/L
Lead	0.07	mg/L
Silicon	7.40	mg/L
Aluminum	0.89	mg/L

Anions	Result	Unit
Bromide	25	mg/L
Chloride	1597	mg/L
Fluoride	3	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	46	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.17
Barite BaSO4 PTB	1.6
Barite BaSO4 SI	1.08
Calcite CaCO3 PTB	3.0
Calcite CaCO3 SI	0.03
Celestite SrSO4 SI	-1.69
Gypsum CaSO4 SI	-2.79
Hemihydrate CaSO4 SI	-2.54

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System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31330**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.43	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	414.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5134	µS - cm3
Ionic Strength	0.06	
Resistivity	1.948	ohms - m
Specific Gravity	1.0020	
Total Dissolved Solids	3460.536	mg/L

Cations	Result	Unit
Iron	172.66	mg/L
Manganese	2.166	mg/L
Barium	2.39	mg/L
Strontium	6.51	mg/L
Calcium	69.60	mg/L
Magnesium	12.39	mg/L
Sodium	1168.02	mg/L
Potassium	17.33	mg/L
Boron	2.12	mg/L
Lithium	0.84	mg/L
Zinc	0.66	mg/L
Lead	0.08	mg/L
Silicon	4.14	mg/L
Aluminum	0.44	mg/L

Anions	Result	Unit
Bromide	25	mg/L
Chloride	1568	mg/L
Fluoride	5	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	44	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	1.3
Barite BaSO4 SI	1.02
Calcite CaCO3 SI	-0.03
Celestite SrSO4 SI	-1.65
Gypsum CaSO4 SI	-2.80
Hemihydrate CaSO4 SI	-2.54

Saturation Index Calculation (Tomson-Oddo Model)

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Attention: **Sidney.shuck@nalco.com**

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Sample ID: **AJ31331**

Login Batch: **2017-09-07-001**

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Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.49	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	292.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	4944	µS - cm3
Ionic Strength	0.06	
Resistivity	2.023	ohms - m
Specific Gravity	1.0023	
Total Dissolved Solids	3370.229	mg/L

Cations	Result	Unit
Iron	203.58	mg/L
Manganese	2.429	mg/L
Barium	2.72	mg/L
Strontium	7.24	mg/L
Calcium	75.81	mg/L
Magnesium	13.06	mg/L
Sodium	1167.59	mg/L
Potassium	17.37	mg/L
Boron	2.24	mg/L
Lithium	0.84	mg/L
Zinc	0.35	mg/L
Lead	<	mg/L
Silicon	5.56	mg/L
Aluminum	0.96	mg/L

Anions	Result	Unit
Bromide	24	mg/L
Chloride	1564	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	41	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.18
Barite BaSO4 PTB	1.4
Barite BaSO4 SI	1.04
Calcite CaCO3 SI	-0.08
Celestite SrSO4 SI	-1.64
Gypsum CaSO4 SI	-2.80
Hemihydrate CaSO4 SI	-2.54

Saturation Index Calculation (Tomson-Oddo Model)

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Sample ID: **AJ31332**

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Receive Date: **09/07/2017**

Report Date: **09/08/2017**

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1.5	mg/L
Oxygen	5	ppb
pH	7.42	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	402.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5157	µS - cm3
Ionic Strength	0.06	
Resistivity	1.939	ohms - m
Specific Gravity	1.0020	
Total Dissolved Solids	3504.273	mg/L

Cations	Result	Unit
Iron	201.11	mg/L
Manganese	2.453	mg/L
Barium	2.74	mg/L
Strontium	6.88	mg/L
Calcium	69.90	mg/L
Magnesium	12.15	mg/L
Sodium	1088.44	mg/L
Potassium	16.31	mg/L
Boron	2.12	mg/L
Lithium	0.77	mg/L
Zinc	0.74	mg/L
Lead	0.11	mg/L
Silicon	5.91	mg/L
Aluminum	0.52	mg/L

Anions	Result	Unit
Bromide	26	mg/L
Chloride	1675	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	3	mg/L
Sulfate	43	mg/L

Scale Type	Result
Calcite CaCO3 SI	-0.09
Celestite SrSO4 SI	-1.67
Anhydrite CaSO4 SI	-3.22
Barite BaSO4 PTB	1.4
Barite BaSO4 SI	1.02
Gypsum CaSO4 SI	-2.83
Hemihydrate CaSO4 SI	-2.58

Saturation Index Calculation (Tomson-Oddo Model)

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Report Date: **09/14/2017**

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Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	3	ppb
pH	7.26	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	414.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5190	µS - cm3
Ionic Strength	0.06	
Resistivity	1.927	ohms - m
Specific Gravity	1.0020	
Total Dissolved Solids	3448.819	mg/L

Cations	Result	Unit
Iron	125.21	mg/L
Manganese	2.309	mg/L
Barium	3.16	mg/L
Strontium	7.60	mg/L
Calcium	75.78	mg/L
Magnesium	12.79	mg/L
Sodium	1154.17	mg/L
Potassium	17.04	mg/L
Boron	2.29	mg/L
Lithium	0.80	mg/L
Zinc	0.45	mg/L
Lead	0.15	mg/L
Silicon	6.14	mg/L
Aluminum	0.28	mg/L

Anions	Result	Unit
Bromide	25	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Chloride	1613	mg/L
Fluoride	3	mg/L
Sulfate	40	mg/L

Scale Type	Result
Barite BaSO4 PTB	1.7
Barite BaSO4 SI	1.05
Calcite CaCO3 SI	-0.21
Celestite SrSO4 SI	-1.66
Anhydrite CaSO4 SI	-3.21
Gypsum CaSO4 SI	-2.83
Hemihydrate CaSO4 SI	-2.58

Saturation Index Calculation (Tomson-Oddo Model)

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	0.5	mg/L
Oxygen	8	ppb
pH	7.26	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	305	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5034	µS - cm3
Ionic Strength	0.06	
Resistivity	1.986	ohms - m
Specific Gravity	1.0018	
Total Dissolved Solids	3396.801	mg/L

Cations	Result	Unit
Iron	172.06	mg/L
Manganese	2.721	mg/L
Barium	3.96	mg/L
Strontium	7.75	mg/L
Calcium	77.12	mg/L
Magnesium	12.79	mg/L
Sodium	1137.40	mg/L
Potassium	16.56	mg/L
Boron	2.30	mg/L
Lithium	0.75	mg/L
Zinc	0.53	mg/L
Lead	0.34	mg/L
Silicon	7.84	mg/L
Aluminum	0.58	mg/L

Anions	Result	Unit
Bromide	26	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Chloride	1638	mg/L
Fluoride	4	mg/L
Sulfate	40	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.21
Barite BaSO4 PTB	2.1
Barite BaSO4 SI	1.15
Calcite CaCO3 SI	-0.33
Celestite SrSO4 SI	-1.65
Gypsum CaSO4 SI	-2.82
Hemihydrate CaSO4 SI	-2.57

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31335**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	0.5	mg/L
Oxygen	8	ppb
pH	7.24	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	317.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5061	µS - cm3
Ionic Strength	0.06	
Resistivity	1.976	ohms - m
Specific Gravity	1.0019	
Total Dissolved Solids	3516.14	mg/L

Cations	Result	Unit
Iron	273.78	mg/L
Manganese	3.560	mg/L
Barium	3.16	mg/L
Strontium	7.23	mg/L
Calcium	75.88	mg/L
Magnesium	12.11	mg/L
Sodium	1054.22	mg/L
Potassium	15.66	mg/L
Boron	2.13	mg/L
Lithium	0.75	mg/L
Zinc	0.78	mg/L
Lead	0.10	mg/L
Silicon	8.48	mg/L
Aluminum	0.68	mg/L

Anions	Result	Unit
Bromide	27	mg/L
Chloride	1729	mg/L
Fluoride	3	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	40	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.21
Barite BaSO4 PTB	1.7
Barite BaSO4 SI	1.05
Calcite CaCO3 SI	-0.34
Celestite SrSO4 SI	-1.68
Gypsum CaSO4 SI	-2.83
Hemihydrate CaSO4 SI	-2.58

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31336**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1.5	mg/L
Oxygen	10	ppb
pH	7.27	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	317.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5335	µS - cm3
Ionic Strength	0.06	
Resistivity	1.874	ohms - m
Specific Gravity	1.0021	
Total Dissolved Solids	3571.61	mg/L

Cations	Result	Unit
Iron	154.95	mg/L
Manganese	2.510	mg/L
Barium	3.82	mg/L
Strontium	8.21	mg/L
Calcium	81.08	mg/L
Magnesium	13.50	mg/L
Sodium	1213.34	mg/L
Potassium	17.35	mg/L
Boron	2.45	mg/L
Lithium	0.84	mg/L
Zinc	0.18	mg/L
Lead	0.08	mg/L
Silicon	7.14	mg/L
Aluminum	0.38	mg/L

Anions	Result	Unit
Bromide	27	mg/L
Nitrate	Not Detected	mg/L
Chloride	1737	mg/L
Fluoride	2	mg/L
Phosphate	Not Detected	mg/L
Sulfate	40	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	2.1
Barite BaSO4 SI	1.13
Hemihydrate CaSO4 SI	-2.55
Calcite CaCO3 SI	-0.28
Celestite SrSO4 SI	-1.63
Gypsum CaSO4 SI	-2.80

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31337**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	4	ppb
pH	7.25	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	341.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5492	µS - cm3
Ionic Strength	0.06	
Resistivity	1.821	ohms - m
Specific Gravity	1.0025	
Total Dissolved Solids	3737.336	mg/L

Cations	Result	Unit
Iron	219.58	mg/L
Manganese	2.946	mg/L
Barium	4.12	mg/L
Strontium	8.31	mg/L
Calcium	81.81	mg/L
Magnesium	13.65	mg/L
Sodium	1229.32	mg/L
Potassium	17.42	mg/L
Boron	2.55	mg/L
Lithium	0.82	mg/L
Zinc	0.59	mg/L
Lead	<	mg/L
Silicon	8.49	mg/L
Aluminum	0.54	mg/L

Anions	Result	Unit
Nitrate	Not Detected	mg/L
Sulfate	39	mg/L
Bromide	28	mg/L
Chloride	1797	mg/L
Fluoride	3	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	2.2
Barite BaSO4 SI	1.15
Gypsum CaSO4 SI	-2.81
Hemihydrate CaSO4 SI	-2.56
Calcite CaCO3 SI	-0.27
Celestite SrSO4 SI	-1.63

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ31338**

Login Batch: **2017-09-07-001**

Collection Date: **09/03/2017**

Receive Date: **09/07/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	7.25	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	378.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5618	µS - cm3
Ionic Strength	0.06	
Resistivity	1.780	ohms - m
Specific Gravity	1.0022	
Total Dissolved Solids	3884.285	mg/L

Cations	Result	Unit
Iron	285.71	mg/L
Manganese	3.375	mg/L
Barium	4.53	mg/L
Strontium	8.43	mg/L
Calcium	83.21	mg/L
Magnesium	13.78	mg/L
Sodium	1223.05	mg/L
Potassium	16.85	mg/L
Boron	2.54	mg/L
Lithium	0.84	mg/L
Zinc	0.90	mg/L
Lead	<	mg/L
Silicon	9.94	mg/L
Aluminum	0.94	mg/L

Anions	Result	Unit
Fluoride	3	mg/L
Sulfate	39	mg/L
Bromide	28	mg/L
Chloride	1845	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	2.5
Barite BaSO4 SI	1.19
Gypsum CaSO4 SI	-2.80
Hemihydrate CaSO4 SI	-2.55
Calcite CaCO3 SI	-0.21
Celestite SrSO4 SI	-1.63

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34447**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	8030	mg/L
Dissolved H2S	1	mg/L
Oxygen	4	ppb
pH	5.36	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	85.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5653	µS - cm3
Ionic Strength	0.07	
Resistivity	1.769	ohms - m
Specific Gravity	1.0062	
Total Dissolved Solids	3648.729	mg/L

Cations	Result	Unit
Iron	28.02	mg/L
Manganese	3.099	mg/L
Barium	1.39	mg/L
Strontium	8.55	mg/L
Calcium	92.67	mg/L
Magnesium	13.97	mg/L
Sodium	1387.63	mg/L
Potassium	18.45	mg/L
Boron	2.84	mg/L
Lithium	0.83	mg/L
Zinc	0.11	mg/L
Lead	0.10	mg/L
Silicon	4.76	mg/L
Aluminum	0.22	mg/L

Anions	Result	Unit
Bromide	27	mg/L
Chloride	2003	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	25	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.34
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	0.49
Calcite CaCO3 SI	-2.70
Celestite SrSO4 SI	-1.82
Gypsum CaSO4 SI	-2.95
Hemihydrate CaSO4 SI	-2.70

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34448**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.28	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	378.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6104	µS - cm3
Ionic Strength	0.07	
Resistivity	1.638	ohms - m
Specific Gravity	1.0024	
Total Dissolved Solids	4210.76	mg/L

Cations	Result	Unit
Iron	300.53	mg/L
Manganese	3.960	mg/L
Barium	4.77	mg/L
Strontium	9.09	mg/L
Calcium	95.93	mg/L
Magnesium	14.74	mg/L
Sodium	1391.54	mg/L
Potassium	18.07	mg/L
Boron	2.89	mg/L
Lithium	0.82	mg/L
Zinc	0.75	mg/L
Lead	0.14	mg/L
Silicon	10.16	mg/L
Aluminum	1.07	mg/L

Anions	Result	Unit
Bromide	29	mg/L
Chloride	1904	mg/L
Fluoride	2	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	108	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.71
Barite BaSO4 PTB	2.7
Barite BaSO4 SI	1.60
Calcite CaCO3 SI	-0.16
Celestite SrSO4 SI	-1.20
Gypsum CaSO4 SI	-2.33
Hemihydrate CaSO4 SI	-2.08

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34449**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	4	ppb
pH	7.33	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	378.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6100	µS - cm3
Ionic Strength	0.07	
Resistivity	1.639	ohms - m
Specific Gravity	1.0036	
Total Dissolved Solids	3938.37	mg/L

Cations	Result	Unit
Iron	32.23	mg/L
Manganese	2.350	mg/L
Barium	1.96	mg/L
Strontium	8.60	mg/L
Calcium	89.73	mg/L
Magnesium	13.84	mg/L
Sodium	1424.46	mg/L
Potassium	17.83	mg/L
Boron	2.86	mg/L
Lithium	0.82	mg/L
Zinc	0.13	mg/L
Lead	0.16	mg/L
Silicon	3.35	mg/L
Aluminum	0.05	mg/L

Anions	Result	Unit
Bromide	30	mg/L
Chloride	1953	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	34	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.23
Barite BaSO4 PTB	0.9
Barite BaSO4 SI	0.73
Calcite CaCO3 SI	-0.14
Celestite SrSO4 SI	-1.71
Gypsum CaSO4 SI	-2.85
Hemihydrate CaSO4 SI	-2.60

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34450**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.3	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	378.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6123	µS - cm3
Ionic Strength	0.07	
Resistivity	1.633	ohms - m
Specific Gravity	1.0033	
Total Dissolved Solids	4581.13	mg/L

Cations	Result	Unit
Iron	654.83	mg/L
Manganese	7.550	mg/L
Barium	4.53	mg/L
Strontium	8.96	mg/L
Calcium	97.28	mg/L
Magnesium	14.23	mg/L
Sodium	1409.55	mg/L
Potassium	18.06	mg/L
Boron	2.91	mg/L
Lithium	0.86	mg/L
Zinc	0.26	mg/L
Lead	<	mg/L
Silicon	11.82	mg/L
Aluminum	0.94	mg/L

Anions	Result	Unit
Bromide	30	mg/L
Chloride	1971	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	35	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	2.4
Barite BaSO4 SI	1.10
Calcite CaCO3 SI	-0.14
Celestite SrSO4 SI	-1.68
Gypsum CaSO4 SI	-2.80
Hemihydrate CaSO4 SI	-2.56

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34451**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.6	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	378.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6004	µS - cm3
Ionic Strength	0.07	
Resistivity	1.666	ohms - m
Specific Gravity	1.0033	
Total Dissolved Solids	3892.47	mg/L

Cations	Result	Unit
Iron	48.16	mg/L
Manganese	1.800	mg/L
Barium	2.76	mg/L
Strontium	8.34	mg/L
Calcium	84.79	mg/L
Magnesium	13.31	mg/L
Sodium	1353.11	mg/L
Potassium	17.18	mg/L
Boron	2.67	mg/L
Lithium	0.79	mg/L
Zinc	<	mg/L
Lead	0.06	mg/L
Silicon	3.61	mg/L
Aluminum	0.03	mg/L

Anions	Result	Unit
Bromide	30	mg/L
Chloride	1968	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	34	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.26
Barite BaSO4 PTB	1.4
Barite BaSO4 SI	0.88
Calcite CaCO3 PTB	9.3
Calcite CaCO3 SI	0.10
Celestite SrSO4 SI	-1.72
Gypsum CaSO4 SI	-2.87
Hemihydrate CaSO4 SI	-2.63

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34451**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34452**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.38	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	402.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6024	µS - cm3
Ionic Strength	0.07	
Resistivity	1.660	ohms - m
Specific Gravity	1.0038	
Total Dissolved Solids	4117.868	mg/L

Cations	Result	Unit
Iron	258.45	mg/L
Manganese	4.028	mg/L
Barium	4.44	mg/L
Strontium	9.64	mg/L
Calcium	96.98	mg/L
Magnesium	15.00	mg/L
Sodium	1522.73	mg/L
Potassium	19.07	mg/L
Boron	3.01	mg/L
Lithium	0.88	mg/L
Zinc	0.35	mg/L
Lead	<	mg/L
Silicon	7.59	mg/L
Aluminum	0.13	mg/L

Anions	Result	Unit
Bromide	27	mg/L
Chloride	1774	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	30	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.24
Barite BaSO4 PTB	2.4
Barite BaSO4 SI	1.07
Calcite CaCO3 PTB	1.3
Calcite CaCO3 SI	0.01
Celestite SrSO4 SI	-1.69
Gypsum CaSO4 SI	-2.86
Hemihydrate CaSO4 SI	-2.60

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34452**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34453**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	7.32	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	402.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5733	µS - cm3
Ionic Strength	0.06	
Resistivity	1.744	ohms - m
Specific Gravity	1.0037	
Total Dissolved Solids	3929.036	mg/L

Cations	Result	Unit
Iron	256.80	mg/L
Manganese	3.326	mg/L
Barium	4.23	mg/L
Strontium	8.63	mg/L
Calcium	88.69	mg/L
Magnesium	13.60	mg/L
Sodium	1341.16	mg/L
Potassium	16.55	mg/L
Boron	2.71	mg/L
Lithium	0.75	mg/L
Zinc	0.21	mg/L
Lead	0.01	mg/L
Silicon	8.33	mg/L
Aluminum	0.55	mg/L

Anions	Result	Unit
Bromide	27	mg/L
Chloride	1781	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	29	mg/L

Scale Type	Result
Barite BaSO4 SI	1.04
Calcite CaCO3 SI	-0.09
Celestite SrSO4 SI	-1.75
Gypsum CaSO4 SI	-2.90
Hemihydrate CaSO4 SI	-2.65
Anhydrite CaSO4 SI	-3.29
Barite BaSO4 PTB	2.2

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34454**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.33	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	402.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	6231	µS - cm3
Ionic Strength	0.07	
Resistivity	1.605	ohms - m
Specific Gravity	1.0035	
Total Dissolved Solids	4282.811	mg/L

Cations	Result	Unit
Iron	290.98	mg/L
Manganese	3.771	mg/L
Barium	4.43	mg/L
Strontium	9.29	mg/L
Calcium	98.81	mg/L
Magnesium	15.26	mg/L
Sodium	1454.67	mg/L
Potassium	18.12	mg/L
Boron	2.91	mg/L
Lithium	0.84	mg/L
Zinc	0.82	mg/L
Lead	0.04	mg/L
Silicon	8.74	mg/L
Aluminum	1.11	mg/L

Anions	Result	Unit
Bromide	30	mg/L
Chloride	1970	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	33	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.21
Barite BaSO4 PTB	2.4
Barite BaSO4 SI	1.07
Calcite CaCO3 SI	-0.07
Celestite SrSO4 SI	-1.69
Gypsum CaSO4 SI	-2.82
Hemihydrate CaSO4 SI	-2.58

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34455**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.59	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	475.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	5306	µS - cm3
Ionic Strength	0.06	
Resistivity	1.885	ohms - m
Specific Gravity	1.0030	
Total Dissolved Solids	3458.932	mg/L

Cations	Result	Unit
Iron	62.24	mg/L
Manganese	1.022	mg/L
Barium	2.18	mg/L
Strontium	6.75	mg/L
Calcium	73.09	mg/L
Magnesium	13.03	mg/L
Sodium	1175.82	mg/L
Potassium	15.32	mg/L
Boron	2.38	mg/L
Lithium	0.76	mg/L
Zinc	0.23	mg/L
Lead	<	mg/L
Silicon	3.83	mg/L
Aluminum	0.67	mg/L

Anions	Result	Unit
Bromide	24	mg/L
Chloride	1607	mg/L
Fluoride	1	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	42	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.21
Barite BaSO4 PTB	1.1
Barite BaSO4 SI	0.91
Calcite CaCO3 PTB	15.5
Calcite CaCO3 SI	0.17
Celestite SrSO4 SI	-1.69
Gypsum CaSO4 SI	-2.82
Hemihydrate CaSO4 SI	-2.57

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34455**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34456**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	12	mg/L
Oxygen	8	ppb
pH	8.66	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	317.2	mg/L
Carbonate	300	mg/L
Conductivity (Calculated)	2218	µS - cm3
Ionic Strength	0.02	
Resistivity	4.509	ohms - m
Specific Gravity	1.0016	
Total Dissolved Solids	1442.059	mg/L

Cations	Result	Unit
Iron	21.63	mg/L
Manganese	1.079	mg/L
Barium	1.05	mg/L
Strontium	2.72	mg/L
Calcium	42.71	mg/L
Magnesium	10.02	mg/L
Sodium	363.65	mg/L
Potassium	6.10	mg/L
Boron	1.10	mg/L
Lithium	0.40	mg/L
Zinc	0.23	mg/L
Lead	<	mg/L
Silicon	2.45	mg/L
Aluminum	0.14	mg/L

Anions	Result	Unit
Bromide	7	mg/L
Chloride	629	mg/L
Fluoride	2	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	53	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.26
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	0.87
Calcite CaCO3 PTB	31.5
Calcite CaCO3 SI	0.97
Celestite SrSO4 SI	-1.86
Gypsum CaSO4 SI	-2.88
Hemihydrate CaSO4 SI	-2.60

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34456**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34457**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	4	mg/L
Oxygen	8	ppb
pH	7.98	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3196.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	7768	µS - cm3
Ionic Strength	0.06	
Resistivity	1.287	ohms - m
Specific Gravity	1.0038	
Total Dissolved Solids	5250.999	mg/L

Cations	Result	Unit
Iron	276.41	mg/L
Manganese	3.349	mg/L
Barium	0.83	mg/L
Strontium	3.82	mg/L
Calcium	41.95	mg/L
Magnesium	7.78	mg/L
Sodium	1295.46	mg/L
Potassium	82.73	mg/L
Boron	2.06	mg/L
Lithium	2.42	mg/L
Zinc	1.89	mg/L
Lead	0.98	mg/L
Silicon	42.99	mg/L
Aluminum	0.81	mg/L

Anions	Result	Unit
Sulfate	160	mg/L
Bromide	Not Detected	mg/L
Chloride	265	mg/L
Fluoride	3	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.89
Barite BaSO4 PTB	0.4
Barite BaSO4 SI	1.03
Calcite CaCO3 PTB	33.7
Calcite CaCO3 SI	1.11
Celestite SrSO4 SI	-1.39
Gypsum CaSO4 SI	-2.50
Hemihydrate CaSO4 SI	-2.26

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34457**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34458**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.87	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3306.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	8247	µS - cm3
Ionic Strength	0.07	
Resistivity	1.213	ohms - m
Specific Gravity	1.0036	
Total Dissolved Solids	5743.925	mg/L

Cations	Result	Unit
Iron	460.62	mg/L
Manganese	5.455	mg/L
Barium	0.90	mg/L
Strontium	4.30	mg/L
Calcium	46.66	mg/L
Magnesium	7.77	mg/L
Sodium	1511.02	mg/L
Potassium	94.93	mg/L
Boron	2.61	mg/L
Lithium	2.83	mg/L
Zinc	1.35	mg/L
Lead	0.33	mg/L
Silicon	47.16	mg/L
Aluminum	0.57	mg/L

Anions	Result	Unit
Fluoride	3	mg/L
Sulfate	166	mg/L
Bromide	Not Detected	mg/L
Chloride	235	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.83
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	1.08
Gypsum CaSO4 SI	-2.44
Hemihydrate CaSO4 SI	-2.20
Calcite CaCO3 PTB	37.1
Calcite CaCO3 SI	1.06
Celestite SrSO4 SI	-1.32

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34458**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34459**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	8.08	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3477	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	8817	µS - cm3
Ionic Strength	0.08	
Resistivity	1.134	ohms - m
Specific Gravity	1.0050	
Total Dissolved Solids	6394.365	mg/L

Cations	Result	Unit
Iron	743.36	mg/L
Manganese	8.325	mg/L
Barium	1.07	mg/L
Strontium	4.86	mg/L
Calcium	55.01	mg/L
Magnesium	7.86	mg/L
Sodium	1705.88	mg/L
Potassium	96.46	mg/L
Boron	2.98	mg/L
Lithium	3.23	mg/L
Zinc	1.66	mg/L
Lead	0.30	mg/L
Silicon	51.33	mg/L
Aluminum	0.93	mg/L

Anions	Result	Unit
Chloride	225	mg/L
Fluoride	4	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	166	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.76
Barite BaSO4 PTB	0.6
Gypsum CaSO4 SI	-2.37
Hemihydrate CaSO4 SI	-2.13
Barite BaSO4 SI	1.15
Calcite CaCO3 PTB	45.9
Calcite CaCO3 SI	1.36
Celestite SrSO4 SI	-1.27

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34459**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34460**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	8.13	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4257.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10052	µS - cm3
Ionic Strength	0.08	
Resistivity	0.995	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	7021.218	mg/L

Cations	Result	Unit
Iron	581.45	mg/L
Manganese	6.198	mg/L
Barium	1.24	mg/L
Strontium	4.50	mg/L
Calcium	47.24	mg/L
Magnesium	7.03	mg/L
Sodium	1742.76	mg/L
Potassium	93.43	mg/L
Boron	3.10	mg/L
Lithium	3.37	mg/L
Zinc	1.87	mg/L
Lead	0.42	mg/L
Silicon	48.27	mg/L
Aluminum	0.67	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	215	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	158	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.86
Barite BaSO4 PTB	0.7
Barite BaSO4 SI	1.16
Calcite CaCO3 PTB	39.6
Calcite CaCO3 SI	1.40
Celestite SrSO4 SI	-1.35
Gypsum CaSO4 SI	-2.47
Hemihydrate CaSO4 SI	-2.23

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34460**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34461**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.98	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3952.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9843	µS - cm3
Ionic Strength	0.08	
Resistivity	1.016	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6505.109	mg/L

Cations	Result	Unit
Iron	201.68	mg/L
Manganese	3.599	mg/L
Barium	0.48	mg/L
Strontium	4.27	mg/L
Calcium	44.60	mg/L
Magnesium	6.96	mg/L
Sodium	1924.72	mg/L
Potassium	99.01	mg/L
Boron	3.36	mg/L
Lithium	3.66	mg/L
Zinc	0.55	mg/L
Lead	<	mg/L
Silicon	32.94	mg/L
Aluminum	0.28	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	210	mg/L
Fluoride	3	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	156	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.89
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.75
Calcite CaCO3 PTB	36.4
Calcite CaCO3 SI	1.19
Celestite SrSO4 SI	-1.38
Gypsum CaSO4 SI	-2.50
Hemihydrate CaSO4 SI	-2.26

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Water Analysis Report

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Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34462**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	8.12	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3818.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9523	µS - cm3
Ionic Strength	0.08	
Resistivity	1.050	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	7183.882	mg/L

Cations	Result	Unit
Iron	1077.38	mg/L
Manganese	11.512	mg/L
Barium	1.34	mg/L
Strontium	4.15	mg/L
Calcium	48.52	mg/L
Magnesium	6.82	mg/L
Sodium	1837.56	mg/L
Potassium	91.41	mg/L
Boron	3.49	mg/L
Lithium	3.39	mg/L
Zinc	2.10	mg/L
Lead	0.33	mg/L
Silicon	48.49	mg/L
Aluminum	0.93	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	218	mg/L
Fluoride	3	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	160	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.84
Barite BaSO4 PTB	0.7
Barite BaSO4 SI	1.20
Calcite CaCO3 PTB	40.4
Calcite CaCO3 SI	1.35
Celestite SrSO4 SI	-1.38
Gypsum CaSO4 SI	-2.46
Hemihydrate CaSO4 SI	-2.22

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34462**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34463**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.92	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4111.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10149	µS - cm3
Ionic Strength	0.08	
Resistivity	0.985	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6696.621	mg/L

Cations	Result	Unit
Iron	198.67	mg/L
Manganese	2.881	mg/L
Barium	0.43	mg/L
Strontium	4.17	mg/L
Calcium	38.75	mg/L
Magnesium	5.92	mg/L
Sodium	1917.40	mg/L
Potassium	93.75	mg/L
Boron	3.40	mg/L
Lithium	3.57	mg/L
Zinc	0.85	mg/L
Lead	<	mg/L
Silicon	44.83	mg/L
Aluminum	0.50	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	268	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	149	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.96
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.68
Calcite CaCO3 PTB	31.0
Calcite CaCO3 SI	1.09
Celestite SrSO4 SI	-1.40
Gypsum CaSO4 SI	-2.58
Hemihydrate CaSO4 SI	-2.34

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34463**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34464**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	8.04	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3989.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9791	µS - cm3
Ionic Strength	0.08	
Resistivity	1.021	ohms - m
Specific Gravity	1.0055	
Total Dissolved Solids	6387.415	mg/L

Cations	Result	Unit
Iron	119.55	mg/L
Manganese	1.695	mg/L
Barium	0.41	mg/L
Strontium	3.53	mg/L
Calcium	31.55	mg/L
Magnesium	5.53	mg/L
Sodium	1874.75	mg/L
Potassium	91.77	mg/L
Boron	3.51	mg/L
Lithium	3.59	mg/L
Zinc	0.30	mg/L
Lead	0.05	mg/L
Silicon	36.57	mg/L
Aluminum	0.15	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	211	mg/L
Fluoride	4	mg/L
Nitrate	14	mg/L
Phosphate	Not Detected	mg/L
Sulfate	150	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.05
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.67
Calcite CaCO3 PTB	25.3
Calcite CaCO3 SI	1.10
Celestite SrSO4 SI	-1.47
Gypsum CaSO4 SI	-2.66
Hemihydrate CaSO4 SI	-2.43

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34464**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34465**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

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Report Date: **09/14/2017**

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	8.02	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4050.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9942	µS - cm3
Ionic Strength	0.08	
Resistivity	1.006	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	7081.141	mg/L

Cations	Result	Unit
Iron	710.37	mg/L
Manganese	7.901	mg/L
Barium	0.94	mg/L
Strontium	4.05	mg/L
Calcium	46.75	mg/L
Magnesium	7.08	mg/L
Sodium	1908.65	mg/L
Potassium	93.73	mg/L
Boron	3.62	mg/L
Lithium	3.57	mg/L
Zinc	1.97	mg/L
Lead	0.22	mg/L
Silicon	46.63	mg/L
Aluminum	1.77	mg/L

Anions	Result	Unit
Sulfate	146	mg/L
Bromide	Not Detected	mg/L
Chloride	199	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.89
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	1.01
Calcite CaCO3 PTB	38.6
Calcite CaCO3 SI	1.26
Celestite SrSO4 SI	-1.43
Gypsum CaSO4 SI	-2.51
Hemihydrate CaSO4 SI	-2.27

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Report Date: **09/14/2017**

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System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34466**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	8	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4331	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10288	µS - cm3
Ionic Strength	0.08	
Resistivity	0.972	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	6636.498	mg/L

Cations	Result	Unit
Iron	51.59	mg/L
Manganese	0.758	mg/L
Barium	0.17	mg/L
Strontium	2.72	mg/L
Calcium	22.78	mg/L
Magnesium	5.05	mg/L
Sodium	1874.43	mg/L
Potassium	90.97	mg/L
Boron	3.65	mg/L
Lithium	3.61	mg/L
Zinc	0.16	mg/L
Lead	0.18	mg/L
Silicon	31.18	mg/L
Aluminum	0.19	mg/L

Anions	Result	Unit
Chloride	201	mg/L
Fluoride	4	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	147	mg/L

Scale Type	Result
Calcite CaCO3 SI	0.96
Celestite SrSO4 SI	-1.59
Gypsum CaSO4 SI	-2.81
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.28
Calcite CaCO3 PTB	17.7
Hemihydrate CaSO4 SI	-2.57

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Location Code: **354156**

Sample ID: **AJ34466**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34467**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	8.04	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4013.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9922	µS - cm3
Ionic Strength	0.08	
Resistivity	1.008	ohms - m
Specific Gravity	1.0048	
Total Dissolved Solids	6934.737	mg/L

Cations	Result	Unit
Iron	578.47	mg/L
Manganese	6.267	mg/L
Barium	0.93	mg/L
Strontium	3.91	mg/L
Calcium	39.42	mg/L
Magnesium	6.10	mg/L
Sodium	1931.84	mg/L
Potassium	93.30	mg/L
Boron	3.74	mg/L
Lithium	3.60	mg/L
Zinc	1.99	mg/L
Lead	0.14	mg/L
Silicon	46.15	mg/L
Aluminum	1.10	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	203	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	4	mg/L
Sulfate	151	mg/L

Scale Type	Result
Calcite CaCO3 PTB	32.2
Calcite CaCO3 SI	1.20
Celestite SrSO4 SI	-1.43
Anhydrite CaSO4 SI	-2.95
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	1.02
Gypsum CaSO4 SI	-2.57
Hemihydrate CaSO4 SI	-2.33

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34467**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34468**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	8.02	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4111.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9914	µS - cm3
Ionic Strength	0.08	
Resistivity	1.009	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6462.212	mg/L

Cations	Result	Unit
Iron	115.56	mg/L
Manganese	1.502	mg/L
Barium	0.30	mg/L
Strontium	3.12	mg/L
Calcium	26.50	mg/L
Magnesium	4.65	mg/L
Sodium	1853.18	mg/L
Potassium	87.77	mg/L
Boron	3.55	mg/L
Lithium	3.51	mg/L
Zinc	0.15	mg/L
Lead	<	mg/L
Silicon	35.64	mg/L
Aluminum	0.09	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	201	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	4	mg/L
Sulfate	145	mg/L

Scale Type	Result
Calcite CaCO3 PTB	20.9
Calcite CaCO3 SI	1.02
Celestite SrSO4 SI	-1.54
Anhydrite CaSO4 SI	-3.14
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.52
Gypsum CaSO4 SI	-2.75
Hemihydrate CaSO4 SI	-2.51

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34468**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34469**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	8.03	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4221.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10132	µS - cm3
Ionic Strength	0.08	
Resistivity	0.987	ohms - m
Specific Gravity	1.0055	
Total Dissolved Solids	6705.729	mg/L

Cations	Result	Unit
Iron	218.90	mg/L
Manganese	2.599	mg/L
Barium	0.54	mg/L
Strontium	3.50	mg/L
Calcium	29.38	mg/L
Magnesium	4.74	mg/L
Sodium	1878.87	mg/L
Potassium	87.74	mg/L
Boron	3.65	mg/L
Lithium	3.42	mg/L
Zinc	0.62	mg/L
Lead	<	mg/L
Silicon	42.18	mg/L
Aluminum	0.17	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	202	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	144	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.09
Barite BaSO4 PTB	0.3
Barite BaSO4 SI	0.77
Calcite CaCO3 PTB	23.6
Calcite CaCO3 SI	1.09
Celestite SrSO4 SI	-1.49
Gypsum CaSO4 SI	-2.71
Hemihydrate CaSO4 SI	-2.47

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34469**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34470**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	8.04	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4111.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10116	µS - cm3
Ionic Strength	0.08	
Resistivity	0.989	ohms - m
Specific Gravity	1.0058	
Total Dissolved Solids	7212.2	mg/L

Cations	Result	Unit
Iron	728.98	mg/L
Manganese	8.790	mg/L
Barium	0.63	mg/L
Strontium	3.81	mg/L
Calcium	40.69	mg/L
Magnesium	5.47	mg/L
Sodium	1945.43	mg/L
Potassium	89.92	mg/L
Boron	4.09	mg/L
Lithium	3.55	mg/L
Zinc	2.38	mg/L
Lead	0.17	mg/L
Silicon	46.83	mg/L
Aluminum	0.95	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	219	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	148	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-2.95
Barite BaSO4 PTB	0.3
Barite BaSO4 SI	0.84
Calcite CaCO3 PTB	33.4
Calcite CaCO3 SI	1.23
Celestite SrSO4 SI	-1.44
Gypsum CaSO4 SI	-2.56
Hemihydrate CaSO4 SI	-2.32

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34470**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34471**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	7.99	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4660.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	11799	µS - cm3
Ionic Strength	0.10	
Resistivity	0.848	ohms - m
Specific Gravity	1.0065	
Total Dissolved Solids	8538.205	mg/L

Cations	Result	Unit
Iron	975.86	mg/L
Manganese	10.685	mg/L
Barium	0.98	mg/L
Strontium	2.40	mg/L
Calcium	30.05	mg/L
Magnesium	5.22	mg/L
Sodium	2316.61	mg/L
Potassium	100.12	mg/L
Boron	10.14	mg/L
Lithium	3.75	mg/L
Zinc	4.25	mg/L
Lead	0.24	mg/L
Silicon	35.48	mg/L
Aluminum	0.79	mg/L

Anions	Result	Unit
Bromide	3	mg/L
Chloride	343	mg/L
Fluoride	5	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	193	mg/L

**Lenntech online TDS calculator result is 8640.7 ppm.
Just checking calculation: BK 03-08-2018**

Scale Type	Result
Anhydrite CaSO4 SI	-2.98
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	1.11
Calcite CaCO3 PTB	24.0
Calcite CaCO3 SI	1.07
Celestite SrSO4 SI	-1.56
Gypsum CaSO4 SI	-2.60
Hemihydrate CaSO4 SI	-2.36

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34471**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34472**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	4	ppb
pH	8.14	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3891.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9555	µS - cm3
Ionic Strength	0.08	
Resistivity	1.047	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	6189.753	mg/L

Cations	Result	Unit
Iron	74.08	mg/L
Manganese	0.653	mg/L
Barium	0.17	mg/L
Strontium	1.15	mg/L
Calcium	6.10	mg/L
Magnesium	4.64	mg/L
Sodium	1855.16	mg/L
Potassium	86.02	mg/L
Boron	3.27	mg/L
Lithium	3.22	mg/L
Zinc	0.56	mg/L
Lead	<	mg/L
Silicon	32.11	mg/L
Aluminum	0.52	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	207	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	149	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.74
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.33
Calcite CaCO3 PTB	3.7
Calcite CaCO3 SI	0.51
Celestite SrSO4 SI	-1.92
Gypsum CaSO4 SI	-3.35
Hemihydrate CaSO4 SI	-3.11

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34472**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34473**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	3	ppb
pH	7.69	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4074.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9900	µS - cm3
Ionic Strength	0.08	
Resistivity	1.010	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6659.06	mg/L

Cations	Result	Unit
Iron	320.44	mg/L
Manganese	2.520	mg/L
Barium	0.75	mg/L
Strontium	3.91	mg/L
Calcium	27.33	mg/L
Magnesium	4.80	mg/L
Sodium	1889.51	mg/L
Potassium	87.84	mg/L
Boron	3.25	mg/L
Lithium	3.59	mg/L
Zinc	0.29	mg/L
Lead	<	mg/L
Silicon	47.99	mg/L
Aluminum	0.08	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	195	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	140	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.14
Barite BaSO4 PTB	0.4
Barite BaSO4 SI	0.90
Calcite CaCO3 PTB	19.0
Calcite CaCO3 SI	0.70
Celestite SrSO4 SI	-1.45
Gypsum CaSO4 SI	-2.75
Hemihydrate CaSO4 SI	-2.51

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34473**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34474**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	4	ppb
pH	7.78	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4050.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9949	µS - cm3
Ionic Strength	0.08	
Resistivity	1.005	ohms - m
Specific Gravity	1.0058	
Total Dissolved Solids	6632.618	mg/L

Cations	Result	Unit
Iron	262.75	mg/L
Manganese	2.218	mg/L
Barium	0.61	mg/L
Strontium	4.12	mg/L
Calcium	30.69	mg/L
Magnesium	5.01	mg/L
Sodium	1938.82	mg/L
Potassium	89.55	mg/L
Boron	3.29	mg/L
Lithium	3.65	mg/L
Zinc	0.54	mg/L
Lead	0.12	mg/L
Silicon	48.69	mg/L
Aluminum	0.49	mg/L

Anions	Result	Unit
Sulfate	142	mg/L
Bromide	Not Detected	mg/L
Chloride	196	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.08
Barite BaSO4 PTB	0.3
Barite BaSO4 SI	0.82
Calcite CaCO3 PTB	22.9
Calcite CaCO3 SI	0.84
Celestite SrSO4 SI	-1.42
Gypsum CaSO4 SI	-2.70
Hemihydrate CaSO4 SI	-2.46

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34474**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34475**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	5	ppb
pH	7.88	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4026	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9899	µS - cm3
Ionic Strength	0.08	
Resistivity	1.010	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6457.506	mg/L

Cations	Result	Unit
Iron	120.54	mg/L
Manganese	1.526	mg/L
Barium	0.49	mg/L
Strontium	3.86	mg/L
Calcium	32.66	mg/L
Magnesium	5.61	mg/L
Sodium	1929.82	mg/L
Potassium	88.97	mg/L
Boron	3.26	mg/L
Lithium	3.63	mg/L
Zinc	0.19	mg/L
Lead	<	mg/L
Silicon	40.77	mg/L
Aluminum	0.73	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	139	mg/L
Chloride	198	mg/L
Fluoride	5	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.07
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.71
Calcite CaCO3 PTB	25.3
Calcite CaCO3 SI	0.96
Celestite SrSO4 SI	-1.46
Gypsum CaSO4 SI	-2.68
Hemihydrate CaSO4 SI	-2.44

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34475**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34476**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	8.11	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4514	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10606	µS - cm3
Ionic Strength	0.09	
Resistivity	0.943	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	7234.084	mg/L

Cations	Result	Unit
Iron	441.79	mg/L
Manganese	4.284	mg/L
Barium	0.94	mg/L
Strontium	4.24	mg/L
Calcium	34.34	mg/L
Magnesium	5.09	mg/L
Sodium	1887.40	mg/L
Potassium	87.99	mg/L
Boron	3.32	mg/L
Lithium	3.64	mg/L
Zinc	0.59	mg/L
Lead	0.05	mg/L
Silicon	48.72	mg/L
Aluminum	1.09	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	200	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	142	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.05
Barite BaSO4 PTB	0.5
Barite BaSO4 SI	0.97
Calcite CaCO3 PTB	28.2
Calcite CaCO3 SI	1.23
Celestite SrSO4 SI	-1.44
Gypsum CaSO4 SI	-2.67
Hemihydrate CaSO4 SI	-2.43

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34476**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34477**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	5	ppb
pH	7.79	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4148	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10051	µS - cm3
Ionic Strength	0.08	
Resistivity	0.995	ohms - m
Specific Gravity	1.0052	
Total Dissolved Solids	6508.827	mg/L

Cations	Result	Unit
Iron	75.21	mg/L
Manganese	1.267	mg/L
Barium	0.32	mg/L
Strontium	3.66	mg/L
Calcium	29.02	mg/L
Magnesium	5.12	mg/L
Sodium	1918.23	mg/L
Potassium	88.94	mg/L
Boron	3.27	mg/L
Lithium	3.62	mg/L
Zinc	0.16	mg/L
Lead	0.03	mg/L
Silicon	38.28	mg/L
Aluminum	0.30	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	192	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	136	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.12
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.52
Calcite CaCO3 PTB	21.5
Calcite CaCO3 SI	0.83
Celestite SrSO4 SI	-1.49
Gypsum CaSO4 SI	-2.74
Hemihydrate CaSO4 SI	-2.50

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34477**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34478**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.81	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4184.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10078	µS - cm3
Ionic Strength	0.08	
Resistivity	0.992	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6477.048	mg/L

Cations	Result	Unit
Iron	26.30	mg/L
Manganese	0.538	mg/L
Barium	0.14	mg/L
Strontium	2.90	mg/L
Calcium	23.18	mg/L
Magnesium	4.33	mg/L
Sodium	1881.06	mg/L
Potassium	84.93	mg/L
Boron	3.26	mg/L
Lithium	3.57	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	36.54	mg/L
Aluminum	<	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	209	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	145	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.19
Calcite CaCO3 PTB	16.7
Calcite CaCO3 SI	0.76
Celestite SrSO4 SI	-1.57
Gypsum CaSO4 SI	-2.81
Hemihydrate CaSO4 SI	-2.57

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34478**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34479**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.86	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4135.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9956	µS - cm3
Ionic Strength	0.08	
Resistivity	1.004	ohms - m
Specific Gravity	1.0059	
Total Dissolved Solids	6453.24	mg/L

Cations	Result	Unit
Iron	80.14	mg/L
Manganese	0.960	mg/L
Barium	0.27	mg/L
Strontium	3.41	mg/L
Calcium	25.65	mg/L
Magnesium	4.42	mg/L
Sodium	1872.59	mg/L
Potassium	84.69	mg/L
Boron	3.27	mg/L
Lithium	3.59	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	39.10	mg/L
Aluminum	0.12	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	193	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	137	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.17
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.45
Calcite CaCO3 PTB	19.2
Calcite CaCO3 SI	0.85
Celestite SrSO4 SI	-1.52
Gypsum CaSO4 SI	-2.79
Hemihydrate CaSO4 SI	-2.55

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34479**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34480**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.74	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3904	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9589	µS - cm3
Ionic Strength	0.08	
Resistivity	1.043	ohms - m
Specific Gravity	1.0057	
Total Dissolved Solids	6187.204	mg/L

Cations	Result	Unit
Iron	49.82	mg/L
Manganese	0.714	mg/L
Barium	0.30	mg/L
Strontium	3.67	mg/L
Calcium	27.57	mg/L
Magnesium	4.44	mg/L
Sodium	1880.69	mg/L
Potassium	84.68	mg/L
Boron	3.26	mg/L
Lithium	3.55	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	40.56	mg/L
Aluminum	0.04	mg/L

Anions	Result	Unit
Chloride	183	mg/L
Fluoride	4	mg/L
Sulfate	133	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Celestite SrSO4 SI	-1.47
Gypsum CaSO4 SI	-2.75
Hemihydrate CaSO4 SI	-2.51
Anhydrite CaSO4 SI	-3.14
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.52
Calcite CaCO3 PTB	20.0
Calcite CaCO3 SI	0.77

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34480**

Login Batch: **2017-09-13-001**

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Receive Date: **09/13/2017**

Report Date: **09/14/2017**

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Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34481**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.69	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4148	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9966	µS - cm3
Ionic Strength	0.08	
Resistivity	1.003	ohms - m
Specific Gravity	1.0055	
Total Dissolved Solids	6530.814	mg/L

Cations	Result	Unit
Iron	150.64	mg/L
Manganese	1.754	mg/L
Barium	0.44	mg/L
Strontium	3.69	mg/L
Calcium	28.33	mg/L
Magnesium	4.40	mg/L
Sodium	1867.56	mg/L
Potassium	83.42	mg/L
Boron	3.23	mg/L
Lithium	3.49	mg/L
Zinc	0.43	mg/L
Lead	0.05	mg/L
Silicon	41.13	mg/L
Aluminum	0.18	mg/L

Anions	Result	Unit
Chloride	189	mg/L
Fluoride	4	mg/L
Phosphate	Not Detected	mg/L
Sulfate	137	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L

Scale Type	Result
Calcite CaCO3 SI	0.72
Celestite SrSO4 SI	-1.49
Gypsum CaSO4 SI	-2.75
Anhydrite CaSO4 SI	-3.13
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.66
Calcite CaCO3 PTB	19.9
Hemihydrate CaSO4 SI	-2.51

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Water Analysis Report

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Sample ID: **AJ34481**

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Report Date: **09/14/2017**

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Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34482**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.68	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4221.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10079	µS - cm3
Ionic Strength	0.08	
Resistivity	0.992	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6457.957	mg/L

Cations	Result	Unit
Iron	7.20	mg/L
Manganese	0.357	mg/L
Barium	0.24	mg/L
Strontium	3.81	mg/L
Calcium	28.12	mg/L
Magnesium	4.48	mg/L
Sodium	1878.55	mg/L
Potassium	85.56	mg/L
Boron	3.28	mg/L
Lithium	3.58	mg/L
Zinc	<	mg/L
Lead	0.01	mg/L
Silicon	41.44	mg/L
Aluminum	<	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	181	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	133	mg/L

Scale Type	Result
Calcite CaCO3 PTB	19.8
Calcite CaCO3 SI	0.72
Celestite SrSO4 SI	-1.48
Gypsum CaSO4 SI	-2.76
Hemihydrate CaSO4 SI	-2.52
Anhydrite CaSO4 SI	-3.15
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.38

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Water Analysis Report

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Location Code: **354156**

Sample ID: **AJ34482**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

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System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34483**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.64	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4148	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10012	µS - cm3
Ionic Strength	0.08	
Resistivity	0.999	ohms - m
Specific Gravity	1.0056	
Total Dissolved Solids	6834.581	mg/L

Cations	Result	Unit
Iron	422.27	mg/L
Manganese	4.671	mg/L
Barium	0.72	mg/L
Strontium	3.96	mg/L
Calcium	33.97	mg/L
Magnesium	4.66	mg/L
Sodium	1894.33	mg/L
Potassium	84.40	mg/L
Boron	3.31	mg/L
Lithium	3.52	mg/L
Zinc	0.81	mg/L
Lead	<	mg/L
Silicon	44.36	mg/L
Aluminum	0.37	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	185	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	5	mg/L
Sulfate	137	mg/L

Scale Type	Result
Calcite CaCO3 PTB	24.4
Calcite CaCO3 SI	0.75
Celestite SrSO4 SI	-1.46
Anhydrite CaSO4 SI	-3.05
Barite BaSO4 PTB	0.4
Barite BaSO4 SI	0.87
Gypsum CaSO4 SI	-2.67
Hemihydrate CaSO4 SI	-2.43

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34483**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34484**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.61	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4270	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10220	µS - cm3
Ionic Strength	0.08	
Resistivity	0.978	ohms - m
Specific Gravity	1.0058	
Total Dissolved Solids	6630.839	mg/L

Cations	Result	Unit
Iron	88.77	mg/L
Manganese	1.329	mg/L
Barium	0.37	mg/L
Strontium	3.69	mg/L
Calcium	30.16	mg/L
Magnesium	4.92	mg/L
Sodium	1934.60	mg/L
Potassium	85.04	mg/L
Boron	3.40	mg/L
Lithium	3.56	mg/L
Zinc	<	mg/L
Lead	0.08	mg/L
Silicon	39.02	mg/L
Aluminum	0.10	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	169	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	128	mg/L

Scale Type	Result
Barite BaSO4 SI	0.56
Calcite CaCO3 PTB	20.8
Calcite CaCO3 SI	0.68
Celestite SrSO4 SI	-1.52
Anhydrite CaSO4 SI	-3.13
Barite BaSO4 PTB	0.2
Gypsum CaSO4 SI	-2.75
Hemihydrate CaSO4 SI	-2.51

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34484**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34485**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.79	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4074.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9763	µS - cm3
Ionic Strength	0.08	
Resistivity	1.024	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	6299.122	mg/L

Cations	Result	Unit
Iron	49.65	mg/L
Manganese	0.862	mg/L
Barium	0.15	mg/L
Strontium	2.76	mg/L
Calcium	22.96	mg/L
Magnesium	4.21	mg/L
Sodium	1863.73	mg/L
Potassium	81.37	mg/L
Boron	3.37	mg/L
Lithium	3.40	mg/L
Zinc	0.36	mg/L
Lead	<	mg/L
Silicon	32.06	mg/L
Aluminum	0.06	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	159	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	121	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.27
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.14
Calcite CaCO3 PTB	16.2
Calcite CaCO3 SI	0.72
Celestite SrSO4 SI	-1.66
Gypsum CaSO4 SI	-2.89
Hemihydrate CaSO4 SI	-2.65

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34485**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34486**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.61	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4270	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10107	µS - cm3
Ionic Strength	0.08	
Resistivity	0.989	ohms - m
Specific Gravity	1.0055	
Total Dissolved Solids	6503.706	mg/L

Cations	Result	Unit
Iron	34.48	mg/L
Manganese	0.606	mg/L
Barium	0.32	mg/L
Strontium	3.79	mg/L
Calcium	29.02	mg/L
Magnesium	4.54	mg/L
Sodium	1861.95	mg/L
Potassium	82.41	mg/L
Boron	3.29	mg/L
Lithium	3.49	mg/L
Zinc	0.20	mg/L
Lead	<	mg/L
Silicon	41.51	mg/L
Aluminum	<	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	169	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	130	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.14
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.50
Calcite CaCO3 PTB	19.8
Calcite CaCO3 SI	0.67
Celestite SrSO4 SI	-1.50
Gypsum CaSO4 SI	-2.76
Hemihydrate CaSO4 SI	-2.52

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34486**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34487**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.54	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4050.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9796	µS - cm3
Ionic Strength	0.08	
Resistivity	1.021	ohms - m
Specific Gravity	1.0042	
Total Dissolved Solids	6275.89	mg/L

Cations	Result	Unit
Iron	6.08	mg/L
Manganese	0.320	mg/L
Barium	0.24	mg/L
Strontium	3.66	mg/L
Calcium	27.26	mg/L
Magnesium	4.32	mg/L
Sodium	1865.61	mg/L
Potassium	82.30	mg/L
Boron	3.29	mg/L
Lithium	3.48	mg/L
Zinc	0.17	mg/L
Lead	<	mg/L
Silicon	39.09	mg/L
Aluminum	0.08	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	182	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	136	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.15
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.39
Calcite CaCO3 PTB	16.9
Calcite CaCO3 SI	0.55
Celestite SrSO4 SI	-1.49
Gypsum CaSO4 SI	-2.77
Hemihydrate CaSO4 SI	-2.53

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34487**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34488**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.68	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4160.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9849	µS - cm3
Ionic Strength	0.08	
Resistivity	1.015	ohms - m
Specific Gravity	1.0051	
Total Dissolved Solids	6312.608	mg/L

Cations	Result	Unit
Iron	9.08	mg/L
Manganese	0.388	mg/L
Barium	0.11	mg/L
Strontium	2.94	mg/L
Calcium	21.62	mg/L
Magnesium	3.85	mg/L
Sodium	1792.42	mg/L
Potassium	79.43	mg/L
Boron	3.23	mg/L
Lithium	3.32	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	34.76	mg/L
Aluminum	0.03	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	188	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	134	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.25
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.05
Calcite CaCO3 PTB	14.1
Calcite CaCO3 SI	0.60
Celestite SrSO4 SI	-1.59
Gypsum CaSO4 SI	-2.87
Hemihydrate CaSO4 SI	-2.63

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34488**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34489**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.53	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4099.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9883	µS - cm3
Ionic Strength	0.08	
Resistivity	1.012	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6340.89	mg/L

Cations	Result	Unit
Iron	15.33	mg/L
Manganese	0.390	mg/L
Barium	0.22	mg/L
Strontium	3.56	mg/L
Calcium	26.09	mg/L
Magnesium	4.20	mg/L
Sodium	1871.90	mg/L
Potassium	82.59	mg/L
Boron	3.36	mg/L
Lithium	3.49	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	39.00	mg/L
Aluminum	0.05	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	187	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	133	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.18
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.35
Calcite CaCO3 PTB	15.9
Calcite CaCO3 SI	0.52
Celestite SrSO4 SI	-1.51
Gypsum CaSO4 SI	-2.79
Hemihydrate CaSO4 SI	-2.56

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34489**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34490**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.99	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4233.4	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10024	µS - cm3
Ionic Strength	0.08	
Resistivity	0.998	ohms - m
Specific Gravity	1.0052	
Total Dissolved Solids	6437.996	mg/L

Cations	Result	Unit
Iron	22.19	mg/L
Manganese	0.446	mg/L
Barium	0.17	mg/L
Strontium	3.04	mg/L
Calcium	22.37	mg/L
Magnesium	3.82	mg/L
Sodium	1831.56	mg/L
Potassium	80.30	mg/L
Boron	3.30	mg/L
Lithium	3.39	mg/L
Zinc	0.13	mg/L
Lead	0.13	mg/L
Silicon	36.29	mg/L
Aluminum	<	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	191	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	130	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.25
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.23
Calcite CaCO3 PTB	17.2
Calcite CaCO3 SI	0.93
Celestite SrSO4 SI	-1.59
Gypsum CaSO4 SI	-2.87
Hemihydrate CaSO4 SI	-2.63

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34490**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34491**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.63	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4123.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9869	µS - cm3
Ionic Strength	0.08	
Resistivity	1.013	ohms - m
Specific Gravity	1.0051	
Total Dissolved Solids	6320.648	mg/L

Cations	Result	Unit
Iron	4.17	mg/L
Manganese	0.298	mg/L
Barium	0.06	mg/L
Strontium	1.92	mg/L
Calcium	11.65	mg/L
Magnesium	3.46	mg/L
Sodium	1852.49	mg/L
Potassium	80.76	mg/L
Boron	3.33	mg/L
Lithium	3.29	mg/L
Zinc	0.02	mg/L
Lead	<	mg/L
Silicon	32.05	mg/L
Aluminum	0.01	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	190	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	133	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.52
Barite BaSO4 SI	-0.21
Calcite CaCO3 PTB	4.8
Calcite CaCO3 SI	0.28
Celestite SrSO4 SI	-1.78
Gypsum CaSO4 SI	-3.14
Hemihydrate CaSO4 SI	-2.90

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34492**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	6	ppb
pH	7.68	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	3952.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9643	µS - cm3
Ionic Strength	0.08	
Resistivity	1.037	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6184.22	mg/L

Cations	Result	Unit
Iron	11.98	mg/L
Manganese	0.480	mg/L
Barium	0.09	mg/L
Strontium	2.83	mg/L
Calcium	22.43	mg/L
Magnesium	4.12	mg/L
Sodium	1871.49	mg/L
Potassium	82.01	mg/L
Boron	3.25	mg/L
Lithium	3.51	mg/L
Zinc	0.13	mg/L
Lead	<	mg/L
Silicon	35.47	mg/L
Aluminum	0.02	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	187	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	131	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.23
Barite BaSO4 SI	-0.01
Calcite CaCO3 PTB	14.9
Calcite CaCO3 SI	0.63
Celestite SrSO4 SI	-1.59
Gypsum CaSO4 SI	-2.85
Hemihydrate CaSO4 SI	-2.60

Saturation Index Calculation (Tomson-Oddo Model)

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34493**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.66	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4062.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9791	µS - cm3
Ionic Strength	0.08	
Resistivity	1.021	ohms - m
Specific Gravity	1.0058	
Total Dissolved Solids	6289.011	mg/L

Cations	Result	Unit
Iron	22.00	mg/L
Manganese	0.531	mg/L
Barium	0.23	mg/L
Strontium	3.58	mg/L
Calcium	30.42	mg/L
Magnesium	11.91	mg/L
Sodium	1836.74	mg/L
Potassium	93.41	mg/L
Boron	3.28	mg/L
Lithium	3.50	mg/L
Zinc	<	mg/L
Lead	0.06	mg/L
Silicon	40.23	mg/L
Aluminum	0.05	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	188	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	133	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.12
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.36
Calcite CaCO3 PTB	21.4
Calcite CaCO3 SI	0.72
Celestite SrSO4 SI	-1.52
Gypsum CaSO4 SI	-2.73
Hemihydrate CaSO4 SI	-2.49

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34493**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34494**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.63	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4148	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9945	µS - cm3
Ionic Strength	0.08	
Resistivity	1.006	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	6387.944	mg/L

Cations	Result	Unit
Iron	22.62	mg/L
Manganese	0.424	mg/L
Barium	0.20	mg/L
Strontium	3.31	mg/L
Calcium	21.16	mg/L
Magnesium	4.14	mg/L
Sodium	1871.09	mg/L
Potassium	81.62	mg/L
Boron	3.25	mg/L
Lithium	3.50	mg/L
Zinc	<	mg/L
Lead	0.01	mg/L
Silicon	38.77	mg/L
Aluminum	0.01	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	187	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	130	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.28
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.30
Calcite CaCO3 PTB	13.2
Calcite CaCO3 SI	0.54
Celestite SrSO4 SI	-1.55
Gypsum CaSO4 SI	-2.89
Hemihydrate CaSO4 SI	-2.65

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34494**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34495**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	8.36	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	2379	mg/L
Carbonate	1140	mg/L
Conductivity (Calculated)	7118	µS - cm3
Ionic Strength	0.07	
Resistivity	1.405	ohms - m
Specific Gravity	1.0052	
Total Dissolved Solids	4580.435	mg/L

Cations	Result	Unit
Iron	24.50	mg/L
Manganese	0.395	mg/L
Barium	0.20	mg/L
Strontium	3.04	mg/L
Calcium	19.14	mg/L
Magnesium	4.05	mg/L
Sodium	1841.11	mg/L
Potassium	80.18	mg/L
Boron	3.24	mg/L
Lithium	3.42	mg/L
Zinc	0.24	mg/L
Lead	0.13	mg/L
Silicon	36.58	mg/L
Aluminum	0.05	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	182	mg/L
Fluoride	4	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Sulfate	127	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.27
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.42
Calcite CaCO3 PTB	15.4
Calcite CaCO3 SI	1.10
Celestite SrSO4 SI	-1.51
Gypsum CaSO4 SI	-2.89
Hemihydrate CaSO4 SI	-2.63

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34495**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34496**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.6	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4343.2	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10194	µS - cm3
Ionic Strength	0.08	
Resistivity	0.981	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6539.485	mg/L

Cations	Result	Unit
Iron	14.80	mg/L
Manganese	0.305	mg/L
Barium	0.34	mg/L
Strontium	3.93	mg/L
Calcium	27.60	mg/L
Magnesium	4.29	mg/L
Sodium	1846.02	mg/L
Potassium	80.88	mg/L
Boron	3.21	mg/L
Lithium	3.47	mg/L
Zinc	0.22	mg/L
Lead	<	mg/L
Silicon	41.35	mg/L
Aluminum	0.05	mg/L

Anions	Result	Unit
Chloride	174	mg/L
Fluoride	4	mg/L
Sulfate	125	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Celestite SrSO4 SI	-1.50
Gypsum CaSO4 SI	-2.80
Hemihydrate CaSO4 SI	-2.56
Anhydrite CaSO4 SI	-3.18
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.51
Calcite CaCO3 PTB	18.5
Calcite CaCO3 SI	0.64

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34496**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34497**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.45	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4184.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10002	µS - cm3
Ionic Strength	0.08	
Resistivity	1.000	ohms - m
Specific Gravity	1.0052	
Total Dissolved Solids	6435.424	mg/L

Cations	Result	Unit
Iron	33.68	mg/L
Manganese	0.554	mg/L
Barium	0.15	mg/L
Strontium	2.96	mg/L
Calcium	20.67	mg/L
Magnesium	3.93	mg/L
Sodium	1879.88	mg/L
Potassium	81.72	mg/L
Boron	3.45	mg/L
Lithium	3.45	mg/L
Zinc	0.15	mg/L
Lead	<	mg/L
Silicon	35.83	mg/L
Aluminum	0.04	mg/L

Anions	Result	Unit
Chloride	182	mg/L
Fluoride	4	mg/L
Phosphate	Not Detected	mg/L
Sulfate	127	mg/L
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L

Scale Type	Result
Calcite CaCO3 SI	0.35
Celestite SrSO4 SI	-1.61
Gypsum CaSO4 SI	-2.91
Anhydrite CaSO4 SI	-3.30
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.16
Calcite CaCO3 PTB	9.9
Hemihydrate CaSO4 SI	-2.67

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34497**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34498**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.57	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4270	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10056	µS - cm3
Ionic Strength	0.08	
Resistivity	0.994	ohms - m
Specific Gravity	1.0055	
Total Dissolved Solids	6456.311	mg/L

Cations	Result	Unit
Iron	20.34	mg/L
Manganese	0.441	mg/L
Barium	0.18	mg/L
Strontium	3.31	mg/L
Calcium	23.34	mg/L
Magnesium	3.96	mg/L
Sodium	1828.74	mg/L
Potassium	80.27	mg/L
Boron	3.37	mg/L
Lithium	3.43	mg/L
Zinc	<	mg/L
Lead	0.02	mg/L
Silicon	37.42	mg/L
Aluminum	<	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	179	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	4	mg/L
Sulfate	127	mg/L

Scale Type	Result
Calcite CaCO3 PTB	14.4
Calcite CaCO3 SI	0.53
Celestite SrSO4 SI	-1.56
Anhydrite CaSO4 SI	-3.24
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.24
Gypsum CaSO4 SI	-2.86
Hemihydrate CaSO4 SI	-2.62

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34498**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34499**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.41	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4184.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10005	µS - cm3
Ionic Strength	0.08	
Resistivity	1.000	ohms - m
Specific Gravity	1.0042	
Total Dissolved Solids	6426.555	mg/L

Cations	Result	Unit
Iron	22.81	mg/L
Manganese	0.455	mg/L
Barium	0.18	mg/L
Strontium	3.40	mg/L
Calcium	23.57	mg/L
Magnesium	4.03	mg/L
Sodium	1879.51	mg/L
Potassium	81.95	mg/L
Boron	3.34	mg/L
Lithium	3.49	mg/L
Zinc	0.11	mg/L
Lead	0.04	mg/L
Silicon	39.02	mg/L
Aluminum	0.06	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	179	mg/L
Fluoride	4	mg/L
Sulfate	129	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Calcite CaCO3 PTB	11.8
Calcite CaCO3 SI	0.37
Celestite SrSO4 SI	-1.55
Anhydrite CaSO4 SI	-3.23
Barite BaSO4 PTB	0.0
Barite BaSO4 SI	0.25
Gypsum CaSO4 SI	-2.85
Hemihydrate CaSO4 SI	-2.61

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34499**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34500**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.58	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4148	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9941	µS - cm3
Ionic Strength	0.08	
Resistivity	1.006	ohms - m
Specific Gravity	1.0054	
Total Dissolved Solids	6412.345	mg/L

Cations	Result	Unit
Iron	49.49	mg/L
Manganese	0.545	mg/L
Barium	0.19	mg/L
Strontium	2.57	mg/L
Calcium	14.41	mg/L
Magnesium	3.46	mg/L
Sodium	1887.68	mg/L
Potassium	82.32	mg/L
Boron	3.58	mg/L
Lithium	3.41	mg/L
Zinc	<	mg/L
Lead	<	mg/L
Silicon	35.61	mg/L
Aluminum	0.02	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Chloride	179	mg/L
Fluoride	4	mg/L
Sulfate	127	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.45
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.27
Calcite CaCO3 PTB	6.5
Calcite CaCO3 SI	0.32
Celestite SrSO4 SI	-1.67
Gypsum CaSO4 SI	-3.07
Hemihydrate CaSO4 SI	-2.83

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34500**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/14/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34501**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.5	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4440.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10384	µS - cm3
Ionic Strength	0.08	
Resistivity	0.963	ohms - m
Specific Gravity	1.0044	
Total Dissolved Solids	6726.524	mg/L

Cations	Result	Unit
Iron	79.96	mg/L
Manganese	1.014	mg/L
Barium	0.40	mg/L
Strontium	4.00	mg/L
Calcium	28.18	mg/L
Magnesium	4.26	mg/L
Sodium	1864.91	mg/L
Potassium	82.45	mg/L
Boron	3.33	mg/L
Lithium	3.52	mg/L
Zinc	0.29	mg/L
Lead	<	mg/L
Silicon	42.57	mg/L
Aluminum	0.11	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Chloride	178	mg/L
Fluoride	4	mg/L
Sulfate	125	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.17
Barite BaSO4 PTB	0.2
Barite BaSO4 SI	0.58
Calcite CaCO3 PTB	17.7
Calcite CaCO3 SI	0.56
Celestite SrSO4 SI	-1.49
Gypsum CaSO4 SI	-2.79
Hemihydrate CaSO4 SI	-2.55

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34501**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34502**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	10	ppb
pH	7.47	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4123.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9896	µS - cm3
Ionic Strength	0.08	
Resistivity	1.011	ohms - m
Specific Gravity	1.0052	
Total Dissolved Solids	6346.937	mg/L

Cations	Result	Unit
Iron	13.08	mg/L
Manganese	0.347	mg/L
Barium	0.27	mg/L
Strontium	3.66	mg/L
Calcium	25.92	mg/L
Magnesium	4.06	mg/L
Sodium	1865.00	mg/L
Potassium	81.30	mg/L
Boron	3.29	mg/L
Lithium	3.45	mg/L
Zinc	0.15	mg/L
Lead	0.12	mg/L
Silicon	39.84	mg/L
Aluminum	0.03	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Nitrate	Not Detected	mg/L
Chloride	182	mg/L
Fluoride	4	mg/L
Phosphate	Not Detected	mg/L
Sulfate	129	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.19
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.42
Calcite CaCO3 PTB	14.7
Hemihydrate CaSO4 SI	-2.57
Calcite CaCO3 SI	0.46
Celestite SrSO4 SI	-1.51
Gypsum CaSO4 SI	-2.81

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34502**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
--

Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34503**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	8	ppb
pH	7.49	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4123.6	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	10083	µS - cm3
Ionic Strength	0.08	
Resistivity	0.992	ohms - m
Specific Gravity	1.0051	
Total Dissolved Solids	6485.585	mg/L

Cations	Result	Unit
Iron	32.22	mg/L
Manganese	0.495	mg/L
Barium	0.21	mg/L
Strontium	3.22	mg/L
Calcium	20.81	mg/L
Magnesium	4.04	mg/L
Sodium	1982.99	mg/L
Potassium	86.02	mg/L
Boron	3.56	mg/L
Lithium	3.56	mg/L
Zinc	0.31	mg/L
Lead	0.14	mg/L
Silicon	39.71	mg/L
Aluminum	0.06	mg/L

Anions	Result	Unit
Bromide	Not Detected	mg/L
Chloride	187	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L
Fluoride	4	mg/L
Sulfate	131	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.28
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.32
Calcite CaCO3 PTB	10.7
Calcite CaCO3 SI	0.39
Celestite SrSO4 SI	-1.56
Gypsum CaSO4 SI	-2.90
Hemihydrate CaSO4 SI	-2.66

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34503**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)
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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34504**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

Receive Date: **09/13/2017**

Report Date: **09/15/2017**

Customer: **Sandridge Energy (1505453)**

Region: **North Park**

Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Analyses	Result	Unit
Dissolved CO2	Not Detected	mg/L
Dissolved H2S	1	mg/L
Oxygen	12	ppb
pH	7.44	
Pressure	1	psi
Temperature	72	° F

Analyses	Result	Unit
Bicarbonate	4074.8	mg/L
Carbonate	Not Detected	mg/L
Conductivity (Calculated)	9993	µS - cm3
Ionic Strength	0.08	
Resistivity	1.001	ohms - m
Specific Gravity	1.0053	
Total Dissolved Solids	6457.31	mg/L

Cations	Result	Unit
Iron	61.03	mg/L
Manganese	0.83	mg/L
Barium	0.22	mg/L
Strontium	3.14	mg/L
Calcium	21.43	mg/L
Magnesium	4.01	mg/L
Sodium	1970.85	mg/L
Potassium	85.58	mg/L
Boron	3.83	mg/L
Lithium	3.55	mg/L
Zinc	0.39	mg/L
Lead	0.12	mg/L
Silicon	39.97	mg/L
Aluminum	0.08	mg/L

Anions	Result	Unit
Fluoride	4	mg/L
Sulfate	131	mg/L
Bromide	Not Detected	mg/L
Chloride	190	mg/L
Nitrate	Not Detected	mg/L
Phosphate	Not Detected	mg/L

Scale Type	Result
Anhydrite CaSO4 SI	-3.27
Barite BaSO4 PTB	0.1
Barite BaSO4 SI	0.34
Gypsum CaSO4 SI	-2.88
Hemihydrate CaSO4 SI	-2.65
Calcite CaCO3 PTB	10.1
Calcite CaCO3 SI	0.34
Celestite SrSO4 SI	-1.57

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Water Analysis Report

Attention: **Sidney.shuck@nalco.com**

Location Code: **354156**

Sample ID: **AJ34504**

Login Batch: **2017-09-13-001**

Collection Date: **09/05/2017**

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Location: **Big Horn 0780 1-17 SWD**

System: **SWD**

Equipment: **SWAB**

Lab ID: **ABU-0021**

Sample Point: **SWAB**

Saturation Index Calculation (Tomson-Oddo Model)

Comments

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