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Sandia National Laboratories

Operated for the U.S. Department of Energy

By: Sandia Corporation

Carlsbad, New Mexico 88220

date: April 23, 2019

to: Records Center

from: Patricia Johnson, SNL Contractor 4/23/19

subject: 2018 Calculated Densities

The groundwater densities for the WIPP Culebra monitoring wells were calculated for 2018 as described in the Activity/Project Specific Procedure (SP) 9-11 *Calculation of Densities for Groundwater in WIPP Wells*. The derivation of the data are explained in the following sections and 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), and that result was then divided by 0.4335 (psi to feet of water conversion at 4°C, at which temperature the density of pure water is 1.000 g/cm^3). The individual calculated density results for each well were then averaged for a final density value.

The density data are included in the *2018 Calculated Densities.xlsx* spreadsheet file created in Excel. Within that spreadsheet, the worksheet *2018 Calc Dens* summarizes the resulting density values and supporting information for the calculated densities, and the worksheet *2018 Calc Dens Formulas* provides the formulas in the worksheet. In addition, the Excel file contains individual well worksheets that include 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 – 2018 Avg Calc Dens (g/cm^3) – Average calculated density value for 2018
- C – 2018 Specific Gravity (Reference: Freshwater at 70°F) – Average calculated density value for 2018 divided by 0.998 to represent specific gravity in reference to freshwater at 70°F
- D – 2017 Avg Calc Dens (g/cm^3) – Average calculated density value for 2017
- E – 2018 - 2017 Difference (g/cm^3) – Difference between 2018 and 2017 calculated densities (Column B - Column D)
- F – # of Dens Averaged – number of density values averaged to get the final value
- G – 2018 Timeframe of Data – Time period for pressure data used in calculations
- H – Pressure Gauge File Name (Gauge SN) – File name for pressure data and INW or In-Situ gauge serial number
- I – Pressure Gauge Install Depth (ft BTOC/BTEC/BTOT) – Depth below primary measuring point at which the pressure gauge was installed

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- J – Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/BTOT) – Mid-Culebra depth below top of referenced casing
- K – Length Off Ideal Depth (ft) – Depth in feet that the pressure gauge is installed below or above the ideal (Column I - Column J)
- L – Date of Install – Date(s) the pressure gauge(s) was/were installed
- M – Installation Logbook Page – Reference to scientific notebook(s) and page(s) where the pressure gauge installation(s) is/are documented
- N – Comments/Explanations – Comments and/or explanations regarding data, as needed

The spreadsheet entries were verified by Amelia Hayes (8882) and Shelly Nielsen (8880).

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

- Excel spreadsheet including the data – 2018 Calculated Densities.xls
  - Worksheet 1 – 2018 Calc Dens
  - Worksheet 2 – 2018 Calc Dens Formulas
  - Worksheet 3 – Baro Data
  - Worksheet 4 – AEC-7R
  - Worksheet 5 – C-2737
  - Worksheet 6 – ERDA-9
  - Worksheet 7 – H-2b2
  - Worksheet 8 – H-4bR
  - Worksheet 9 – H-5b
  - Worksheet 10 – H-6bR
  - Worksheet 11 – H-7b1
  - Worksheet 12 – H-9bR
  - Worksheet 13 – H-10cR
  - Worksheet 14 – H-11b4R
  - Worksheet 15 – H-12R
  - Worksheet 16 – H-15R
  - Worksheet 17 – H-16
  - Worksheet 18 – H-17
  - Worksheet 19 – H-19b0
  - Worksheet 20 – IMC-461
  - Worksheet 21 – SNL-1
  - Worksheet 22 – SNL-2
  - Worksheet 23 – SNL-3
  - Worksheet 24 – SNL-5
  - Worksheet 25 – SNL-6
  - Worksheet 26 – SNL-8
  - Worksheet 27 – SNL-9
  - Worksheet 28 – SNL-10
  - Worksheet 29 – SNL-12
  - Worksheet 30 – SNL-13
  - Worksheet 31 – SNL-14
  - Worksheet 32 – SNL-15
  - Worksheet 33 – SNL-16
  - Worksheet 34 – SNL-17
  - Worksheet 35 – SNL-18
  - Worksheet 36 – SNL-19
  - Worksheet 37 – WIPP-11
  - Worksheet 38 – WIPP-13
  - Worksheet 39 – WIPP-19

3. Data Qualification for Compliance Decision Analysis:

Data sources are documented in Column H (Pressure Gauge File Name (Gauge SN)), Column M (Installation Logbook Page), and in the References Section of this memorandum.

4. Software Used:

Lenovo, Intel® Core™ i7-4810MQ CPU, Windows 10 Pro, Microsoft Office 2016 Excel

5. Reviews:

Technical: Barbara Rigney, 8882
QA: Shelly Nielsen, 8880

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6. **References:**
   - Pressure gauge installation data and SNL water level data from the following scientific notebooks (package ERMS 543277):
     Long-Term Monitoring Notebook (LTM)-27
     Long-Term Monitoring Notebook (LTM)-28
     Long-Term Monitoring Notebook (LTM)-29
   - RES 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 2018 Calc Dens.xls
   2. Printout of Excel file worksheet 2018 Calc Dens Formulas.xls
   3. CD including the Excel file and memorandum

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2018 Calculated Densities

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Monitor Well	2018 Avg Calc Dens (g/cm^3)	2018 Specific Gravity (Reference: Freshwater at 70°F)	2017 Avg Calc Dens (g/cm^3)	2018 - 2017 Difference (g/cm^3)	# of Dens Averaged	2018 Timeframe of Data	Pressure Gauge File Name (Gauge SN)	Pressure Gauge Install Depth (ft BTOC/BTEC/ BTOT)	Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/ BTOT)	Length Off Ideal Depth (ft)	Date of Install	Installation Logbook Page	Comments/Explanations
AEC-7R	1.075	1.077	1.066	0.009	8	Aug-Nov	AEC-7R C15 062018 (21534015)	866.00	867.72	-1.72	6/20/2018	LTM-28 p 135	
C-2737	1.022	1.024	1.027	-0.005	8	Jul-Oct	C-2737 C33 050918 (21237044)	688.85	689.78	-0.93	5/9/2018	LTM-28 p 98	
ERDA-9	1.073	1.075	1.071	0.002	8	Aug-Nov	ERDA-9 C24 050918 (21237074)	717.20	717.81	-0.61	5/9/2018	LTM-28 p 98	
H-2b2	1.011	1.013	1.011	0.000	8	Jul-Dec	H-2b2 C17 090717 (21237040), H-2b2 C19 092018 (21237059)	635.50	635.50	0.00	9/7/17, 9/20/18	LTM-27 p 48, LTM-29 p 69	
H-3b2	Not Available -- Sandia ceased monitoring in Sept 2017 due to well collapse												
H-4bR	1.016	1.018	1.018	-0.002	8	Aug-Nov	H-4bR C16 032918 (21237037), H-4bR C17 100318 (21237040)	507.90	507.54	0.36	3/29/18, 10/3/18	LTM-28 p 70, LTM-29 p 72	
H-5b	1.100	1.102	1.096	0.004	8	Aug-Nov	H-5b C21 090717 (21237027), H-5b C23 092018 (21534013)	889.22	909.22	-20.00	9/7/17, 9/20/18	LTM-27 p 46, LTM-29 p 69	
H-6bR	1.033	1.035	1.037	-0.004	8	Aug-Nov	H-6bR C15 021518 (21237028), H-6bR C16 080818 (21237028)	616.60	616.58	0.02	2/15/18, 8/8/18	LTM-28 p 36, LTM-29 p 30	
H-7b1	1.009	1.011	1.005	0.004	8	Aug-Nov	H-7b1 C27 072518 (21237051), H-7b1 C28 100318 (21237043)	269.90	269.13	0.77	7/25/18, 10/3/18	LTM-29 p 26, LTM-29 p 71	
H-9bR	1.003	1.005	1.002	0.001	8	Aug-Nov	H-9bR C14 070318 (21237083), H-9bR C16 101618 (21225020)	660.54	660.54	0.00	7/3/18, 10/16/18	LTM-29 p 5, LTM-29 p 81	
H-10cR	1.079	1.081	1.076	0.003	8	Aug-Nov	H-10cR C10 072418_2018-08-14_09-31-07-460.wsl (539743)	1374.10	1374.10	0.00	7/24/2018	LTM-29 p 22	
H-11b4R	1.076	1.078	1.076	0.000	8	Aug-Dec	H-11b4R C14 032918 (21534011), H-11b4R C15 091318 (21534011), H-114bR C16 111518 (21534011)	735.85	736.82	-0.97	3/29/18, 9/13/18	LTM-28 p 69, LTM-29 p 64	Test was inadvertently not started on 9/13/18, but was started on 11/15/18
H-12R	1.108	1.110	1.102	0.006	8	Jun-Oct	H-12R C11 052318 (21237075), H-12R C12 091418 (21237086)	835.80	835.75	0.05	5/23/18, 9/14/18	LTM-28 p 115, LTM-29 p 67	
H-15R	1.119	1.121	1.116	0.003	8	Aug-Nov	H-15R C20 072418 (21237054)	872.50	872.57	-0.07	7/24/2018	LTM-29 p 24	
H-16	1.031	1.033	1.031	0.000	8	Aug-Dec	H-16 C13 030818 (21237078)	715.10	715.10	0.00	3/8/2018	LTM-28 P 52	
H-17	1.130	1.132	1.131	-0.001	9	Jan-May	H-17 C21 010918 (21237056)	719.93	719.93	0.00	1/9/2018	LTM-28 p 6	
H-19b0	1.065	1.067	1.064	0.001	8	Aug-Nov	H-19b0 C26 052318 (21237073)	754.00	753.49	0.51	5/23/2018	LTM-28 p 116	
IMC-461	1.000	1.002	1.000	0.000	8	Jul-Dec	IMC-461 C34 050718 (21237066), IMC-461 C35 110818 (21237066)	376.50	376.10	0.40	5/7/2018, 11/8/18	LTM-28 p 94, LTM-29 p 100	
SNL-1	1.029	1.031	1.029	0.000	8	Aug-Nov	SNL-1 C32 072418 (21237038), SNL-1 C33 080718 (21237038)	612.90	612.23	0.67	7/24/18, 8/7/18	LTM-29 p 25, LTM-29 p 28	
SNL-2	1.006	1.008	1.006	0.000	8	Aug-Nov	SNL-2 C38 072518 (21237035)	470.70	470.69	0.01	7/25/2018	LTM-29 p 26	
SNL-3	1.026	1.028	1.025	0.001	8	Aug-Nov	SNL-3 C22 030818 (21534013), SNL-3 C24 090518 (21237049)	766.50	766.19	0.31	3/8/18, 9/5/2018	LTM-28 p 52, LTM-29 p 50	
SNL-5	1.005	1.007	1.010	-0.005	8	Aug-Nov	SNL-5 C35 060618 (21237030)	649.00	648.84	0.16	6/6/2018	LTM-28 p 118	
SNL-6	1.246	1.248	1.245	0.001	8	Aug-Nov	SNL-6 C22 111417_Append_2018-08-14_08-07-23-090.wsl (452594), SNL-6 C22 111417_Append_2018-11-06_10-26-00-770.wsl (452594)	1338.20	1338.03	0.17	11/14/2017	LTM-27 p 87	
SNL-8	1.104	1.106	1.099	0.005	8	Aug-Nov	SNL-8 C45 090717 (21225020), SNL-8 C47 0090518 (21237061), SNL-8 C48 101818 (21237084)	969.70	969.70	0.00	9/7/17, 9/5/18, 10/18/18	LTM-27 p 46, LTM-29 p 50, LTM-29 p88	
SNL-9	1.015	1.017	1.015	0.000	8	Aug-Nov	SNL-9 C35 062118 (21237089)	567.20	567.20	0.00	6/21/2018	LTM-28 p 136	
SNL-10	1.009	1.011	1.008	0.001	7	Aug-Nov	SNL-10 C27 062118 (21237070)	613.50	613.46	0.04	6/21/2018	LTM-28 p 136	
SNL-12	1.013	1.015	1.011	0.002	8	Aug-Nov	SNL-12 C28 051718 (21237072)	570.90	570.68	0.22	5/17/2018	LTM-28 p 106	
SNL-13	1.020	1.022	1.022	-0.002	8	Aug-Nov	SNL-13 C29 032918 (21534016), SNL-13 C30 101518 (21225017)	401.00	400.62	0.38	3/29/2018, 10/15/18	LTM-28 p 70, LTM-29 p 76	
SNL-14	1.045	1.047	1.044	0.001	8	Aug-Nov	SNL-14 C34 072418 (21237050), SNL-14 C35 080818 (21237050)	668.95	668.95	0.00	7/24/18, 8/8/2018	LTM-29 p 23, LTM-29 p 31	
SNL-15	1.225	1.227	1.223	0.002	8	May-Aug	SNL-15 C30 050718 (21237076)	922.18	922.18	0.00	5/7/2018	LTM-28 p 97	
SNL-16	1.014	1.016	1.012	0.002	7	Sept-Dec	SNL-16 C31 090518 (21237011)	207.86	207.86	0.00	9/5/2018	LTM-29 p 50	
SNL-17	1.007	1.009	1.004	0.003	8	Aug-Nov	SNL-17 C28 041218 (21237004), SNL-17 C30 100918 (21237004)	349.60	349.93	-0.33	4/12/2018, 10/11/18	LTM-28 p 72, LTM-29 p 75	
SNL-18	1.011	1.013	1.008	0.003	8	Aug-Nov	SNL-18 C36 071818 (21237081), SNL-18 C37 080818 (21237081)	549.30	549.30	0.00	7/18/18, 8/8/18	LTM-29 p 12, LTM-29 p 30	
SNL-19	1.004	1.006	1.005	-0.001	8	Aug-Nov	SNL-19 C25 072518 (21237048)	355.10	354.19	0.91	7/25/2018	LTM-29 p 26	
WIPP-11	1.037	1.039	1.034	0.003	8	Aug-Nov	WIPP-11 C33 042518 (21534009)	857.41	857.41	0.00	4/25/2018	LTM-28 p 92	
WIPP-13	1.032	1.034	1.034	-0.002	8	Aug-Nov	WIPP-13 C26 052318 (21237032)	715.30	714.88	0.42	5/23/2018	LTM-28 p 116	
WIPP-19	1.057	1.059	1.053	0.004	8	Aug-Nov	WIPP-19 C22 062018 (21225018)	770.96	770.96	0.00	6/20/2018	LTM-28 p 135	

Notes:

All pressure gauges except H-10cR and SNL-6 are INW brand and cables are all non-vented

H-10cR and SNL-6 pressure gauges are InSitu brand

Barometric data are from INW gauges - SN 21237001 and SN 21237003

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

Mid Depths are from ERMS 553781, except for AEC-7R, H-9bR, H-11b4R, and H-12R, which are from RES BDRs and/or construction diagrams

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2018 Calculated Densities - Formulas

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Monitor Well	2018 Avg Calc Dens (g/cm^3)	2018 Specific Gravity (Reference: Freshwater at 70°F)	2017 Avg Calc Dens (g/cm^3)	2018 - 2017 Difference (g/cm^3)	# of Dens Averaged	2018 Timeframe of Data	Pressure Gauge File Name (Gauge SN)	Pressure Gauge Install Depth (ft BTOC/BTEC/ BTOT)	Pressure Gauge Ideal Install Depth (ft BTOC/BTEC/ BTOT)	Length Off Ideal Depth (ft)	Date of Install	Installation Logbook Page	Comments/Explanations
AEC-7R	1.075	=B4/0.998	1.0655637339314	=B4-D4	8	Aug-Nov	AEC-7R C15 062018 (21534015)	866	867.72	=I4-J4	43271	LTM-28 p 135	
C-2737	1.022	=B5/0.998	1.0265112882734	=B5-D5	8	Jul-Oct	C-2737 C33 050918 (21237044)	688.85	689.78	=I5-J5	43229	LTM-28 p 98	
ERDA-9	1.073	=B6/0.998	1.07147567311738	=B6-D6	8	Aug-Nov	ERDA-9 C24 050918 (21237074)	717.2	717.81	=I6-J6	43229	LTM-28 p 98	
H-2b2	1.011	=B7/0.998	1.01054831424333	=B7-D7	8	Jul-Dec	H-2b2 C17 090717 (21237040), H-2b2 C19 092018 (21237059)	635.5	635.5	=I7-J7	9/7/17, 9/20/18	LTM-27 p 48, LTM-29 p 69	
H-3b2	Not Available – Sandia ceased monitoring in Sept 2017 due to well collapse												
H-4bR	1.016	=B9/0.998	1.01814986928009	=B9-D9	8	Aug-Nov	H-4bR C16 032918 (21237037), H-4bR C17 100318 (21237040)	507.9	507.54	=I9-J9	3/29/18, 10/3/18	LTM-28 p 70, LTM-29 p 72	
H-5b	1.1	=B10/0.998	1.09603540202608	=B10-D10	8	Aug-Nov	H-5b C21 090717 (21237027), H-5b C23 092018 (21534013)	889.22	909.22	=I10-J10	9/7/17, 9/20/18	LTM-27 p 46, LTM-29 p 69	
H-6bR	1.033	=B11/0.998	1.03662603217431	=B11-D11	8	Aug-Nov	H-6bR C15 021518 (21237028), H-6bR C16 080818 (21237028)	616.6	616.58	=I11-J11	2/15/18, 8/8/18	LTM-28 p 36, LTM-29 p 30	
H-7b1	1.009	=B12/0.998	1.00537106050265	=B12-D12	8	Aug-Nov	H-7b1 C27 072518 (21237051), H-7b1 C28 100318 (21237043)	269.9	269.13	=I12-J12	7/25/18, 10/3/18	LTM-29 p 26, LTM-29 p 71	
H-9bR	1.003	=B13/0.998	1.00153045359701	=B13-D13	8	Aug-Nov	H-9bR C14 070318 (21237083), H-9bR C16 101618 (21225020)	660.54	660.54	=I13-J13	7/3/18, 10/16/18	LTM-29 p 5, LTM-29 p 81	
H-10cR	1.079	=B14/0.998	1.07578590838329	=B14-D14	8	Aug-Nov	H-10cR C10 072418_2018-08-14_09-31-07-460.wsl (539743)	1374.1	1374.1	=I14-J14	43305	LTM-29 p 22	
H-11b4R	1.076	=B15/0.998	1.0763894189543 3	=B15-D15	8	Aug-Dec	H-11b4R C14 032918 (21534011), H-11b4R C15 091318 (21534011), H-114bR C16 111518 (21534011)	735.85	736.82	=I15-J15	3/29/18, 9/13/18	LTM-28 p 69, LTM-29 p 64	Test was inadvertently not started on 9/13/18, but was actually started on 11/15/18
H-12R	1.108	=B16/0.998	1.10188282432239	=B16-D16	8	Jun-Oct	H-12R C11 052318 (21237075), H-12R C12 091418 (21237086)	835.8	835.75	=I16-J16	5/23/18, 9/14/18	LTM-28 p 115, LTM-29 p	
H-15R	1.119	=B17/0.998	1.11624020527116	=B17-D17	8	Aug-Nov	H-15R C20 072418 (21237054)	872.5	872.57	=I17-J17	43305	LTM-29 p 24	
H-16	1.031	=B18/0.998	1.03119273368421	=B18-D18	8	Aug-Dec	H-16 C13 030818 (21237078)	715.1	715.1	=I18-J18	43167	LTM-28 P 52	
H-17	1.13	=B19/0.998	1.13095999727295	=B19-D19	9	Jan-May	H-17 C21 010918 (21237056)	719.93	719.93	=I19-J19	43109	LTM-28 p 6	
H-19b0	1.065	=B20/0.998	1.06448772598505	=B20-D20	8	Aug-Nov	H-19b0 C26 052318 (21237073)	754	753.49	=I20-J20	43243	LTM-28 p 116	
IMC-461	1	=B21/0.998	0.999821458250173	=B21-D21	8	Jul-Dec	IMC-461 C34 050718 (21237066), IMC-461 C35 110818 (21237066)	376.5	376.1	=I21-J21	5/7/2018, 11/8/18	LTM-28 p 94, LTM-29 p	
SNL-1	1.029	=B22/0.998	1.02854877636205	=B22-D22	8	Aug-Nov	SNL-1 C32 072418 (21237038), SNL-1 C33 080718 (21237038)	612.9	612.23	=I22-J22	7/24/18, 8/7/18	LTM-29 p 25, LTM-29 p 28	
SNL-2	1.006	=B23/0.998	1.00626362454398	=B23-D23	8	Aug-Nov	SNL-2 C38 072518 (21237035)	470.7	470.69	=I23-J23	43306	LTM-29 p 26	
SNL-3	1.026	=B24/0.998	1.0254414676508	=B24-D24	8	Aug-Nov	SNL-3 C22 030818 (21534013), SNL-3 C24 090518 (21237049)	766.5	766.19	=I24-J24	3/8/18, 9/5/2018	LTM-28 p 52, LTM-29 p 50	
SNL-5	1.005	=B25/0.998	1.00976367175272	=B25-D25	8	Aug-Nov	SNL-5 C35 060618 (21237030)	649	648.84	=I25-J25	43257	LTM-28 p 118	
SNL-6	1.246	=B26/0.998	1.24494870926254	=B26-D26	8	Aug-Nov	SNL-6 C22 111417_Append_2018-08-14_08-07-23-090.wsl (452594), SNL-6 C22 111417_Append_2018-11-06_10-26-00-770.wsl (452594)	1338.2	1338.03	=I26-J26	43053	LTM-27 p 87	
SNL-8	1.104	=B27/0.998	1.09877811472987	=B27-D27	8	Aug-Nov	SNL-8 C45 090717 (21225020), SNL-8 C47 0090518 (21237061), SNL-8 C48 101818 (21237084)	969.7	969.7	=I27-J27	9/7/17, 9/5/18, 10/18/18	LTM-27 p 46, LTM-29 p 50, LTM-29 p88	
SNL-9	1.015	=B28/0.998	1.01542124450948	=B28-D28	8	Aug-Nov	SNL-9 C35 062118 (21237089)	567.2	567.2	=I28-J28	43272	LTM-28 p 136	
SNL-10	1.009	=B29/0.998	1.00786730196747	=B29-D29	7	Aug-Nov	SNL-10 C27 062118 (21237070)	613.5	613.46	=I29-J29	43272	LTM-28 p 136	
SNL-12	1.013	=B30/0.998	1.01131035862743	=B30-D30	8	Aug-Nov	SNL-12 C28 051718 (21237072)	570.9	570.68	=I30-J30	43237	LTM-28 p 106	
SNL-13	1.02	=B31/0.998	1.02241118925183	=B31-D31	8	Aug-Nov	SNL-13 C29 032918 (21534016), SNL-13 C30 101518 (21225017)	401	400.62	=I31-J31	3/29/2018, 10/15/18	LTM-28 p 70, LTM-29 p 76	
SNL-14	1.045	=B32/0.998	1.04400614037956	=B32-D32	8	Aug-Nov	SNL-14 C34 072418 (21237050), SNL-14 C35 080818 (21237050)	668.95	668.95	=I32-J32	7/24/18, 8/8/2018	LTM-29 p 23, LTM-29 p 31	
SNL-15	1.225	=B33/0.998	1.22326505936134	=B33-D33	8	May-Aug	SNL-15 C30 050718 (21237076)	922.18	922.18	=I33-J33	43227	LTM-28 p 97	
SNL-16	1.014	=B34/0.998	1.01194683935113	=B34-D34	7	Sept-Dec	SNL-16 C31 090518 (21237011)	207.86	207.86	=I34-J34	43348	LTM-29 p 50	
SNL-17	1.007	=B35/0.998	1.00449676304011	=B35-D35	8	Aug-Nov	SNL-17 C28 041218 (21237004), SNL-17 C30 100918 (21237004)	349.6	349.93	=I35-J35	4/12/2018, 10/11/18	LTM-28 p 72, LTM-29 p 75	
SNL-18	1.011	=B36/0.998	1.00819334508087	=B36-D36	8	Aug-Nov	SNL-18 C36 071818 (21237081), SNL-18 C37 080818 (21237081)	549.3	549.3	=I36-J36	7/18/18, 8/8/18	LTM-29 p 12, LTM-29 p 30	
SNL-19	1.004	=B37/0.998	1.00520825920126	=B37-D37	8	Aug-Nov	SNL-19 C25 072518 (21237048)	355.1	354.19	=I37-J37	43306	LTM-29 p 26	
WIPP-11	1.037	=B38/0.998	1.03396398623716	=B38-D38	8	Aug-Nov	WIPP-11 C33 042518 (21534009)	857.41	857.41	=I38-J38	43215	LTM-28 p 92	
WIPP-13	1.032	=B39/0.998	1.03421991043945	=B39-D39	8	Aug-Nov	WIPP-13 C26 052318 (21237032)	715.3	714.88	=I39-J39	43243	LTM-28 p 116	
WIPP-19	1.057	=B40/0.998	1.052977026011	=B40-D40	8	Aug-Nov	WIPP-19 C22 062018 (21225018)	770.96	=769.5+1.46	=I40-J40	43271	LTM-28 p 135	

Notes:
All pressure gauges except H-10cR and SNL-6 are INW brand and cables are all non-vented
H-10cR and SNL-6 pressure gauges are InSitu brand
Barometric data are from INW gauges - SN 21237001 and SN 21237003
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
Mid Depths are from ERMS 553781, except for AEC-7R, H-9bR, H-11b4R, and H-12R, which are from RES BDRs and/or construction diagrams

Information Only