550755

Routine Calculations Report
In Support of Task 6 of AP-114

2008 Calculated Densities for Use in Deriving Equivalent Freshwater Heads of the Culebra Dolomite Member of the Rustler Formation near the WIPP Site

(AP-114: Analysis Plan for Evaluation and Recalibration of Culebra Transmissivity Fields, Revision 1, ERMS 537960)

WBS 1.4.2.3

Report Date: January 27, 2009

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WIPP:1.4.2.3:TD:QA:L:RECRT:541153

Title of Calculation:

2008 Calculated Densities for Use in Deriving Equivalent Freshwater Heads of the Culebra Dolomite Member of the Rustler Formation near the WIPP Site, in support of Task 6 of AP-114.

1. **Planning Document:**

AP-114 (ERMS 537208): Analysis Plan for Evaluation and Recalibration of Culebra Transmissivity Fields, Task 6, Calculation of Freshwater Heads and Compilation of Transient Heads to be Used in T-Field Calibration.

Note: A slight deviation from the task 6 specifications in AP-114 is more recent data (2008) were used to calculate the densities for the wells than was specified in AP-114 (late 2004 or early 2005) so that more current head data could be used.

2. **Description of Calculation Process:**

The densities of the water in the WIPP wells in the Culebra Dolomite Member of the Rustler Formation were calculated using pressure (both head and barometric) data collected by downhole pressure gauges, the depths of the pressure gauges, and the corresponding water level data. In-Situ miniTrolls or LevelTrolls were used to collect the downhole pressure data. Specifically, the measured pressure values were divided by the Troll depth minus the closest corresponding water level, and that result was then divided by 0.4335 (pressure to feet of water conversion), as depicted in the following equation:

$$PD = \left[\frac{P_{meas*}}{Z_1 - DTW} \right] / C$$

Where,
PD = Pressure Density
P_{meas*} = the measured pressure head (psia or psig)
Z_1 = installation depth of the transducer/Troll (ft)
DTW = depth to water (ft)
C = conversion coefficient (0.4335 psi/ft, for fresh water)
Note: P_{meas*} is equal to P_{meas} for gauge (vented) sensors or P_{meas} minus barometric pressure (BP, psia) for absolute (non-vented) sensors.

When using pressure data from a LevelTroll (or from a miniTroll with a non-vented cable), the closest corresponding barometric pressure values were subtracted from the water pressures prior to dividing by the Troll depth minus the water level, then the results were divided by 0.4335. This calculation resulted in a density value for the date and time of the subject water level data and the closest corresponding pressure data. Depending on data availability, densities were calculated and averaged for a final value. Initially, attempts were made to consistently use June through August 2008 water level and pressure data to calculate the densities; however, because the data during this time period were not always available, some of the densities were calculated using data from other time periods. Attempts were also made to use at least four data points; however, water level data was limited for some wells. The

densities are used for the purposes of calculating equivalent freshwater heads for the Culebra wells.

The densities were calculated in the *2008 Calc Densities.xls* file created in Excel. The worksheet *2008 Calc Dens* summarizes all of the resulting density values and supporting information for the calculated densities and the worksheet *2008 Calc Dens Formulas* provides the formulas in the worksheet. In addition, there are worksheets for each of the wells that include the actual data used for the calculations and a plot of the Troll pressure data. The resulting density values and the supporting information are included in the worksheet *2008 Calc Dens* and the formulas are included in the worksheet *2008 Calc Dens Formulas*. The spreadsheet entries were verified by Shelly Johnsen, Organization 6710. The columns in the worksheets and their contents are described below:

- A – Monitor Well – Well name
- B – 2008 Avg Calc Dens – Average Calculated Density Value for 2008
- C – 2007 Avg Calc Dens – Average Calculated Density Value for 2007
- D – 2008 - 2007 Diff – Difference between 2008 and 2007 densities (Column C - Column B)
- E – # of Dens Averaged – number of density values averaged to get the final value
- F – Troll – Mini or Level/Vented (v) or Non-Vented (nv) – information on the type of Troll and cable used to collect pressure measurements
- G – Timeframe of Data – Time period for pressure data used in calculations
- H – Troll File Name(s) – File names for pressure data
- I – Troll Install Depth (ft BTOC/T) – Depth the Troll was installed to below primary measuring point, either below top of casing or top of tubing
- J – Troll Ideal Install Depth (ft BTOC) – Mid-Culebra depth below top of casing (unless otherwise noted)
- K – Actual-Ideal Install Depth – Number of feet the Troll was installed off Ideal, Column I minus Column J
- L – Date of Install – Date the Troll was installed into the well
- M – Installation Logbook Page – Reference to the logbook and page where the Troll installation was documented
- N – Data Source/Other Issues – Comments and or issues regarding data

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

- Excel spreadsheet including the data – 2008 Calc Densities.xls
  - Worksheet 1 – 2008 Calc Dens (printed copy attached)
  - Worksheet 2 – 2008 Calc Dens Formulas (printed copy attached)
  - Worksheet 3 – AEC-7
  - Worksheet 4 – C-2737
  - Worksheet 5 – ERDA-9
  - Worksheet 6 – H-2b2
  - Worksheet 7 – H-3b2
  - Worksheet 8 – H-4b
  - Worksheet 9 – H-5b

- Worksheet 10 – H-6bR
- Worksheet 11 – H-7b1
- Worksheet 12 – H-9c
- Worksheet 13 – H-10c
- Worksheet 14 – H-11b4
- Worksheet 15 – H-12
- 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-17A
- Worksheet 35 – SNL-18
- Worksheet 36 – SNL-19
- Worksheet 37 – WIPP-11
- Worksheet 38 – WIPP-13
- Worksheet 39 – WIPP-19
- Worksheet 40 – WIPP-25

4. **Data Qualification for Compliance Decision Analysis:**
   Data sources provided in Column H (Troll File Name(s)), Column M (Installation Logbook Page), and in Section 7.0.

5. **Software Used:**
   Microsoft Office Excel 2003 SP2, Intel Pentium 2 Quad CPU processor under Microsoft Windows XP

6. **Reviews:**
   Technical: Michael Hillesheim, 6712
   QA: Shelly Johnsen, 6710

7. **References:**
   - Troll installation data and SNL water level data from the following logbooks:

Long-Term Monitoring Notebook (LTM)-4 (ERMS 547753)
Long-Term Monitoring Notebook (LTM)-5 (ERMS 547072)
Long-Term Monitoring Notebook (LTM)-6 (ERMS 548068)
Long-Term Monitoring Notebook (LTM)-7 (ERMS 550179)
Long-Term Monitoring Notebook (LTM)-8 (package ERMS 543277)
Long-Term Monitoring Notebook (LTM)-9 (package ERMS 543277)
WIPP Site Well Testing (WSWT)-11 (package ERMS 540244)
WIPP Site Well Testing (WSWT)-12 (package ERMS 540244)

- WRES Water Level Data submitted to SNL in monthly memoranda (package ERMS 546636)
- Johnson, Patricia B., 2007 Calculated Densities for Use in Deriving Equivalent Freshwater Heads of the Culebra Dolomite Member of the Rustler Formation near the WIPP Site, May 2007, February 7, 2008 (ERMS 548127)
- 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 2, August 7, 2008 (ERMS 549564)
- Mercer, J.W. and Snyder, R.P., Basic Data Report for Drillhole H-16 (Waste Isolation Pilot Plan – WIPP) (SAND89-0203)

8. List of Attachments:

1. Printout of Excel file worksheet 2008 Calc Dens.xls
2. Printout of Excel file worksheet 2008 Calc Dens Formulas.xls
3. CD including the Excel file and documentation of calculation file

2008 Calculated Densities

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Monitor Well	2008 Avg Calc Dens	2007 Avg Calc Dens	2008 - 2007 Diff	# of Dens Averaged	Troll - Mini or Level/ Vented (v) or Non-Vented (nv)	Timeframe of Data	Troll File Name(s)	Troll Install Depth (ft BTOC/T)	Troll Ideal Install Depth (ft BTOC/T) (ERMS 549564)	Actual-Ideal Install Depth	Date of Install	Installation Logbook Page	Data Source/Other Issues
AEC-7	1.078	1.211	-0.133	2	Level (nv)	July-August	SN116451 061708 AEC-7 (C6) 2008-09-25 12.57.09.wsl	872.40	872.40	0.0	6/17/2008	WSWT-12 p. 53	breach in well casing was discovered and well was plugged back between 2007 and 2008 data
C-2737	1.029	1.010	0.019	3	Level (nv)	July-August	SN116300 062608 C-2737(C18) 2008-09-24 07.52.59.wsl	691.00	691.00	0.0	6/26/2008	LTM-7 p. 133	691.0' BTOT SN116300, leaking packer replaced between 2007 and 2008 data
ERDA-9	1.067	1.047	0.020	3	Level (nv)	July-August	SN102903 072308 ERDA-9(C9) 2008-09-24 07.38.06.wsl	717.50	716.8	0.7	7/23/2008	LTM-7 p. 148	Troll lowered from 450.8' to 717.5' (mid-formation) between 2007 and 2008 data
H-2b2	0.999	1.014	-0.015	2	Level (nv)	November	SN116450 111208 H-2b2 (C4) 2008-11-21 14.25.58.wsl	635.50	635.5	0.0	11/12/2008	LTM-9 p. 21	Foreign water in well needs to be removed
H-3b2	1.038	1.042	-0.005	2	Level (nv)	November	SN133569 110608 H-3b2(C4) 2008-11-21 13.16.05.wsl	660.60	687.7	-27.1	11/6/2008	LTM-9 p. 6	
H-4b	1.013	1.015	-0.002	5	Mini (v)	June-August	SN12807 2008-02-06 120000 H-4b(C6).bin, SN12807 2008-06-25 090000 H-4b (C6).bin	500.80	504.1	-3.3	2/6/2008, 6/25/2008	LTM-6 p.108, LTM-7 p. 119	
H-5b	1.093	1.091	0.002	4	Mini (v)	June-August	SN08276 2008-06-25 160000 H-5b(C6).bin	550.80	910.3	-359.5	6/25/2008	LTM-7 p. 128	
H-6bR	1.033	1.034	0.000	1	Level (nv)	November	SN121044 110308 H-6bR(Cpump) 2008-11-13 11.25.39.wsl	609.65	617.5	-7.9	11/3/2008	WSWT-12 p. 92	H-6b 2007 density value used for comparison. H-6bR testing specific gravity is 1.041.
H-7b1	0.994	1.002	-0.008	5	Mini (v)	June-August	SN04558 2008-03-26 160000 H-7b1 (C9).bin	258.80	269.9	-11.1	11/5/2007, 3/26/2008	LTM-5 p. 122, LTM-7 p. 36	
H-9c	1.003	1.001	0.002	3	Level (nv)	November - December	SN110383 102008 H-9c (C15) 2008-12-16 14.15.37.wsl	663.50	663.5	0.0	10/20/2008	LTM-8 p. 109	
H-10c	1.001	1.008	-0.007	3	Level (nv)	November - December	SN129649 101508 H-10c(C5) 2008-12-16 13.46.49.wsl	1372.10	1372.1	0.0	10/15/2008	LTM-8 p. 93	Foreign water in well needs to be removed
H-11b4	1.062	1.070	-0.008	3	Level (nv)	November - December	SN134838 092408 H-11b4(C9) 2008-12-16 12.32.58.wsl	736.28	736.2	0.1	9/24/2008	LTM-8 p. 63	
H-12	1.096	1.097	-0.001	2	Level (nv)	November	SN123363 111208 H-12(C16) 2008-11-21 10.00.30.wsl	821.90	838.4	-16.5	11/12/2008	LTM-9 p. 17	
H-15R	1.130											WSWT-12 p. 105-106	Value is specific gravity. Data unavailable for calculation,.
H-16	1.039	NA	NA	2	Level (nv)	December	SN116450 120508 H-16(C) 2009-01-08 09.50.43.wsl	715.10	715.09	0.0	12/5/2008	LTM-9 p. 69	Ideal install per BDR (SAND89-0203) and LTM-9 p. 69
H-17	1.120	1.133	-0.012	2	Level (nv)	November	SN102927 111708 H-17(C3) 2008-11-21 11.52.29.wsl	694.80	720.40	-25.6	11/17/2008	LTM-9 p. 24	
H-19b0	1.075	1.068	0.007	4	Level (nv)	June-August	SN129856 062408 H-19b0(C8) 2008-10-20 08.42.26.wsl	753.60	754.0	-0.4	6/24/2008	LTM-7 p. 110	
IMC-461	1.019	1.005	0.014	6	Level (nv)	May-August	SN102920 121207 IMC-461 (C14) 2008-10-21 08.45.09.wsl	376.80	376.5	0.3	12/12/2007	LTM-6 p. 61	
SNL-1	1.032	1.033	-0.001	7	Level (nv)	May-August	SN110390 021408 SNL-1 (C15) 2008-11-06 12.43.54.wsl	613.00	612.9	0.1	2/14/2008	LTM-6 p. 123	
SNL-2	1.015	1.012	0.004	7	Level (nv)	May-August	SN110382 082708 SNL-2(C22) 2008-10-21 10.20.05.wsl, SN110383 112107 SNL-2 (C21) 2008-08-27 08.21.57.wsl	475.00	470.7	4.3	8/27/2008, 11/21/2007	LTM-8, p. 42, LTM-6 p. 6	
SNL-3	1.029	1.023	0.006	7	Level (nv)	May-August	SN123361 110807 SNL-3(C8) 2008-07-23 13.32.11.wsl, SN126694 072308 SNL-3(C9) 2008-10-21 13.39.18.wsl	767.30	766.5	0.8	7/23/2008, 11/8/2007	LTM-7 p. 154. LTM-5 p. 131	
SNL-5	1.012	1.010	0.002	7	Level (nv)	May-August	SN123363 022608 SNL-5 (C10) 2008-08-27 09.00.01.wsl	651.10	649.0	2.1	8/27/2008, 9/10/2007	LTM-8, p. 43, LTM-5 p. 45	
SNL-6	1.253	1.246	0.008	7	Level (nv)	May-August	SN116306 043008 SNL-6(C5) 2008-10-17 11.02.45.wsl	1307.00	1338.2	-31.2	4/30/2008	LTM-7 p. 63	
SNL-8	1.104	1.103	0.001	7	Level (nv)	May-August	SN106823 121207 SNL-8 (C24) 2008-10-30 11.44.34.wsl	968.30	969.7	-1.4	12/12/2007	LTM-6 p. 66	
SNL-9	1.026	1.024	0.002	11	Level (nv)	May-October	SN121791 110807 SNL-9(C17) 2008-07-23 12.14.34.wsl, SN102927 072308 SNL-9(C18) 2008-10-21 07.29.51.wsl	564.40	567.2	-2.8	7/23/2008, 11/8/2007	LTM-7 p. 151, LTM-5 p. 132	
SNL-10	1.013	1.011	0.003	7	Level (nv)	May-August	SN110411 110807 SNL-10(C9) 2008-10-17 10.05.06.wsl	611.50	613.5	-2.0	8/28/07, 11/8/2007	LTM-5 p. 36, LTM-5 p. 132	
SNL-12	1.011	1.005	0.006	7	Level (nv)	May-August	SN116452 032608 SNL-12 (C10) 2008-11-06 10.34.24.wsl	571.58	570.9	0.7	3/26/2008	LTM-7 p. 35	
SNL-13	1.028	1.027	0.001	7	Level (nv)	May-August	SN121786 110807 SNL-13(C18) 2008-06-25 09.17.30.wsl, SN116454 062508 SNL-13(C9) 2008-10-22 10.36.42.wsl	402.90	401.2	1.7	10/25/2007, 11/8/2007, 6/25/2008	LTM-5 p. 105, LTM-5 p. 133, LTM-7 p. 121	
SNL-14	1.048	1.048	0.000	7	Level (nv)	May-August	SN123367 110907 SNL-14(C16) 2008-09-24 08.50.47.wsl	667.50	669.5	-2.0	11/9/2007	WSWT-11 p. 106	
SNL-15	1.232	1.228	0.004	7	Level (nv)	May-August	SN116453 013008 SNL-15(C12) 2008-10-30 09.51.33.wsl	919.50	922.8	-3.3	1/30/2008	LTM-6 p. 78	
SNL-16	1.023	1.010	0.012	7	Level (nv)	May-August	SN110407 112007 SNL-16 (C4) 2008-08-26 15.03.01.wsl	208.00	206.3	1.7	11/20/2007	LTM-5 p. 153	
SNL-17A	1.007	1.006	0.001	6	Level (nv)	May-July	SN110382 102407 SNL-17(C9) 2008-07-24 08.49.09.wsl	349.50	349.6	-0.1	10/24/2007	LTM-5 p. 101	
SNL-18	1.011	1.028	-0.017	7	Level (nv)	May-August	116299 013108 SNL-18(C10) 2008-10-21 11.10.26.wsl	548.80	551.2	-2.4	1/31/2008	LTM-6 p. 96	
SNL-19	1.008	1.003	0.004	7	Level (nv)	May-August	SN123384 032608 SNL-19 (C9) 2008-10-15 13.04.17.wsl	354.58	355.1	-0.5	3/25/2008	LTM-7 p. 17	
WIPP-11	1.035	1.038	-0.003	3	Level (nv)	November - December	SN110411 110608 WIPP-11(C19) 2008-12-17 12.19.04.wsl	857.80	857.80	0.0	11/6/2008	LTM-9 p. 12	
WIPP-13	1.055	1.053	0.003	8	Level (nv)	May-August	SN126697 062508 WIPP-13(C9) 2008-10-22 09.08.32.wsl, SN121345 101207 WIPP-13 (C8) 2008-06-25 10.27.27.wsl	714.80	715.30	-0.5	10/12/2007, 6/25/2008	LTM-5 p. 87, LTM-7 p. 123	
WIPP-19	1.046	1.044	0.002	8	Mini (nv)	May-August	SN11358 2007-08-07 160000 WIPP-19b(C1).bin	741.30	770.20	-28.9	8/7/2007	LTM-4 p. 156	
WIPP-25	1.010	1.011	-0.001	6	Mini (v)	May-August	SN11028 2007-12-19 120000 WIPP-25 (C7).bin	459.50	461.90	-2.4	12/19/2007	WSWT-11 p. 123	

Notes:
ft BTOC = feet below top of casing
ft BTOT = feet below top of tubing
(v) = vented
(nv) = non-vented
NA = not applicable/available
LTM = Long-Term Monitoring
WSWT = WIPP Well Site Testing
Barometric data are from Port-a-camp baro Troll files SN11064 2008-05-01 150000 prt-a-cmp(BARO3).bin and SN11064 2008-11-25 190000 Test #3.bin

2008 Calculated Densities

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Monitor Well	2008 Avg Calc Dens	2007 Avg Calc Dens	2008 - 2007 Diff	# of Dens Averaged	Troll - Mini or Level/ Vented (v) or Non-Vented (nv)	Timeframe of Data	Troll File Name(s)	Troll Install Depth (ft BTOC/T)	Troll Ideal Install Depth (ft BTOC/T) (ERMS 549564)	Actual-Ideal Install Depth	Date of Install	Installation Logbook Page	Data Source/Other Issues
AEC-7	1.078	1.2106	=B4-C4	2	Level (nv)	July-August	SN116451 061708 AEC-7 (C6) 2008-09-25 12.57.09.wsl	872.4	872.4	=I4-J4	39616	WSWT-12 p. 53	breach in well casing was discovered and well was plugged back between 2007 and 2008 data
C-2737	1.0293	1.01032370894	=B5-C5	3	Level (nv)	July-August	SN116300 062608 C-2737(C18) 2008-09-24 07.52.59.wsl	691	691	=I5-J5	39625	LTM-7 p. 133	691.0' BTOT SN116300, leaking packer replaced between 2007 and 2008 data
ERDA-9	1.0669	1.04715034025	=B6-C6	3	Level (nv)	July-August	SN102903 072308 ERDA-9(C9) 2008-09-24 07.38.06.wsl	717.5	716.78	=I6-J6	39652	LTM-7 p. 148	Troll lowered from 450.8' to 717.5' (mid-formation) between 2007 and 2008 data
H-2b2	0.9987	1.01393932342	=B7-C7	2	Level (nv)	November	SN116450 111208 H-2b2 (C4) 2008-11-21 14.25.58.wsl	635.5	635.5	=I7-J7	39764	LTM-9 p. 21	Foreign water in well needs to be removed
H-3b2	1.0377	1.04236845026	=B8-C8	2	Level (nv)	November	SN133569 110608 H-3b2(C4) 2008-11-21 13.16.05.wsl	660.6	687.7	=I8-J8	39758	LTM-9 p. 6	
H-4b	1.013	1.01480625364	=B9-C9	5	Mini (v)	June-August	SN12807 2008-02-06 120000 H-4b(C6).bin, SN12807 2008-06-25 090000 H-4b (C6).bin	500.8	504.1	=I9-J9	2/6/2008, 6/25/2008	LTM-6 p.108, LTM-7 p. 119	
H-5b	1.0925	1.09081606134	=B10-C10	4	Mini (v)	June-August	SN08276 2008-06-25 160000 H-5b(C6).bin	550.8	910.3	=I10-J10	39624	LTM-7 p. 128	
H-6bR	1.0332	1.0336	=B11-C11	1	Level (nv)	November	SN121044 110308 H-6bR(Cpump) 2008-11-13 11.25.39.wsl	609.65	617.5	=I11-J11	39755	WSWT-12 p. 92	H-6b 2007 density value used for comparison. H-6bR testing specific gravity is 1.041.
H-7b1	0.9937	1.00213541450	=B12-C12	5	Mini (v)	June-August	SN04558 2008-03-26 160000 H-7b1 (C9).bin	258.8	269.9	=I12-J12	11/5/2007, 3/26/2008	LTM-5 p. 122, LTM-7 p. 36	
H-9c	1.0033	1.00139018209	=B13-C13	3	Level (nv)	November - December	SN110383 102008 H-9c (C15) 2008-12-16 14.15.37.wsl	663.5	663.5	=I13-J13	39741	LTM-8 p. 109	
H-10c	1.0007	1.00811813675	=B14-C14	3	Level (nv)	November - December	SN129649 101508 H-10c(C5) 2008-12-16 13.46.49.wsl	1372.1	1372.1	=I14-J14	39736	LTM-8 p. 93	Foreign water in well needs to be removed
H-11b4	1.0622	1.07030972653	=B15-C15	3	Level (nv)	November - December	SN134838 092408 H-11b4(C9) 2008-12-16 12.32.58.wsl	736.28	736.2	=I15-J15	39715	LTM-8 p. 63	
H-12	1.0957	1.09700563550	=B16-C16	2	Level (nv)	November	SN123363 111208 H-12(C16) 2008-11-21 10.00.30.wsl	821.9	838.4	=I16-J16	39764	LTM-9 p. 17	
H-15R	1.13											WSWT-12 p. 105-106	Value is specific gravity. Data unavailable for calculation,.
H-16	1.0388	NA	NA	2	Level (nv)	December	SN116450 120508 H-16(C) 2009-01-08 09.50.43.wsl	715.1	=713.5+1.59	=I18-J18	39787	LTM-9 p. 69	Ideal install per BDR (SAND89-0203) and LTM-9 p. 69
H-17	1.1201	1.13252326624	=B19-C19	2	Level (nv)	November	SN102927 111708 H-17(C3) 2008-11-21 11.52.29.wsl	694.8	720.4	=I19-J19	39769	LTM-9 p. 24	
H-19b0	1.0748	1.06817140148	=B20-C20	4	Level (nv)	June-August	SN129856 062408 H-19b0(C8) 2008-10-20 08.42.26.wsl	753.6	754	=I20-J20	39623	LTM-7 p. 110	
IMC-461	1.0187	1.00512170612	=B21-C21	6	Level (nv)	May-August	SN102920 121207 IMC-461 (C14) 2008-10-21 08.45.09.wsl	376.8	376.5	=I21-J21	39428	LTM-6 p. 61	
SNL-1	1.0321	1.03308869357	=B22-C22	7	Level (nv)	May-August	SN110390 021408 SNL-1 (C15) 2008-11-06 12.43.54.wsl	613	612.87	=I22-J22	39492	LTM-6 p. 123	
SNL-2	1.0153	1.0118	=B23-C23	7	Level (nv)	May-August	SN110382 082708 SNL-2(C22) 2008-10-21 10.20.05.wsl, SN110383 112107 SNL-2 (C21) 2008-08-27 08.21.57.wsl	475	470.7	=I23-J23	8/27/2008, 11/21/2007	LTM-8, p. 42, LTM-6 p. 6	
SNL-3	1.029	1.02337589996	=B24-C24	7	Level (nv)	May-August	SN123361 110807 SNL-3(C8) 2008-07-23 13.32.11.wsl, SN126694 072308 SNL-3(C9) 2008-10-21 13.39.18.wsl	767.3	766.5	=I24-J24	7/23/2008, 11/8/2007	LTM-7 p. 154, LTM-5 p. 131	
SNL-5	1.0119	1.01	=B25-C25	7	Level (nv)	May-August	SN123363 022608 SNL-5 (C10) 2008-08-27 09.00.01.wsl	651.1	649	=I25-J25	8/27/2008, 9/10/2007	LTM-8, p. 43, LTM-5 p. 45	
SNL-6	1.2532	1.24563194170	=B26-C26	7	Level (nv)	May-August	SN116306 043008 SNL-6(C5) 2008-10-17 11.02.45.wsl	1307	1338.2	=I26-J26	39568	LTM-7 p. 63	
SNL-8	1.1037	1.1026	=B27-C27	7	Level (nv)	May-August	SN106823 121207 SNL-8 (C24) 2008-10-30 11.44.34.wsl	968.3	969.7	=I27-J27	39428	LTM-6 p. 66	
SNL-9	1.0261	1.0243	=B28-C28	11	Level (nv)	May-October	SN121791 110807 SNL-9(C17) 2008-07-23 12.14.34.wsl, SN102927 072308 SNL-9(C18) 2008-10-21 07.29.51.wsl	564.4	567.2	=I28-J28	7/23/2008, 11/8/2007	LTM-7 p. 151, LTM-5 p. 132	
SNL-10	1.0133	1.0106	=B29-C29	7	Level (nv)	May-August	SN110411 110807 SNL-10(C9) 2008-10-17 10.05.06.wsl	611.5	613.46	=I29-J29	8/28/07, 11/8/2007	LTM-5 p. 36, LTM-5 p. 132	
SNL-12	1.011	1.005	=B30-C30	7	Level (nv)	May-August	SN116452 032608 SNL-12 (C10) 2008-11-06 10.34.24.wsl	571.58	570.9	=I30-J30	39533	LTM-7 p. 35	
SNL-13	1.0276	1.0267	=B31-C31	7	Level (nv)	May-August	SN121786 110807 SNL-13(C18) 2008-06-25 09.17.30.wsl, SN116454 062508 SNL-13(C9) 2008-10-22 10.36.42.wsl	402.9	401.16	=I31-J31	10/25/2007, 11/8/2007,	LTM-5 p. 105, LTM-5 p. 133,	
SNL-14	1.0479	1.0476	=B32-C32	7	Level (nv)	May-August	SN123367 110907 SNL-14(C16) 2008-09-24 08.50.47.wsl	667.5	669.5	=I32-J32	39395	WSWT-11 p. 106	
SNL-15	1.2315	1.22768383580	=B33-C33	7	Level (nv)	May-August	SN116453 013008 SNL-15(C12) 2008-10-30 09.51.33.wsl	919.5	922.8	=I33-J33	39477	LTM-6 p. 78	
SNL-16	1.0228	1.0104	=B34-C34	7	Level (nv)	May-August	SN110407 112007 SNL-16 (C4) 2008-08-26 15.03.01.wsl	208	206.3	=I34-J34	39406	LTM-5 p. 153	
SNL-17A	1.0072	1.00606911413	=B35-C35	6	Level (nv)	May-July	SN110382 102407 SNL-17(C9) 2008-07-24 08.49.09.wsl	349.5	349.56	=I35-J35	39379	LTM-5 p. 101	
SNL-18	1.0106	1.02750489464	=B36-C36	7	Level (nv)	May-August	116299 013108 SNL-18(C10) 2008-10-21 11.10.26.wsl	548.8	551.19	=I36-J36	39478	LTM-6 p. 96	
SNL-19	1.0075	1.00304806603	=B37-C37	7	Level (nv)	May-August	SN123384 032608 SNL-19 (C9) 2008-10-15 13.04.17.wsl	354.58	355.1	=I37-J37	39532	LTM-7 p. 17	
WIPP-11	1.0352	1.03800745809	=B38-C38	3	Level (nv)	November - December	SN110411 110608 WIPP-11(C19) 2008-12-17 12.19.04.wsl	857.8	857.8	=I38-J38	39758	LTM-9 p. 12	
WIPP-13	1.0552	1.0525	=B39-C39	8	Level (nv)	May-August	SN126697 062508 WIPP-13(C9) 2008-10-22 09.08.32.wsl, SN121345 101207 WIPP-13 (C8) 2008-06-25 10.27.27.wsl	714.8	715.3	=I39-J39	10/12/2007, 6/25/2008	LTM-5 p. 87, LTM-7 p. 123	
WIPP-19	1.0462	1.04370501044	=B40-C40	8	Mini (nv)	May-August	SN11358 2007-08-07 160000 WIPP-19b(C1).bin	741.3	770.2	=I40-J40	39301	LTM-4 p. 156	
WIPP-25	1.0096	1.011	=B41-C41	6	Mini (v)	May-August	SN11028 2007-12-19 120000 WIPP-25 (C7).bin	459.5	461.9	=I41-J41	39435	WSWT-11 p. 123	

Notes:
ft BTOC = feet below top of casing
ft BTOT = feet below top of tubing
(v) = vented
(nv) = non-vented
NA = not applicable/available
LTM = Long-Term Monitoring
WSWT = WIPP Well Site Testing
Barometric data are from Port-a-camp baro Troll files SN11064 2008-05-01 150000 prt-a-cmp(BARO3).bin and SN11064 2008-11-25 190000 Test #3.bin