

561659



Sandia National Laboratories

Operated for the U.S. Department of Energy

by

Sandia Corporation

Carlsbad, New Mexico 88220

*date:* February 6, 2014

*to:* Records Center

*from:* Patricia Johnson, SNL Contractor 

*subject:* 2013 Calculated Culebra Groundwater Densities

Groundwater densities for the WIPP Culebra monitoring wells were calculated for 2013 as described in the Activity/Project Specific Procedure (SP) 9-11 *Calculation of Densities for Groundwater in WIPP Wells*. The development of the calculated values and pedigree of the data are explained in the following sections. The supporting data are attached.

### 1. Calculation Process:

As stated in SP 9-11, for each calculation the observed water pressure is divided by the height of the water column. Specifically, the measured pressure value minus the closest corresponding barometric pressure was divided by the pressure gauge depth minus the closest corresponding depth to water (from or adjusted to the same measurement point elevation). That result was then divided by 0.4335 (conversion from psi to feet of water at 4°C, at which temperature the density of pure water is 1.000 g/cm<sup>3</sup>). The individual calculated density results for each well were then averaged between 5 or 6 independent calculated values for a final density value.

The density data are included in the "2013 Calc Densities.xlsx" Excel spreadsheet. Within that spreadsheet, the worksheet "2013 Calc Dens" summarizes the resulting density values and supporting information for the calculated densities, and the worksheet "2013 Calc Dens Formulas" provides the formulas in the worksheet. In addition, the Excel spreadsheet contains individual well worksheets including the data used for the calculations and plots of the pressure gauge pressure data. The columns in the worksheets and their contents are described below:

- A – Monitor Well – Well name
- B – 2013 Avg Calc Dens (g/cm<sup>3</sup>) – Average Calculated Density Value for 2013
- C – 2012 Avg Calc Dens (g/cm<sup>3</sup>) – Average Calculated Density Value for 2012
- D – 2013 - 2012 Diff (g/cm<sup>3</sup>) – Difference between 2013 and 2012 densities (Column B - Column C)
- E – # of Dens Averaged – number of density values averaged to get the final value
- F – 2013 Timeframe of Data – Time period for pressure data used in calculations

WIPP:4.4.2.3.1:TD:QA-C:RECERT:541153

Information Only

- G – Pressure Gauge File Name(s) – File names for pressure data
- H – Pressure Gauge Install Depth (feet (ft) below top of casing (BTOC)/ below top of environmental casing (BTEC)/ below top of tubing (BTOT)) – Depth below primary measuring point at which the pressure gauge was installed
- I – Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/BTOT) (ERMS 553781) – Mid-Culebra depth below top of referenced casing
- J – Length Off Ideal Depth (ft) – Depth in feet that the pressure gauge is installed below or above the ideal (Column I - Column H)
- K – Date of Install – Date the pressure gauge was installed or reinstalled into the well
- L – Installation Logbook Page – Reference to the logbook and page where the pressure gauge installation was documented
- M – Comments/Explanations – Comments and/or explanations regarding data

The spreadsheet entries were verified by Kris Kuhlman, Organization 6212.

## 2. Identification/Listing of Input, Input sources, and Output:

- Excel spreadsheet including the data – 2013 Calc Densities.xls
  - Worksheet 1 – 2013 Calc Dens (printed copy attached)
  - Worksheet 2 – 2013 Calc Dens Formulas (printed copy attached)
  - Worksheet 3 – Baro Data
  - Worksheet 4 – AEC-7
  - Worksheet 5 – C-2737
  - Worksheet 6 – ERDA-9
  - Worksheet 7 – H-2b2
  - Worksheet 8 – H-3b2
  - Worksheet 9 – H-4bR
  - Worksheet 10 – H-5b
  - Worksheet 11 – H-6bR
  - Worksheet 12 – H-7b1
  - Worksheet 13 – H-9bR
  - Worksheet 14 – H-10c
  - Worksheet 15 – H-11b4R
  - Worksheet 16 – H-12
  - Worksheet 17 – H-15R
  - Worksheet 18 – H-16
  - Worksheet 19 – H-17
  - Worksheet 20 – H-19b0
  - Worksheet 21 – IMC-461
  - Worksheet 22 – SNL-1
  - Worksheet 23 – SNL-2
  - Worksheet 24 – SNL-3
  - Worksheet 25 – SNL-5
  - Worksheet 26 – SNL-6

- Worksheet 27 – SNL-8
- Worksheet 28 – SNL-9
- Worksheet 29 – SNL-10
- Worksheet 30 – SNL-12
- Worksheet 31 – SNL-13
- Worksheet 32 – SNL-14
- Worksheet 33 – SNL-15
- Worksheet 34 – SNL-16
- Worksheet 35 – SNL-17A
- Worksheet 36 – SNL-18
- Worksheet 37 – SNL-19
- Worksheet 38 – WIPP-11
- Worksheet 39 – WIPP-13
- Worksheet 40 – WIPP-19

### **3. Data Qualification for Compliance Decision Analysis:**

Data sources provided in Column G (Pressure Gauge File Name(s)), Column L (Installation Logbook Page), and in the References Section.

### **4. Software Used:**

Intel® Xeon® CPU, Microsoft Windows 7, Microsoft Office Professional Plus 2010 Excel

### **5. Reviews:**

Technical: Kris Kuhlman, 6212

QA: Shelly Nielsen, 6210

### **6. References:**

- Pressure gauge installation data and SNL water level data from the following logbooks (package ERMS 543277):
  - Long-Term Monitoring Notebook (LTM)-18
  - Long-Term Monitoring Notebook (LTM)-19
  - Long-Term Monitoring Notebook (LTM)-20
- Memo of Correction for H-11b4R pressure gauge installation depth, January 21, 2014 (ERMS 561529)
- WRES Water Level Data submitted to SNL in monthly memoranda (package ERMS 525178)
- Johnson, Patricia B., Culebra Center Depths for Use in Calculating Equivalent Freshwater Heads of the Culebra Dolomite Member of the Rustler Formation near the WIPP Site, Revision 3, June 10, 2010 (ERMS 553781)

### **7. List of Attachments:**

1. Printout of Excel file worksheet 2013 Calc Dens.xls
2. Printout of Excel file worksheet 2013 Calc Dens Formulas.xls
3. CD including the Excel file and memorandum

2013 Calc Dens Formulas

A	B	C	D	E	F	G	H	I	J	K	L	M
Monitor Well	2013 Avg Calc Dens (g/cm <sup>3</sup> )	2012 Avg Calc Dens (g/cm <sup>3</sup> )	2013 - 2012 Diff (g/cm <sup>3</sup> )	# of Dens Averaged	2013 Timeframe of Data	Pressure Gauge File Name(s)	Pressure Gauge Install Depth (ft BTOC/BTEC/BTOT)	Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/BTOT) (ERMS 553781)	Length Off Ideal Depth (ft)	Date of Install	Installation Logbook Page	Comments/Explanations
AEC-7	1.066	1.065	=B4-C4	6	Mar - Jun 2013	SN123357 032513 AEC-7 (C18) 2013-09-04 09.41.29.wsl	872.98	872.98	=I4-H4	41358	LTM-19 p 74	
C-2737	1.021	1.021	=B5-C5	6	Mar - Jun 2013	SN121047 032613 C-2737 (C25) 2013-12-05 10.33.29.wsl	688.85	689.78	=I5-H5	41359	LTM-19 p 77	
ERDA-9	1.069	1.071	=B6-C6	6	Apr - Jun 2013	SN139810 120412 ERDA-9 (C17) 2013-11-19 08.47.12.wsl	717.2	717.81	=I6-H6	41247	LTM-18 p 140	
H-2b2	1.011	1.01	=B7-C7	6	Apr - Jun 2013	SN116305 022713 H-2b2 (C11) 2013-12-03 11.45.11.wsl	635.5	635.5	=I7-H7	41332	LTM-19 p 55	
H-3b2	1.03	1.034	=B8-C8	6	Mar - Jun 2013	SN110383 032613 H-3b2 (C19) 2014-01-07 12.50.10.wsl	670.6	687.1	=I8-H8	41359	LTM-19 p 76	
H-4bR	1.015	1.015	=B9-C9	6	Apr - Jun 2013	SN126697 022613 H-4bR (C9) 2013-12-03 12.47.12.wsl	507.9	507.54	=I9-H9	41331	LTM-19 p 52	
H-5b	1.09	1.093	=B10-C10	6	Apr - Jun 2013	SN134838 070312 H-5b (C14) 2013-04-30 10.28.38.wsl, SN146411 043013 H-5b (C15) 2013-12-04 14.29.47.wsl	909.22	909.22	=I10-H10	7/3/2012, 4/30/2013	LTM-18 p 25, LTM-19 p 101	
H-6bR	1.037	1.036	=B11-C11	6	Apr - Jun 2013	SN110390 022713 H-6bR (C7) 2013-12-05 09.57.25.wsl	616.6	616.58	=I11-H11	41332	LTM-19 p 55	
H-7b1	1.005	1.005	=B12-C12	6	Mar - Jun 2013	SN122638 032513 H-7b1 (C18) 2013-12-03 09.31.59.wsl	269.9	269.13	=I12-H12	41358	LTM-19 p 75	
H-9bR	0.999	0.996	=B13-C13	6	Apr - Jun 2013	SN121044 111412 H-9bR (C6) 2013-08-28 11.38.54.wsl	660.54	660.54	=I13-H13	41227	LTM-18 p 137	
H-10c	1.093	1.092	=B14-C14	6	Apr - Jun 2013	SN129649 082912 H-10c (C14) 2013-07-30 08.34.06.wsl	1372.1	1371.9	=I14-H14	41150	LTM-18 p 82	
H-11b4R	1.074	1.074	=B15-C15	6	Apr - Jun 2013	SN134842 013113 H-11b4R (C5) 2013-05-21 10.38.44.wsl, SN136296 052113 H-11b4R (C6) 2013-12-05 14.23.52.wsl	735.85	735.85	=I15-H15	6/28/12, 5/21/2013	LTM-18 p 21, LTM-19 p 119	Pressure gauge depth entered incorrectly into LTM-19, memo of correction completed to correct error (ERMS 561529)
H-12	1.106	1.111	=B16-C16	6	Apr - Jun 2013	SN143789 013013 H-12 (C25) 2013-12-06 10.50.57.wsl	820	837.67	=I16-H16	41304	LTM-19 p 26, LTM-19 p 47	
H-15R	1.116	1.116	=B17-C17	5	Apr - Jun 2013	SN149044 013113 H-15R (C11) 2013-06-05 08.14.44.wsl, SN149041 061913 H-15R (C14) 2013-12-05 11.17.31.wsl	872.5	872.57	=I17-H17	7/3/2012, 6/5/2013	LTM-18 p 25, LTM-19 p 128	
H-16	1.034	1.035	=B18-C18	6	Apr - Jun 2013	SN147216 120412 H-16 (C6) 2013-11-19 09.32.07.wsl	715.1	715.1	=I18-H18	41247	LTM-18 p 141	
H-17	1.131	1.131	=B19-C19	6	Apr - Jun 2013	SN116450 070912 H-17 (C11) 2013-04-22 11.48.02.wsl, SN116300 042213 H-17 (C12) 2013-12-05 13.13.02.wsl	719.93	719.93	=I19-H19	5/30/2012, 4/22/2013	LTM-17 p 134, LTM-19 p 97	
H-19b0	1.064	1.064	=B20-C20	6	Apr - Jun 2013	SN123363 080812 H-19b0 (C17) 2013-04-22 12.49.11.wsl, SN129856 042213 H-19b0 (C18) 2013-12-06 11.45.03.wsl	754	753.49	=I20-H20	5/30/2012, 4/22/2013	LTM-17 p 135, LTM-19 p 99	
IMC-461	0.995	0.994	=B21-C21	6	Apr - Jun 2013	SN143793 020113 IMC-461 (C24) 2013-06-17 10.31.11.wsl, SN143793 061713 IMC-461 (C25) 2013-12-03 10.16.14.wsl	376.5	376.1	=I21-H21	41306	LTM-19 p 34	
SNL-1	1.028	1.027	=B22-C22	6	Apr - Jun 2013	SN116452 020113 SNL-1 (C22) 2013-04-09 07.58.13.wsl, SN123367 040413 SNL-1 (C23) 2013-05-23 09.09.43.wsl	612.9	612.23	=I22-H22	2/1/2013, 4/4/13, 5/23/13	LTM-19 p 32, LTM-19 p 89, LTM-19 p	
SNL-2	1.007	1.007	=B23-C23	6	Apr - Jun 2013	SN148779 031313 SNL-2 (C30) 2013-12-04 09.41.36.wsl	470.7	470.69	=I23-H23	41346	LTM-19 p 70	
SNL-3	1.026	1.026	=B24-C24	6	Apr - Jun 2013	SN153537 022713 SNL-3 (C16) 2013-12-04 12.01.20.wsl	766.5	766.19	=I24-H24	41332	LTM-19 p 56	
SNL-5	1.007	1.007	=B25-C25	6	Apr - Jun 2013	SN164456 053112 SNL-5 (C19) 2013-04-30 12.20.43.wsl, SN116450 043013 SNL-5 (C20) 2013-07-11 11.00.17.wsl	649	648.84	=I25-H25	5/31/2012, 4/30/2013	LTM-17 p 138, LTM-19 p 103	
SNL-6	1.241	1.241	=B26-C26	6	Apr - Jun 2013	SN174038 022613 SNL-6 (C15) 2014-01-09 13.13.09.wsl	1338.2	1338.03	=I26-H26	41331	LTM-19 p 49	
SNL-8	1.093	1.092	=B27-C27	6	Apr - Jun 2013	SN116451 020113 SNL-8 (C34) 2013-05-23 07.20.03.wsl, SN116451 052313 SNL-8 (C35) 2013-12-04 14.09.22.wsl	969.7	969.7	=I27-H27	2/1/2013, 5/23/13	LTM-19 p 31, LTM-19 p 123	
SNL-9	1.016	1.016	=B28-C28	6	Apr - Jun 2013	SN126691 031313 SNL-9 (C25) 2013-12-03 10.45.02.wsl	567.2	567.2	=I28-H28	41346	LTM-19 p 72	
SNL-10	1.008	1.007	=B29-C29	5	Apr - Jun 2013	SN121344 041013 SNL-10 (C16) 2013-05-22 06.47.20.wsl, SN121344 052213 SNL-10 (C17) 2013-06-19 09.28.43.wsl, SN128518 053012 SNL-12 (C17) 2013-04-22 10.20.43.wsl, SN121361 042213 SNL-12 (C18) 2013-12-03 15.36.31.wsl	613.5	613.46	=I29-H29	4/8/2013, 5/22/13	LTM-19 p 92, LTM-19 p 121	
SNL-12	1.004	1.004	=B30-C30	6	Apr - Jun 2013	SN136297 100312 SNL-13 (C20) 2013-07-30 12.08.43.wsl	570.9	570.68	=I30-H30	5/30/2012, 4/22/2013	LTM-17 p 135, LTM-19 p 95	
SNL-13	1.015	1.016	=B31-C31	6	Apr - Jun 2013	SN146411 111312 SNL-14 (C-27) 2013-04-22 12.12.12.wsl, SN126694 042213 SNL-14 (C28) 2013-12-05 12.53.14.wsl, SN162609 030713 SNL-15 (C21) 2013-04-22 11.03.42.wsl, SN121360 042213 SNL-15 (C22) 2013-10-30 07.48.07.wsl	401.16	400.62	=I31-H31	41150	LTM-18 p 85	
SNL-14	1.044	1.044	=B32-C32	6	Apr - Jun 2013	SN146411 111312 SNL-14 (C-27) 2013-04-22 12.12.12.wsl, SN126694 042213 SNL-14 (C28) 2013-12-05 12.53.14.wsl, SN162609 030713 SNL-15 (C21) 2013-04-22 11.03.42.wsl, SN121360 042213 SNL-15 (C22) 2013-10-30 07.48.07.wsl	668.95	668.95	=I32-H32	11/13/2012, 4/22/2013	LTM-18 p 134, LTM-19 p 98	
SNL-15	1.227	1.227	=B33-C33	6	Apr - Jun 2013	SN149045 020113 SNL-16 (C17) 2013-12-03 08.57.03.wsl	922.18	922.18	=I33-H33	5/31/2012, 4/22/2013	LTM-17 p 139, LTM-19 p 96	
SNL-16	1.006	1.007	=B34-C34	6	Apr - Jun 2013	SN149045 020113 SNL-16 (C17) 2013-12-03 08.57.03.wsl	207.86	207.86	=I34-H34	41306	LTM-19 p 34	
SNL-17A	1.003	1.003	=B35-C35	6	Mar - Jun 2013	SN121033 032513 SNL-17 (C19) 2013-12-03 13.29.57.wsl	349.6	349.93	=I35-H35	41358	LTM-19 p 74	
SNL-18	1.007	1.003	=B36-C36	6	Apr - Jun 2013	SN116453 020113 SNL-18 (C20) 2013-05-22 09.35.53.wsl, SN116453 052213 SNL-18 (C21) 2013-08-01 09.26.48.wsl	549.3	549.3	=I36-H36	2/1/2013, 5/22/13	LTM-19 p 33, LTM-19 p 122	
SNL-19	1.005	1.005	=B37-C37	6	Mar - Jun 2013	SN170831 031313 SNL-19 (C16) 2013-12-04 09.11.35.wsl	355.1	354.19	=I37-H37	41346	LTM-19 p 69	
WIPP-11	1.036	1.036	=B38-C38	6	Mar - Jun 2013	SN141106 031313 WIPP-11 (C25) 2013-12-04 11.18.31.wsl	857.8	857.41	=I38-H38	41346	LTM-19 p 71	
WIPP-13	1.038	1.039	=B39-C39	6	Apr - Jun 2013	SN123361 070212 WIPP-13 (C18) 2013-05-21 08.53.49.wsl, SN147945 052113 WIPP-13 (C19) 2013-12-05 08.55.47.wsl	715.3	714.88	=I39-H39	7/2/2012, 5/21/2013	LTM-18 p 23, LTM-19 p 117	
WIPP-19	1.05	1.05	=B40-C40	6	Apr - Jun 2013	SN146412 053112 WIPP-19 (C9) 2013-04-30 11.10.29.wsl, SN162604 043013 WIPP-19 (C10) 2013-12-04 14.54.45.wsl	770.2	769.5	=I40-H40	5/31/2012, 4/30/2013	LTM-17 p 137, LTM-19 p 101	

Notes:

All pressure gauges, except for the baro gauge, are In-Situ Level Troll gauges and cables are all non-vented  
 Barometric data are from INW gauge - file PAC-A\_BARO1\_021513  
 ft BTOC = feet below top of casing  
 ft BTEC = feet below top of environmental casing  
 ft BTOT = feet below top of tubing  
 LTM = Long-Term Monitoring  
 NA = Not available

Information Only

2013 Calc Dens

A	B	C	D	E	F	G	H	I	J	K	L	M
Monitor Well	2013 Avg Calc Dens (g/cm <sup>3</sup> )	2012 Avg Calc Dens (g/cm <sup>3</sup> )	2013 - 2012 Diff (g/cm <sup>3</sup> )	# of Dens Averaged	2013 Timeframe of Data	Pressure Gauge File Name(s)	Pressure Gauge Install Depth (ft BTOC/BTEC/BTOT)	Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/BTOT) (ERMS 553781)	Length Off Ideal Depth (ft)	Date of Install	Installation Logbook Page	Comments/Explanations
AEC-7	1.066	1.065	0.001	6	Mar - Jun 2013	SN123357 032513 AEC-7 (C18) 2013-09-04 09.41.29.wsl	872.98	872.98	0.00	3/25/2013	LTM-19 p 74	
C-2737	1.021	1.021	0.000	6	Mar - Jun 2013	SN121047 032613 C-2737 (C25) 2013-12-05 10.33.29.wsl	688.85	689.78	0.93	3/26/2013	LTM-19 p 77	
ERDA-9	1.069	1.071	-0.002	6	Apr - Jun 2013	SN139810 120412 ERDA-9 (C17) 2013-11-19 08.47.12.wsl	717.20	717.81	0.61	12/4/2012	LTM-18 p 140	
H-2b2	1.011	1.01	0.001	6	Apr - Jun 2013	SN116305 022713 H-2b2 (C11) 2013-12-03 11.45.11.wsl	635.50	635.50	0.00	2/27/2013	LTM-19 p 55	
H-3b2	1.03	1.034	-0.004	6	Mar - Jun 2013	SN110383 032613 H-3b2 (C19) 2014-01-07 12.50.10.wsl	670.60	687.10	16.50	3/26/2013	LTM-19 p 76	
H-4bR	1.015	1.015	0.000	6	Apr - Jun 2013	SN126697 022613 H-4bR (C9) 2013-12-03 12.47.12.wsl	507.90	507.54	-0.36	2/26/2013	LTM-19 p 52	
H-5b	1.09	1.093	-0.003	6	Apr - Jun 2013	SN134838 070312 H-5b (C14) 2013-04-30 10.28.38.wsl, SN146411 043013 H-5b (C15) 2013-12-04 14.29.47.wsl	909.22	909.22	0.00	7/3/2012, 4/30/2013	LTM-18 p 25, LTM-19 p 101	
H-6bR	1.037	1.036	0.001	6	Apr - Jun 2013	SN110390 022713 H-6bR (C7) 2013-12-05 09.57.25.wsl	616.60	616.58	-0.02	2/27/2013	LTM-19 p 55	
H-7b1	1.005	1.005	0.000	6	Mar - Jun 2013	SN122638 032513 H-7b1 (C18) 2013-12-03 09.31.59.wsl	269.90	269.13	-0.77	3/25/2013	LTM-19 p 75	
H-9bR	0.999	0.996	0.003	6	Apr - Jun 2013	SN121044 111412 H-9bR (C6) 2013-08-28 11.38.54.wsl	660.54	660.54	0.00	11/14/2012	LTM-18 p 137	
H-10c	1.093	1.092	0.001	6	Apr - Jun 2013	SN129649 082912 H-10c (C14) 2013-07-30 08.34.06.wsl	1372.10	1371.90	-0.20	8/29/2012	LTM-18 p 82	
H-11b4R	1.074	1.074	0	6	Apr - Jun 2013	SN134842 013113 H-11b4R (C5) 2013-05-21 10.38.44.wsl, SN136296 052113 H-11b4R (C6) 2013-12-05 14.23.52.wsl	735.85	735.85	0.00	6/28/12, 5/21/2013	LTM-18 p 21, LTM-19 p 119	Pressure gauge depth entered incorrectly into LTM-19, memo of correction completed to correct error (ERMS 561529)
H-12	1.106	1.111	-0.005	6	Apr - Jun 2013	SN143789 013013 H-12 (C25) 2013-12-06 10.50.57.wsl	820.00	837.67	17.67	1/30/2013	LTM-19 p 26, LTM-19 p 47 explanation	
H-15R	1.116	1.116	0.000	5	Apr - Jun 2013	SN149044 013113 H-15R (C11) 2013-06-05 08.14.44.wsl, SN149041 061913 H-15R (C14) 2013-12-05 11.17.31.wsl	872.50	872.57	0.07	7/3/2012, 6/5/2013	LTM-18 p 25, LTM-19 p 128	
H-16	1.034	1.035	-0.001	6	Apr - Jun 2013	SN147216 120412 H-16 (C6) 2013-11-19 09.32.07.wsl	715.10	715.10	0.00	12/4/2012	LTM-18 p 141	
H-17	1.131	1.131	0.000	6	Apr - Jun 2013	SN116450 070912 H-17 (C11) 2013-04-22 11.48.02.wsl, SN116300 042213 H-17 (C12) 2013-12-05 13.13.02.wsl	719.93	719.93	0.00	5/30/2012, 4/22/2013	LTM-17 p 134, LTM-19 p 97	
H-19b0	1.064	1.064	0.000	6	Apr - Jun 2013	SN123363 080812 H-19b0 (C17) 2013-04-22 12.49.11.wsl, SN129856 042213 H-19b0 (C18) 2013-12-06 11.45.03.wsl	754.00	753.49	-0.51	5/30/2012, 4/22/2013	LTM-17 p 135, LTM-19 p 99	
IMC-461	0.995	0.994	0.001	6	Apr - Jun 2013	SN143793 020113 IMC-461 (C24) 2013-06-17 10.31.11.wsl, SN143793 061713 IMC-461 (C25) 2013-12-03 10.16.14.wsl	376.50	376.10	-0.40	2/1/2013	LTM-19 p 34	
SNL-1	1.028	1.027	0.001	6	Apr - Jun 2013	SN116452 020113 SNL-1 (C22) 2013-04-09 07.58.13.wsl, SN123367 040413 SNL-1 (C23) 2013-05-23 09.09.43.wsl, SN123367 052313 SNL-1 (C24) 2013-07-11 09.08.17.wsl	612.90	612.23	-0.67	2/1/2013, 4/4/13, 5/23/13	LTM-19 p 32, LTM-19 p 89, LTM-19 p 124	
SNL-2	1.007	1.007	0.000	6	Apr - Jun 2013	SN148779 031313 SNL-2 (C30) 2013-12-04 09.41.36.wsl	470.70	470.69	-0.01	3/13/2013	LTM-19 p 70	
SNL-3	1.026	1.026	0.000	6	Apr - Jun 2013	SN153537 022713 SNL-3 (C16) 2013-12-04 12.01.20.wsl	766.50	766.19	-0.31	2/27/2013	LTM-19 p 56	
SNL-5	1.007	1.007	0.000	6	Apr - Jun 2013	SN164456 053112 SNL-5 (C19) 2013-04-30 12.20.43.wsl, SN116450 043013 SNL-5 (C20) 2013-07-11 11.00.17.wsl	649.00	648.84	-0.16	5/31/2012, 4/30/2013	LTM-17 p 138, LTM-19 p 103	
SNL-6	1.241	1.241	0.000	6	Apr - Jun 2013	SN174038 022613 SNL-6 (C15) 2014-01-09 13.13.09.wsl	1338.20	1338.03	-0.17	2/26/2013	LTM-19 p 49	
SNL-8	1.093	1.092	0.001	6	Apr - Jun 2013	SN116451 020113 SNL-8 (C34) 2013-05-23 07.20.03.wsl, SN116451 052313 SNL-8 (C35) 2013-12-04 14.09.22.wsl	969.70	969.70	0.00	2/1/2013, 5/23/13	LTM-19 p 31, LTM-19 p 123	
SNL-9	1.016	1.016	0.000	6	Apr - Jun 2013	SN126691 031313 SNL-9 (C25) 2013-12-03 10.45.02.wsl	567.20	567.20	0.00	3/13/2013	LTM-19 p 72	
SNL-10	1.008	1.007	0.001	5	Apr - Jun 2013	SN121344 041013 SNL-10 (C16) 2013-05-22 06.47.20.wsl, SN121344 052213 SNL-10 (C17) 2013-06-19 09.28.43.wsl, SN121344 061913 SNL-10 (C18) 2013-08-28 09.01.15.wsl	613.50	613.46	-0.04	4/8/2013, 5/22/13	LTM-19 p 92, LTM-19 p 121	
SNL-12	1.004	1.004	0.000	6	Apr - Jun 2013	SN128518 053012 SNL-12 (C17) 2013-04-22 10.20.43.wsl, SN121361 042213 SNL-12 (C18) 2013-12-03 15.36.31.wsl	570.90	570.68	-0.22	5/30/2012, 4/22/2013	LTM-17 p 135, LTM-19 p 95	
SNL-13	1.015	1.016	-0.001	6	Apr - Jun 2013	SN136297 100312 SNL-13 (C20) 2013-07-30 12.08.43.wsl	401.16	400.62	-0.54	8/29/2012	LTM-18 p 85	
SNL-14	1.044	1.044	0.000	6	Apr - Jun 2013	SN146411 111312 SNL-14 (C-27) 2013-04-22 12.12.12.wsl, SN126694 042213 SNL-14 (C28) 2013-12-05 12.53.14.wsl	668.95	668.95	0.00	11/13/2012, 4/22/2013	LTM-18 p 134, LTM-19 p 98	
SNL-15	1.227	1.227	0.000	6	Apr - Jun 2013	SN162609 030713 SNL-15 (C21) 2013-04-22 11.03.42.wsl, SN121360 042213 SNL-15 (C22) 2013-10-30 07.48.07.wsl	922.18	922.18	0.00	5/31/2012, 4/22/2013	LTM-17 p 139, LTM-19 p 96	
SNL-16	1.006	1.007	-0.001	6	Apr - Jun 2013	SN149045 020113 SNL-16 (C17) 2013-12-03 08.57.03.wsl	207.86	207.86	0.00	2/1/2013	LTM-19 p 34	
SNL-17A	1.003	1.003	0.000	6	Mar - Jun 2013	SN121033 032513 SNL-17 (C19) 2013-12-03 13.29.57.wsl	349.60	349.93	0.33	3/25/2013	LTM-19 p 74	
SNL-18	1.007	1.003	0.004	6	Apr - Jun 2013	SN116453 020113 SNL-18 (C20) 2013-05-22 09.35.53.wsl, SN116453 052213 SNL-18 (C21) 2013-08-01 09.26.48.wsl	549.30	549.30	0.00	2/1/2013, 5/22/13	LTM-19 p 33, LTM-19 p 122	
SNL-19	1.005	1.005	0.000	6	Mar - Jun 2013	SN170831 031313 SNL-19 (C16) 2013-12-04 09.11.35.wsl	355.10	354.19	-0.91	3/13/2013	LTM-19 p 69	
WIPP-11	1.036	1.036	0.000	6	Mar - Jun 2013	SN141106 031313 WIPP-11 (C25) 2013-12-04 11.18.31.wsl	857.80	857.41	-0.39	3/13/2013	LTM-19 p 71	
WIPP-13	1.038	1.039	-0.001	6	Apr - Jun 2013	SN123361 070212 WIPP-13 (C18) 2013-05-21 08.53.49.wsl, SN147945 052113 WIPP-13 (C19) 2013-12-05 08.55.47.wsl	715.30	714.88	-0.42	7/2/2012, 5/21/2013	LTM-18 p 23, LTM-19 p 117	
WIPP-19	1.05	1.05	0.000	6	Apr - Jun 2013	SN146412 053112 WIPP-19 (C9) 2013-04-30 11.10.29.wsl, SN162604 043013 WIPP-19 (C10) 2013-12-04 14.54.45.wsl	770.20	769.50	-0.70	5/31/2012, 4/30/2013	LTM-17 p 137, LTM-19 p 101	

Notes:  
 All pressure gauges, except for the baro gauge, are In-Situ Level Troll gauges and cables are all non-vented  
 Barometric data are from INW gauge - file PAC-A\_BARO1\_021513  
 ft BTOC = feet below top of casing  
 ft BTEC = feet below top of environmental casing  
 ft BTOT = feet below top of tubing  
 LTM = Long-Term Monitoring  
 NA = Not available

Information Only