August 4, 2015 Project Number 1404221

Celestine Ngam
New Mexico Environment Department
Petroleum Storage Tank Bureau
2905 Rodeo Park Drive E., Bldg. 1
Santa Fe, NM 87505

RE: NOTICE OF COMPLETION AND REPORT OF FINDINGS - CONTINGENCY NAPL BAILING TESTS, DELIVERABLE ID 17138-5; LOVINGTON 66, LOVINGTON, NEW MEXICO

FACILITY #: 1489 RELEASE ID#: 1182

Dear Mr. Ngam:

I am transmitting this letter to advise you that Golder has completed work associated with Deliverable Identification number 17138-5, which included a contingency task to conduct non-aqueous phase liquid (NAPL) drawdown and recharge testing and data interpretation at the above referenced site. Proposed tasks and methods were set forth in our April 29, 2015 Request for Authorization for Contingency Budget Expenditure and approved in your May 12, 2015 reply correspondence (copies included in **Attachment 1**).

The NAPL baildown and recovery testing was performed by Clayton Barnhill (CMB, Roswell) on June 2-4, 2015. The locations of the tested wells (Wells W-1, W-2 and W-3), as well as the pre-bailing NAPL thickness measured in each well are shown on **Figure 1**, attached. Each of the tested wells was bailed until NAPL reached a minimum thickness, then periodic measurements of top of NAPL and oil-water contact were measured until fluid levels approached pre-bailing conditions. Copies of Mr. Barnhill's completed bail test data forms are included with this submittal in **Attachment 2**. NAPL yield from the 4-inch wells ranged from 6 to 7 gallons; time required to fully remove NAPL ranged from 13 to 26 minutes. Measured fluid recovery periods ranged from 2947 minutes to 3273 minutes.

The NAPL bail test recovery data was analyzed to yield estimates of formation NAPL thickness (distinct from NAPL well thickness) using a method described by Gruszczenski (1987). The Gruszczenski method includes determining the NAPL thickness at the point in time after bail-down when the oil water contact reaches a maximum elevation. These analyses are presented in the time-series fluid level plots in **Attachment 3**. Indicated formation NAPL thicknesses ranged from 0.06 feet to 0.44 feet.

The NAPL bail test data was also analyzed in accordance with methods outlined by the ASTM (Designation ES2856-13) using an algorithm (EXCEL spreadsheet program) prepared by the American

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Petroleum Institute (API NAPL Transmissivity Workbook). Input data and interpretive plots are included in **Attachment 4**. The ASTM method and API algorithm yield estimates of NAPL transmissivity and storativity using slug test methods developed by Cooper Bredehoeft and Papadolulos (1961), Cooper and Jacob (1946) and Bouwer and Rice (1976). The API algorithm analyses of the W-1, W-2 and W-3 bailing and recovery data indicate that NAPL transmissivity values ranged from 0.24 ft^2/day to 0.66 ft^2/day. Testing indicates that storage coefficients ranged from 4.6 x 10^{-6} to 5.3 x 10^{-1} (dimensionless). A summary of the results of all analyses of NAPL baildown tests is included in **Table 1**.

The Golder cost proposal and agency workplan approval sets forth an approved budget of $9,545.99 for the NAPL baildown and recovery and data analytical tasks; we anticipate that we will issue a claim for the full amount upon receipt of your acceptance of this deliverable. The data and interpretations contained in this transmittal will be incorporated into cumulative report on multiphase extraction (MPE) pilot test well installation and MPE testing. If you have any questions regarding this transmittal, please do not hesitate to contact us.

Sincerely,

GOLDER ASSOCIATES INC.

Clay Kilmer
Senior Hydrogeologist

Phil Carrillo
EIT

Attachments:

Table 1:	Summary of analytical results, all NAPL baildown tests
Figure 1:	Locations of NAPL baildown test wells
Attachment 1:	Contingency expenditure authorization correspondence
Attachment 2:	Barnhill NAPL bailing and recovery data
Attachment 3:	Gruszczenski formation NAPL thickness plots
Attachment 4:	API LNAPL transmissivity workbook results

PC/CK/rj

TABLES

Table 1 Summary of NAPL Bail-Down Test Results
Walstad Lovington 66 LUST Site

Well	Date	Pre Bail Test Depth to Water (ft)	Pre Bail Test Depth to NAPL (ft)	Apparent NAPL Thickness, Pre Bailing Static (ft)	[1]NAPL Thickness at Peak Recovery Water Level (ft)	[2]Bouwer and Rice Method	[2]Cooper-Jacob Method	[2]Cooper, Bredehoeft, Papadopulos Method	Average of Analytical Methods	Cooper-Jacob Method	Cooper, Bredehoeft and Papadopulos Method
						Transmissivity (T_n), ft^2/day				Storage Coefficient (S_n), dimensionless	
W-1	6/2/2015	58.11	64.89	6.78	0.06	0.58	0.7	0.7	0.66	7.40E-02	4.00E-01
W-2	6/2/2015	57.07	64.26	7.19	0.22	0.28	0.58	0.3	0.39	4.60E-05	3.90E-01
W-3	6/2/2015	57.17	64.1	6.93	0.44	0.19	0.3	0.23	0.24	1.00E-03	5.30E-01

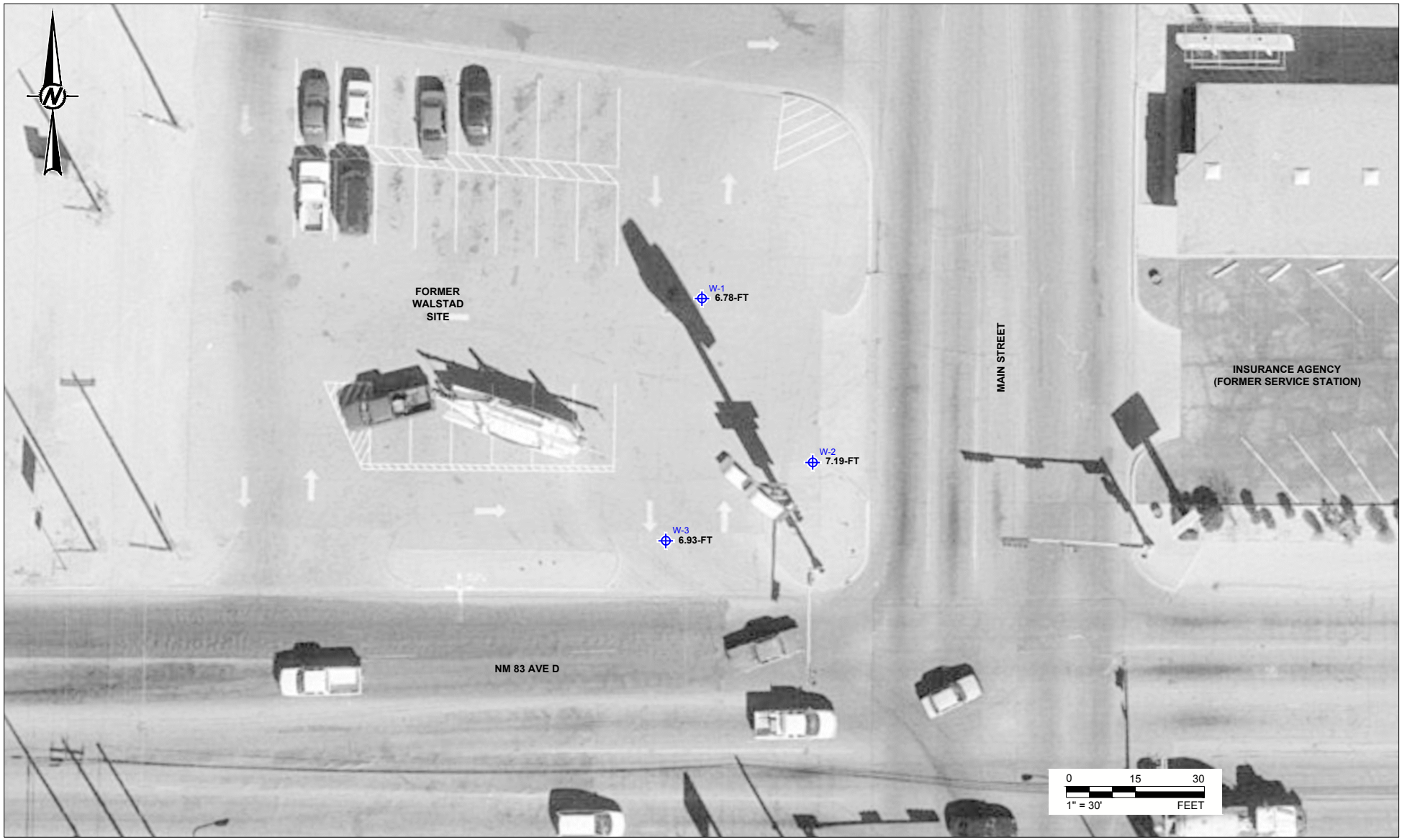
Notes:

[1] *Formation NAPL thickness estimated by Gruszenski method*

[2] *Hydraulic properties estimated using the ASTM Designation ES2856-13 method (API LNAPL Transmissivity Workbook)*

FIGURES

Path: \\albuquerque\Cad\2014 Projects\1404221\PRODUCTION\ | File Name: 140-4221E001.dwg



LEGEND

W-2 7.19-FT — EXISTING MONITORING WELL WITH NAPL THICKNESS (FT)

CLIENT
NEW MEXICO ENVIRONMENT DEPARTMENT
PETROLEUM STORAGE TANK BUREAU
SANTA FE, NEW MEXICO

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-04
DESIGNED	PDC
PREPARED	PDC
REVIEWED	CLK
APPROVED	BN

PROJECT
WALSTAD OIL COMPANY
LOVINGTON 66
LOVINGTON, NEW MEXICO

TITLE
NAPL BAILDOWN TEST LAYOUT

PROJECT NO.	TASK:	REV.	FIGURE:
140-4221	5	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

ATTACHMENT 1
CONTINGENCY EXPENDITURE AUTHORIZATION
CORRESPONDENCE

April 29, 2015 1302645

Mr. Celestine Ngam
NMED PSTB
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

RE: REQUEST FOR AUTHORIZATION FOR CONTINGENCY BUDGET EXPENDITURE FOR NAPL THICKNESS-TRANSMITTIVITY TESTING, ANALYSIS AND REPORTING WORKPLAN # 17138, LOVINGTON 66 (LUST ID 1182), LOVINGTON, NEW MEXICO

Dear Mr. Ngam:

I am transmitting this letter to request authorization to expend contingency budget encumbered under workplan deliverable identification number 17138-5 to perform nonaqueous phase liquids (NAPL) testing, analysis and reporting at the Walstad 66 site in Lovington, NM. This out of scope work is proposed in response to a request for the additional testing that you and Katherine MacNeil made during a teleconference on April 17, 2015.

We understand that, in addition to the multiphase extraction (MPE) pilot testing approved in Workplan 17138, NMED-PSTB requests that separate and dedicated NAPL testing be performed at the site and that the data be reduced, analyzed and interpreted in accordance with protocol set forth in the American Society for Testing and Materials (ASTM) method: **Designation ES2856-13 *"Standard Guide for Estimation of LNAPL Transmissivity"***, as well as a method for estimating in situ NAPL thickness developed by Thomas Gruszenski: ***"Determination of A Realistic Estimate of the Actual Formation Product Thickness Using Monitor Wells: A Field Bailout Test".*** Ms. MacNeil provided an electronic spreadsheet file that contains an algorithm prepared by the American Petroleum Institute (API) that incorporates the numerical functions set forth in ASTM Method ES2856-13, as well as excerpts from several consultant reports that include interpretation of NAPL bail test data using the Gruszenski NAPL thickness determination method. We propose to perform NAPL bail-down and recovery monitoring tests of Walstad wells W-1, W-2 and W-3, and to reduce and interpret the test data from these wells using the ASTM ES2856-13 and Gruscinskin methods, and to present the testing data and analytical results along with the pilot test well installation and MPE testing report originally scoped in Workplan 17138. Proposed tasks are described below.

Task 1. – NAPL Gauging and Bail-Down: We propose to coordinate with the site manager, Mr. Ken Fadke, and mobilize to the site and to gauge NAPL and oil-water contact levels in monitoring wells W-1,

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W-2 and W-3 to establish pre-test equilibrium conditions of NAPL and oil-water contact in each well. Each well will be bailed until the NAPL thickness in the well falls below one inch.

Task 2. – NAPL and Oil-Water Contact Level Recovery Measurements: Immediately upon termination of NAPL bailing in each well, measurements of NAPL and oil-water contact will commence in accordance with the following schedule:

Test Interval (minutes)	Reading Frequency (minutes)
0-5	0.5 (30 seconds)
5-10	1
10-30	2
30-60	5
60-180	10
180+	As necessary to define trend

Based upon measurements of NAPL and water recovered and elapsed time collected during the previous NAPL bailing event conducted February 13, 2015 at wells MW-1, MW-2 and MW-3, we anticipate that the following bailing durations and fluid recoveries will be required to remove NAPL to a thickness of less than one inch in each of the wells:

Well	Bailing Duration	NAPL Recovered	Water Recovered
W-1	28 minutes	12.2 gallons	12.8 gallons
W-2	21 minutes	25.2 gallons	39.9 gallons
W-3	25 minutes	13.0 gallons	7.0 gallons

We propose to maintain NAPL and oil water contact measurements on each well after bailing until equilibrium is reached, as defined in the ASTM Method Designation ES2856-13, section 6.1.4.16. Although we anticipate that recovery equilibrium may be reached in several hours, based upon required bailing intervals to remove NAPL to less than one inch and protocol set forth in ASTM Method Designation ES2856-13, section 6.1.4.3, we anticipate that the post-bailing monitoring period could be as long as two days. Field data will be recorded on a format developed for ASTM Method Designation ES2856-13 (copy attached). Field plots of NAPL recovery thickness against the logarithm of time (minutes) will be maintained to ensure that equilibrium has been reached before measurements are curtailed at each well.

Task 4. – Produced Fluid Collection and Disposal: It is anticipated that total fluid recovery (water and NAPL combined) will approach 150 gallons. We propose to containerize the combined produced fluids and to transport to the Gandy Marley Inc disposal facility in Roswell (NMED DP-1041) and will provide documentation of proper disposal in an attachment to the well completion and summary testing report.

Task 5. – Data Reduction, Interpretation and Reporting: NAPL bailing and recovery data will be interpreted to derive estimates of formation NAPL thickness using the Gruszenski methodology and estimates of NAPL transmissivity and production projections using the ASTM Designation ES2856-13 methodology. The field data and interpretations will be included in the final report that will include as-built documentation for the MPE pilot test well, as well as the data and interpretation of the AcuVac MPE pilot test results.

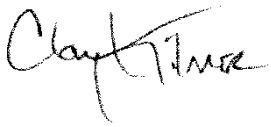
Schedule and Budget

We propose to complete the NAPL bail testing of Walstad wells W-1, W-2 and W-3 prior to installation of the MPE pilot test well such that site fluid levels will be unperturbed. It is currently anticipated that the MPE pilot test well will be completed sometime during late May or early June. We propose to perform the identified tasks for a lump sum cost of $9545.99, including New Mexico Gross Receipts Tax. A contingency budget in the amount of $14,229.93 was encumbered under Deliverable ID Number 17138-5. Assuming the proposed work is authorized, a balance of $4,683.94 would remain after the proposed work is completed and compensated.

I hope information in this submittal is adequate to meet your needs at this time. If you have any questions, please do not hesitate to contact me. Thanks for your effort to review this request.

Sincerely,

GOLDER ASSOCIATES INC.



Clay Kilmer
Sr. Hydrogeologist

cc: Mr. Bob Murrell, Walstad Oil Company

Attachment: ASTM Method Designation ES2856-13 field data form

Baildown/Slug Test Field Form

Project #:		**Site Name:**	
Well:		**Samplers:**	
Evacuation Method:		**Weather:**	

Borehole Diameter (INCHES):
Filter Pack Specific Yield (LNAPL)
0.175

Well Information		**LNAPL Information**	
Casing Diameter (INCHES):		**Fluid Type:**	
Total Depth (FT):		**Volume Removed:**	
Depth to Top of Screen (FT):		**Evacuation Method:**	
Screen Length (FT):		**LNAPL Well Volume:**	

Effective Well Radius (FT)	
	LNAPL Well Volume
ft^3	
gal	
ml	

Length and volumetric units need to be specified

Length Units: **Volume Units:**

Period	Date	Time HH:MM	Elapsed Time (min)	DTP (feet)	DTW (feet)	Comments
Initial						
Removal Start						Test Start
Removal Stop						LNAPL/Slug Volume Removed (gal): Water Volume Removed (gal):

Jeffrey, Rick

From: Ngam, Celestine, NMENV <Celestine.Ngam@state.nm.us>
Sent: Tuesday, May 12, 2015 9:27 AM
To: Kilmer, Clay
Subject: Request for Contingency Expenditure, Lovington 66 (Walstad)

PSTB approves the use of **$9,545.99** including NMGRT of the contingency fund (**Deliverable ID #: 17138-5)** for NAPL Thickness Transmissivity Testing, Analysis and Reporting at **Lovington 66** (**FID #: 1489 , RID #: 1182)**. The deliverable shall be a written report of the NAPL Thickness Transmissivity Test to PSTB.

Thanks,

Celestine Ngam
Project Manager
NMED-PSTB

ATTACHMENT 2
BARNHILL NAPL BAILING AND RECOVERY DATA

Baildown/Slug Test Data
Site: Walstad 66 Lovington
Well: W-1
Date: 6/2/15 - 6/4/15

Project #:	1404221	Site Name:	Walstad Oil Co.
Well:	W-1	Samplers:	Barnhill/Beagles
Evacuation Method:	Bailing	Weather:	Warm Sunny

Borehole Diam: 8 inches
Filter Pack Specific Yield (LNAPL)
0.175
Effective Well Radius (ft)
LNAPL Well Volume
6.78 x 0.668
4.40 g. psh

Well Information		LNAPL Information	
Casing Diameter (Inches):	4"	Fluid Type:	Gasolline
Total Depth (Ft):	70.03'	Volume Removed:	16 gallons
Static Depth to Product (Ft)	58.11	Evacuation Method:	bailing
Static Depth to Water (Ft)	64.89	LNAPL Removed:	5.75 gallons removed

Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	NAPL Thickness (feet)	Comments
Bailed	06/02/15	9:39:00					4 gals NAPL
Bailed	06/02/15	9:44:00					1 gal NAPL, 3 gal water
Bailed	06/02/15	9:50:00					0.75 gal NAPL, 3.25 gal water
Bailed	06/02/15	9:55:00					trace NAPL, 4 gal water
0 - 5	06/02/15	9:57:00	start recovery	0	60.51		
0 - 5	06/02/15	9:57:30	0.5	60.41	60.51	0.10	
0 - 5	06/02/15	9:58:00	1.0	60.26	60.27	0.01	
0 - 5	06/02/15	9:58:30	1.5	60.16	60.17	0.01	
0 - 5	06/02/15	9:59:00	2.0	60.06	60.07	0.01	
0 - 5	06/02/15	9:59:30	2.5	59.91	59.94	0.03	
0 - 5	06/02/15	10:00:00	3.0	59.88	59.90	0.02	
0 - 5	06/02/15	10:00:30	3.5	59.85	59.87	0.02	
0 - 5	06/02/15	10:01:00	4.0	59.84	59.86	0.02	
0 - 5	06/02/15	10:01:30	4.5	59.81	59.83	0.02	
0 - 5	06/02/15	10:02:00	5.0	59.79	59.81	0.02	
0 - 5	06/02/15	10:02:30	5.5	59.77	59.79	0.02	
5 - 10	06/02/15	10:03:00	6.0	59.74	59.78	0.04	
5 - 10	06/02/15	10:04:00	7.0	59.71	59.77	0.06	Water level peak vaule
5 - 10	06/02/15	10:05:00	8.0	59.68	59.79	0.11	
5 - 10	06/02/15	10:06:00	9.0	59.67	59.81	0.14	
5 - 10	06/02/15	10:07:00	10.0	59.65	59.84	0.19	
5 - 10	06/02/15	10:08:00	11.0	59.64	59.86	0.22	
10 - 30	06/02/15	10:10:00	13.0	59.62	59.9	0.28	
10 - 30	06/02/15	10:12:00	15.0	59.60	59.94	0.34	
10 - 30	06/02/15	10:14:00	17.0	59.59	59.98	0.39	
10 - 30	06/02/15	10:16:00	19.0	59.58	60.00	0.42	
10 - 30	06/02/15	10:18:00	21.0	59.57	60.02	0.45	
10 - 30	06/02/15	10:20:00	23.0	59.57	60.04	0.47	
10 - 30	06/02/15	10:22:00	25.0	59.56	60.06	0.50	
10 - 30	06/02/15	10:24:00	27.0	59.55	60.08	0.53	
10 - 30	06/02/15	10:26:00	29.0	59.54	60.09	0.55	
10 - 30	06/02/15	10:28:00	31.0	59.53	60.11	0.58	
10 - 30	06/02/15	10:30:00	33.0	59.53	60.12	0.59	
10 - 30	06/02/15	10:32:00	35.0	59.52	60.14	0.62	
10 - 30	06/02/15	10:34:00	37.0	59.52	60.16	0.64	
10 - 30	06/02/15	10:36:00	39.0	59.51	60.17	0.66	
10 - 30	06/02/15	10:38:00	41.0	59.50	60.19	0.69	
10 - 30	06/02/15	10:40:00	43.0	59.49	60.21	0.72	
30 - 60	06/02/15	10:45:00	48.0	59.48	60.24	0.76	
30 - 60	06/02/15	10:50:00	53.0	59.47	60.29	0.82	
30 - 60	06/02/15	10:55:00	58.0	59.45	60.33	0.88	
30 - 60	06/02/15	11:00:00	63.0	59.44	60.36	0.92	
30 - 60	06/02/15	11:05:00	68.0	59.43	60.39	0.96	
30 - 60	06/02/15	11:10:00	73.0	59.42	60.43	1.01	
60-180	06/02/15	11:20:00	83.0	59.40	60.51	1.11	
60-180	06/02/15	11:30:00	93.0	59.37	60.57	1.2	
60-180	06/02/15	11:40:00	103.0	59.36	60.65	1.29	
60-180	06/02/15	11:50:00	113.0	59.34	60.73	1.39	
60-180	06/02/15	12:00:00	123.0	59.31	60.80	1.49	

Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	NAPL Thickness (feet)	Comments
60-180	06/02/15	12:10:00	133.0	59.27	60.88	1.61	
60-180	06/02/15	12:20:00	143.0	59.26	60.92	1.66	
60-180	06/02/15	12:30:00	153.0	59.24	60.98	1.74	
60-180	06/02/15	12:40:00	163.0	59.21	61.04	1.83	
60-180	06/02/15	12:50:00	173.0	59.19	61.11	1.92	
60-180	06/02/15	13:00:00	183.0	59.17	61.16	1.99	
60-180	06/02/15	13:10:00	193.0	59.15	61.23	2.08	
60-180	06/02/15	13:20:00	203.0	59.12	61.29	2.17	
180+	06/02/15	13:30:00	213.0	59.10	61.35	2.25	
180+	06/02/15	14:00:00	243.0	59.04	61.54	2.50	
180+	06/02/15	14:30:00	273.0	58.98	61.71	2.73	
180+	06/02/15	15:00:00	303.0	58.93	61.87	2.94	
180+	06/02/15	16:00:00	363.0	58.84	61.57	2.73	
180+	06/02/15	17:00:00	423.0	58.73	62.49	3.76	
180+	06/02/15	18:00:00	483.0	58.65	62.77	4.12	
180+	06/02/15	19:00:00	543.0	58.58	63.02	4.44	
180+	06/02/15	20:00:00	603.0	58.52	63.22	4.70	
180+	06/02/15	21:00:00	663.0	58.47	63.40	4.93	
180+	06/03/15	6:30:00	1233.0	58.22	64.27	6.05	
180+	06/03/15	7:30:00	1293.0	58.20	64.30	6.10	
180+	06/03/15	8:30:00	1353.0	58.19	64.32	6.13	
180+	06/03/15	9:30:00	1413.0	58.18	64.36	6.18	
180+	06/03/15	10:30:00	1473.0	58.16	64.38	6.22	
180+	06/03/15	11:30:00	1533.0	58.16	64.40	6.24	
180+	06/03/15	12:30:00	1593.0	58.15	64.42	6.27	
180+	06/03/15	13:30:00	1653.0	58.14	64.43	6.29	
180+	06/03/15	14:30:00	1713.0	58.13	64.44	6.31	
180+	06/03/15	15:30:00	1773.0	58.12	64.45	6.33	
180+	06/04/15	11:30:00	2973.0	58.14	64.61	6.47	
180+	06/04/15	16:30:00	3273.0	58.11	64.58	6.47	

Baildown/Slug Test Data
Site: Walstad 66 Lovington
Well: W-2
Date: 6/2/15 - 6/4/15

Project #:	1404221	Site Name:	Walstad Oil Co.
Well:	W-2	Samplers:	Barnhill/Beagles
Evacuation Method:	Bailing	Weather:	Warm Sunny

Borehole Diam: 8 inches
Filter Pack Specific Yield (LNAPL)
0.175
Effective Well Radius (ft)
LNAPL Well Volume
7.19 x 0.668 = 4.80 gallons
4.8 gal psh

Well Information		LNAPL Information	
Casing Diameter (Inches):	4"	Fluid Type:	Gasolline
Total Depth (Ft):	69.55	Volume Removed:	16 gallons
Static Depth to Product (Ft)	57.07	Evacuation Method:	bailing
Static Depth to Water (Ft)	64.26	LNAPL Removed:	7.2 gallons removed

Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	Total thickness (feet)	Comments
Bailed	06/02/15	11:36:00					4 gal NAPL
Bailed	06/02/15	11:44:00					2 gal NAPL, 2 gal water
Bailed	06/02/15	11:53:00					1.2 gal NAPL, 2.8 gal water
Bailed	06/02/15	12:02:00					trace NAPL, 4 gal water
0 - 5	06/02/15	12:04:00	start recovery	59.30	59.32	0.02	
0 - 5	06/02/15	12:04:30	0.5	59.14	59.17	0.03	
0 - 5	06/02/15	12:05:00	1.0	59.01	59.06	0.05	
0 - 5	06/02/15	12:05:30	1.5	58.94	59.02	0.08	
0 - 5	06/02/15	12:06:00	2.0	58.87	58.95	0.08	
0 - 5	06/02/15	12:06:30	2.5	58.82	58.95	0.13	
0 - 5	06/02/15	12:07:00	3.0	58.79	58.91	0.12	
0 - 5	06/02/15	12:07:30	3.5	58.75	58.88	0.13	
0 - 5	06/02/15	12:08:00	4.0	58.73	58.86	0.13	
0 - 5	06/02/15	12:08:30	4.5	58.71	58.86	0.15	
0 - 5	06/02/15	12:09:00	5.0	58.70	58.86	0.16	
5 - 10	06/02/15	12:10:00	6.0	58.69	58.85	0.16	
5 - 10	06/02/15	12:11:00	7.0	58.66	58.85	0.19	
5 - 10	06/02/15	12:12:00	8.0	58.65	58.85	0.20	
5 - 10	06/02/15	12:13:00	9.0	58.64	58.85	0.21	
5 - 10	06/02/15	12:14:00	10.0	58.64	58.85	0.21	
10 - 30	06/02/15	12:16:00	12.0	58.63	58.85	0.22	Water level peak vaule
10 - 30	06/02/15	12:18:00	14.0	58.62	58.86	0.24	
10 - 30	06/02/15	12:20:00	16.0	58.61	58.88	0.27	
10 - 30	06/02/15	12:22:00	18.0	58.61	58.89	0.28	
10 - 30	06/02/15	12:24:00	20.0	58.61	58.89	0.28	
10 - 30	06/02/15	12:26:00	22.0	58.60	58.90	0.30	
10 - 30	06/02/15	12:28:00	24.0	58.60	58.91	0.31	
10 - 30	06/02/15	12:30:00	26.0	58.60	58.92	0.32	
10 - 30	06/02/15	12:32:00	28.0	58.59	58.93	0.34	
10 - 30	06/02/15	12:34:00	30.0	58.59	58.94	0.35	
30 - 60	06/02/15	12:39:00	35.0	58.58	58.96	0.38	
30 - 60	06/02/15	12:44:00	40.0	58.58	58.98	0.40	
30 - 60	06/02/15	12:49:00	45.0	58.57	58.99	0.42	
30 - 60	06/02/15	12:54:00	50.0	58.56	59.01	0.45	
30 - 60	06/02/15	12:59:00	55.0	58.55	59.03	0.48	
30 - 60	06/02/15	13:04:00	60.0	58.54	59.04	0.50	
60 - 180	06/02/15	13:14:00	70.0	58.53	59.08	0.55	
60 - 180	06/02/15	13:24:00	80.0	58.51	59.11	0.60	
60 - 180	06/02/15	13:34:00	90.0	58.50	59.14	0.64	
60 - 180	06/02/15	13:44:00	100.0	58.49	59.17	0.68	
60 - 180	06/02/15	13:54:00	110.0	58.48	59.20	0.72	
60 - 180	06/02/15	14:04:00	120.0	58.47	59.23	0.76	
60 - 180	06/02/15	14:14:00	130.0	58.46	59.27	0.81	
60 - 180	06/02/15	14:24:00	140.0	58.44	59.30	0.86	
60 - 180	06/02/15	14:34:00	150.0	58.43	59.33	0.90	
60 - 180	06/02/15	14:44:00	160.0	58.42	59.35	0.93	
180+	06/02/15	15:00:00	176.0	58.41	59.40	0.99	
180+	06/02/15	15:30:00	206.0	58.39	59.51	1.12	
180+	06/02/15	16:00:00	236.0	58.32	59.62	1.30	

Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	Total thickness (feet)	Comments
180+	06/02/15	17:00:00	296.0	58.30	59.74	1.44	
180+	06/02/15	18:00:00	356.0	58.25	59.90	1.65	
180+	06/02/15	19:00:00	416.0	58.21	60.05	1.84	
180+	06/02/15	20:00:00	476.0	58.16	60.22	2.06	
180+	06/02/15	21:00:00	536.0	58.11	60.37	2.26	
180+	06/03/15	6:30:00	1106.0	57.72	61.67	3.95	
180+	06/03/15	7:30:00	1166.0	57.68	61.78	4.10	
180+	06/03/15	8:30:00	1226.0	57.65	61.89	4.24	
180+	06/03/15	9:30:00	1286.0	57.61	61.97	4.36	7.19' PSH initial
180+	06/03/15	10:30:00	1346.0	57.57	62.07	4.50	
180+	06/03/15	11:30:00	1406.0	57.55	62.17	4.62	
180+	06/03/15	12:30:00	1466.0	57.51	62.25	4.74	
180+	06/03/15	13:30:00	1526.0	57.48	62.33	4.85	
180+	06/03/15	14:30:00	1586.0	57.46	62.42	4.96	
180+	06/03/15	15:30:00	1646.0	57.43	62.49	5.06	
180+	06/04/15	11:30:00	2846.0	57.22	63.47	6.25	
180+	06/04/15	16:30:00	3146.0	57.16	63.55	6.39	

Baildown/Slug Test Data
Site: Walstad 66 Lovington
Well: W-3
Date: 6/2/15 - 6/4/15

Project #:	1404221	Site Name:	Walstad Oil Co.
Well:	W-3	Samplers:	Barnhill/Beagles
Evacuation Method:	Bailing	Weather:	Hot 92ºF

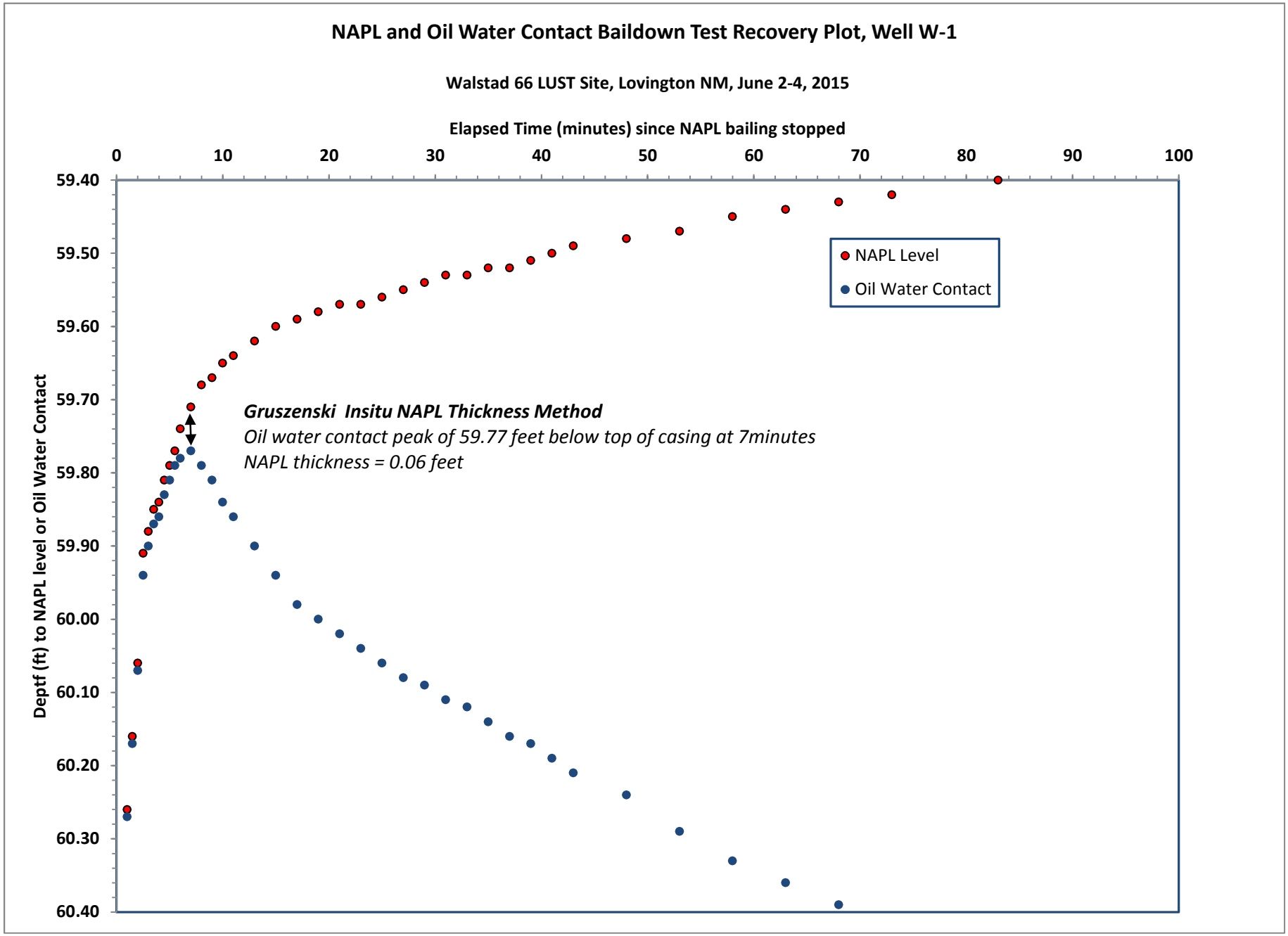
Borehole Diam: 8 inches
Filter Pack Specific Yield (LNAPL)
0.175
Effective Well Radius (ft)
LNAPL Well Volume
6.94 x 0.668 = 4.63 gallons
4.63 gal psh

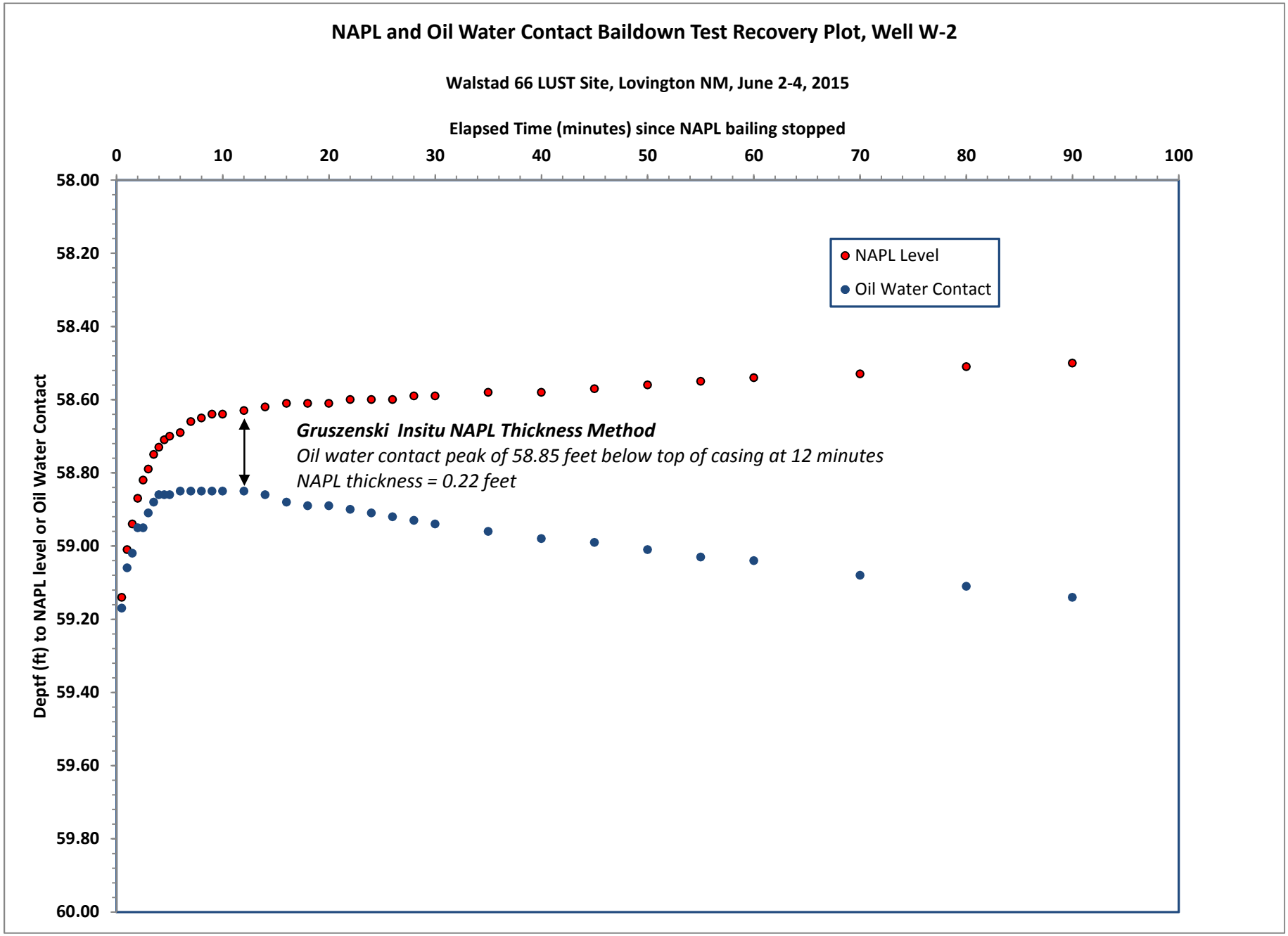
Well Information		LNAPL Information	
Casing Diameter (Inches):	4"	Fluid Type:	Gasolline
Total Depth (Ft):	73.45	Volume Removed:	16 gallons
Static Depth to Product (Ft)	57.17	Evacuation Method:	bailing
Static Depth to Water (Ft)	64.1	LNAPL Removed:	7 gallons removed

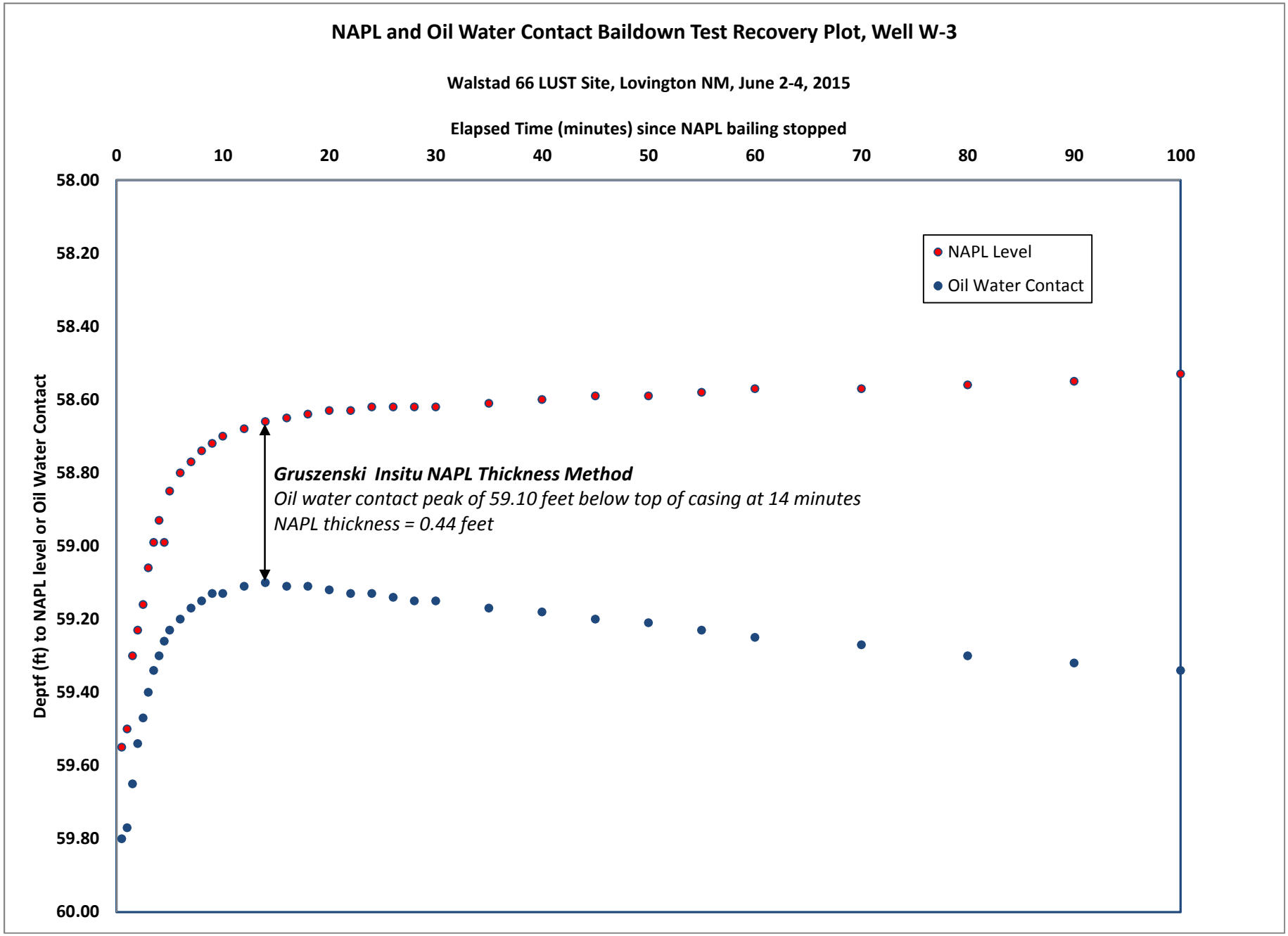
Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	Total thickness (feet)	Comments
Bailed	06/02/15	15:08:00					4 gals NAPL
Bailed	06/02/15	15:12:00					2 gal NAPL, 2 gal water
Bailed	06/02/15	15:17:00					0.8 gal NAPL, 3.2 gal water
Bailed	06/02/15	15:21:00					0.2 gal NAPL, 3.2 gal water
0 - 5	06/02/15	15:23:00	0	59.80	59.95	0.15	
0 - 5	06/02/15	15:23:30	0.5	59.55	59.80	0.25	
0 - 5	06/02/15	15:24:00	1.0	59.50	59.77	0.27	
0 - 5	06/02/15	15:24:30	1.5	59.30	59.65	0.35	
0 - 5	06/02/15	15:25:00	2.0	59.23	59.54	0.31	
0 - 5	06/02/15	15:25:30	2.5	59.16	59.47	0.31	
0 - 5	06/02/15	15:26:00	3.0	59.06	59.40	0.34	
0 - 5	06/02/15	15:26:30	3.5	58.99	59.34	0.35	
0 - 5	06/02/15	15:27:00	4.0	58.93	59.30	0.37	
0 - 5	06/02/15	15:27:30	4.5	58.99	59.26	0.27	
0 - 5	06/02/15	15:28:00	5.0	58.85	59.23	0.38	
5 - 10	06/02/15	15:29:00	6.0	58.80	59.20	0.40	
5 - 10	06/02/15	15:30:00	7.0	58.77	59.17	0.40	
5 - 10	06/02/15	15:31:00	8.0	58.74	59.15	0.41	
5 - 10	06/02/15	15:32:00	9.0	58.72	59.13	0.41	
5 - 10	06/02/15	15:33:00	10.0	58.70	59.13	0.43	
10 - 30	06/02/15	15:35:00	12.0	58.68	59.11	0.43	
10 - 30	06/02/15	15:37:00	14.0	58.66	59.10	0.44	Water level peak vaule
10 - 30	06/02/15	15:39:00	16.0	58.65	59.11	0.46	
10 - 30	06/02/15	15:41:00	18.0	58.64	59.11	0.47	
10 - 30	06/02/15	15:43:00	20.0	58.63	59.12	0.49	
10 - 30	06/02/15	15:45:00	22.0	58.63	59.13	0.50	
10 - 30	06/02/15	15:47:00	24.0	58.62	59.13	0.51	
10 - 30	06/02/15	15:49:00	26.0	58.62	59.14	0.52	
10 - 30	06/02/15	15:51:00	28.0	58.62	59.15	0.53	
10 - 30	06/02/15	15:53:00	30.0	58.62	59.15	0.53	
30 - 60	06/02/15	15:58:00	35.0	58.61	59.17	0.56	
30 - 60	06/02/15	16:03:00	40.0	58.60	59.18	0.58	
30 - 60	06/02/15	16:08:00	45.0	58.59	59.20	0.61	
30 - 60	06/02/15	16:13:00	50.0	58.59	59.21	0.62	
30 - 60	06/02/15	16:18:00	55.0	58.58	59.23	0.65	
30 - 60	06/02/15	16:23:00	60.0	58.57	59.25	0.68	
60 - 180	06/02/15	16:33:00	70.0	58.57	59.27	0.70	
60 - 180	06/02/15	16:43:00	80.0	58.56	59.30	0.74	
60 - 180	06/02/15	16:53:00	90.0	58.55	59.32	0.77	
60 - 180	06/02/15	17:03:00	100.0	58.53	59.34	0.81	
60 - 180	06/02/15	17:13:00	110.0	58.53	59.38	0.85	
60 - 180	06/02/15	17:23:00	120.0	58.53	59.40	0.87	
60 - 180	06/02/15	17:33:00	130.0	58.52	59.42	0.90	
60 - 180	06/02/15	17:43:00	140.0	58.51	59.45	0.94	
60 - 180	06/02/15	17:53:00	150.0	58.50	59.46	0.96	
60 - 180	06/02/15	18:03:00	160.0	58.50	59.49	0.99	
60 - 180	06/02/15	18:13:00	170.0	58.49	59.52	1.03	
60 - 180	06/02/15	18:23:00	180.0	58.48	59.53	1.05	
180+	06/02/15	19:00:00	217.0	58.47	59.62	1.15	

Period	Date	Time (HH:MM:SS)	Elapsed Time (Minutes)	DTP (feet)	DTW (feet)	Total thickness (feet)	Comments
180+	06/02/15	20:00:00	277.0	58.42	59.76	1.34	
180+	06/02/15	21:00:00	337.0	58.39	59.89	1.50	
180+	06/03/15	6:30:00	907.0	58.06	61.00	2.94	
180+	06/03/15	7:30:00	967.0	58.02	61.09	3.07	
180+	06/03/15	8:30:00	1027.0	58.00	61.18	3.18	
180+	06/03/15	9:30:00	1087.0	57.96	61.26	3.30	6.93' PSH initial
180+	06/03/15	10:30:00	1147.0	57.93	61.35	3.42	
180+	06/03/15	11:30:00	1207.0	57.90	61.44	3.54	
180+	06/03/15	12:30:00	1267.0	57.87	61.51	3.64	
180+	06/03/15	13:30:00	1327.0	57.84	61.59	3.75	
180+	06/03/15	14:30:00	1387.0	57.82	61.66	3.84	
180+	06/03/15	15:30:00	1447.0	57.79	61.72	3.93	
180+	06/04/15	11:30:00	2647.0	57.48	62.82	5.34	
180+	06/04/15	16:30:00	2947.0	57.42	62.96	5.54	

ATTACHMENT 3
GRUSZCZENSKI FORMATION NAPL THICKNESS PLOTS


NAPL and Oil Water Contact Baildown Test Recovery Plot, Well W-1
Walstad 66 LUST Site, Lovington NM, June 2-4, 2015
Elapsed Time (minutes) since NAPL bailing stopped
0
10
20
30
40
50
60
70
80
90
100
Deptf (ft) to NAPL level or Oil Water Contact
59.40
59.50
59.60
59.70
59.80
59.90
60.00
60.10
60.20
60.30
60.40
NAPL Level
Oil Water Contact
Gruszenski Insitu NAPL Thickness Method
Oil water contact peak of 59.77 feet below top of casing at 7minutes
NAPL thickness = 0.06 feet


NAPL and Oil Water Contact Baildown Test Recovery Plot, Well W-2
Walstad 66 LUST Site, Lovington NM, June 2-4, 2015
Elapsed Time (minutes) since NAPL bailing stopped
0
10
20
30
40
50
60
70
80
90
100
Deptf (ft) to NAPL level or Oil Water Contact
58.00
58.20
58.40
58.60
58.80
59.00
59.20
59.40
59.60
59.80
60.00
NAPL Level
Oil Water Contact
Gruszenski Insitu NAPL Thickness Method
Oil water contact peak of 58.85 feet below top of casing at 12 minutes
NAPL thickness = 0.22 feet


NAPL and Oil Water Contact Baildown Test Recovery Plot, Well W-3
Walstad 66 LUST Site, Lovington NM, June 2-4, 2015
Elapsed Time (minutes) since NAPL bailing stopped
0
10
20
30
40
50
60
70
80
90
100
Deptf (ft) to NAPL level or Oil Water Contact
58.00
58.20
58.40
58.60
58.80
59.00
59.20
59.40
59.60
59.80
60.00
NAPL Level
Oil Water Contact
Gruszenski Insitu NAPL Thickness Method
Oil water contact peak of 59.10 feet below top of casing at 14 minutes
NAPL thickness = 0.44 feet

ATTACHMENT 4
API LNAPL TRANSMISSIVITY WORKBOOK RESULTS

API LNAPL Transmissivity Workbook

Calculation of LNAPL Transmissivity from Baildown Test Data

STEP 1: RESET OUTPUT SUMMARY

STEP 2: ENTER DATA & VIEW FIGURES

STEP 3: CHOOSE WELL CONDITIONS

STEP 4: LNAPL TRANSMISSIVITY SUMMARY

Mean LNAPL Transmissivity (ft^2/d)

0.66

Standard Deviation (ft^2/d)

0.07

Coefficient of Variation

0.10

NAPL Bailing Test Data and Interpretation
Well W-1
Walstad Lovington 66 LUST Site
June 2-4, 2015

Well Designation:	W-1	Walstad LUST Site
Date:	date	2-Jun-15

Ground Surface Elev (ft msl)	0.0	Enter These Data
Top of Casing Elev (ft msl)	0.0	
Well Casing Radius, r_c (ft):	0.167	r_{e1}
Well Radius, r_w (ft):	0.333	
LNAPL Specific Yield, S_y:	0.175	
LNAPL Density Ratio, ρ_r:	0.780	
Top of Screen (ft bgs):	50.0	
Bottom of Screen (ft bgs):	70.0	
LNAPL Baildown Vol. (gal.):	6.0	
Effective Radius, r_{e3} (ft):	0.206	Calculated Parameters
Effective Radius, r_{e2} (ft):	0.197	
Initial Casing LNAPL Vol. (gal.):	4.44	
Initial Filter LNAPL Vol. (gal.):	2.31	

Drawdown Adjustment (ft)
0.004

Enter Data Here

	Time (min)	DTP (ft btoc)	DTW (ft btoc)	DTP (ft bgs)	DTW (ft bgs)	Water Table Depth (ft)	LNAPL Drawdown s_n (ft)	Average Time (min)	LNAPL Discharge Q_n (ft^3/d)	s_n (ft)	b_n (ft)	r_e (ft)
Initial Fluid Levels:	0	58.11	64.89	58.11	64.89	59.60					6.78	
Enter Test Data:	0.5	60.41	60.51	60.41	60.51	60.43	2.30				0.10	
	1.0	60.26	60.27	60.26	60.27	60.26	2.15	0.8	-34.538	2.22	0.01	0.206
	1.5	60.17	60.17	60.17	60.17	60.17	2.06	1.3	-3.838	2.10	0.00	0.206
	2.0	60.06	60.07	60.06	60.07	60.06	1.95	1.8	3.838	2.00	0.01	0.206
	2.5	59.91	59.94	59.91	59.94	59.92	1.80	2.3	7.675	1.87	0.03	0.206
	3.0	59.88	59.90	59.88	59.90	59.88	1.77	2.8	-3.838	1.78	0.02	0.206
	3.5	59.85	59.87	59.85	59.87	59.85	1.74	3.3	0.000	1.75	0.02	0.206
	4.0	59.84	59.86	59.84	59.86	59.84	1.73	3.8	0.000	1.73	0.02	0.206
	4.5	59.81	59.83	59.81	59.83	59.81	1.70	4.3	0.000	1.71	0.02	0.206
	5.0	59.79	59.81	59.79	59.81	59.79	1.68	4.8	0.000	1.69	0.02	0.206
	6.0	59.74	59.78	59.74	59.78	59.75	1.63	5.5	3.838	1.65	0.04	0.206
	7.0	59.71	59.77	59.71	59.77	59.72	1.60	6.5	3.838	1.61	0.06	0.206
	8.0	59.68	59.79	59.68	59.79	59.70	1.57	7.5	9.594	1.58	0.11	0.206
	9.0	59.67	59.81	59.67	59.81	59.70	1.56	8.5	5.756	1.56	0.14	0.206
	10.0	59.65	59.84	59.65	59.84	59.69	1.54	9.5	9.594	1.55	0.19	0.206
	11.0	59.64	59.86	59.64	59.86	59.69	1.53	10.5	5.756	1.53	0.22	0.206
	13.0	59.62	59.90	59.62	59.90	59.68	1.51	12.0	5.756	1.52	0.28	0.206
	15.0	59.6	59.94	59.60	59.94	59.67	1.49	14.0	5.756	1.50	0.34	0.206
	17.0	59.59	59.98	59.59	59.98	59.68	1.48	16.0	4.797	1.48	0.39	0.206
	19.0	59.58	60.00	59.58	60.00	59.67	1.47	18.0	2.878	1.47	0.42	0.206
	21.0	59.57	60.02	59.57	60.02	59.67	1.46	20.0	2.878	1.46	0.45	0.206
	23.0	59.57	60.04	59.57	60.04	59.67	1.46	22.0	1.919	1.46	0.47	0.206
	25.0	59.56	60.06	59.56	60.06	59.67	1.45	24.0	2.878	1.45	0.50	0.206
	27.00	59.55	60.08	59.55	60.08	59.67	1.44	26.0	2.878	1.44	0.53	0.206
	29.00	59.54	60.09	59.54	60.09	59.66	1.43	28.0	1.919	1.43	0.55	0.206
	35.00	59.52	60.14	59.52	60.14	59.66	1.41	32.0	2.239	1.42	0.62	0.206
	41.00	59.5	60.19	59.50	60.19	59.65	1.39	38.0	2.239	1.40	0.69	0.206
	43.00	59.49	60.21	59.49	60.21	59.65	1.38	42.0	2.878	1.38	0.72	0.206
	48.00	59.48	60.24	59.48	60.24	59.65	1.37	45.5	1.535	1.37	0.76	0.206
	53.00	59.47	60.29	59.47	60.29	59.65	1.36	50.5	2.303	1.36	0.82	0.206
	58.00	59.45	60.33	59.45	60.33	59.64	1.34	55.5	2.303	1.35	0.88	0.206
	68.00	59.43	60.39	59.43	60.39	59.64	1.32	63.0	1.535	1.33	0.96	0.206
	73.00	59.42	60.43	59.42	60.43	59.64	1.31	70.5	1.919	1.31	1.01	0.206
	83.00	59.4	60.51	59.40	60.51	59.64	1.29	78.0	1.919	1.30	1.11	0.206
	93.00	59.37	60.57	59.37	60.57	59.63	1.26	88.0	1.727	1.27	1.20	0.206
	103.00	59.36	60.65	59.36	60.65	59.64	1.25	98.0	1.727	1.25	1.29	0.206
	123.00	59.31	60.80	59.31	60.80	59.64	1.20	113.0	1.919	1.22	1.49	0.206
	143.00	59.26	60.92	59.26	60.92	59.63	1.15	133.0	1.631	1.17	1.66	0.206
	163	59.21	61.04	59.21	61.04	59.61	1.10	153.0	1.631	1.12	1.83	0.206
	183	59.17	61.16	59.17	61.16	59.61	1.06	173.0	1.535	1.08	1.99	0.206
	213	59.12	61.29	59.12	61.29	59.60	1.01	198.0	1.151	1.03	2.17	0.206
	243	59.04	61.54	59.04	61.54	59.59	0.93	228.0	2.111	0.97	2.50	0.206
	273	58.98	61.71	58.98	61.71	59.58	0.87	258.0	1.471	0.90	2.73	0.206
	303	58.93	61.87	58.93	61.87	59.58	0.82	288.0	1.343	0.84	2.94	0.206
	363	58.84	61.57	58.84	61.57	59.44	0.73	333.0	-0.672	0.77	2.73	0.206
	423	58.73	62.49	58.73	62.49	59.56	0.62	393.0	3.294	0.67	3.76	0.206
	483	58.65	62.77	58.65	62.77	59.56	0.54	453.0	1.151	0.58	4.12	0.206
	543	58.58	63.02	58.58	63.02	59.56	0.47	513.0	1.023	0.50	4.44	0.206
	603	58.52	63.22	58.52	63.22	59.55	0.41	573.0	0.831	0.44	4.70	0.206
	663	58.47	63.40	58.47	63.40	59.55	0.36	633.0	0.736	0.38	4.93	0.206
	1233	58.22	64.27	58.22	64.27	59.55	0.11	948.0	0.377	0.23	6.05	0.206
	1293	58.20	64.30	58.20	64.30	59.54	0.09	1263.0	0.160	0.10	6.10	0.206
	1353	58.19	64.32	58.19	64.32	59.54	0.08	1323.0	0.096	0.08	6.13	0.206
	1413	58.18	64.36	58.18	64.36	59.54	0.07	1383.0	0.160	0.07	6.18	0.206
	1473	58.16	64.38	58.16	64.38	59.53	0.05	1443.0	0.128	0.06	6.22	0.206
	1533	58.16	64.40	58.16	64.40	59.53	0.05	1503.0	0.064	0.05	6.24	0.206
	1773	58.12	64.45	58.12	64.45	59.51	0.01	1653.0	0.072	0.03	6.33	0.206
	2973	58.14	64.61	58.14	64.61	59.56	0.03	2373.0	0.022	0.02	6.47	0.206
	3273	58.14	64.58	58.14	64.58	59.56	0.03	3123.0	-0.019	0.03	6.44	0.206

Figure 1

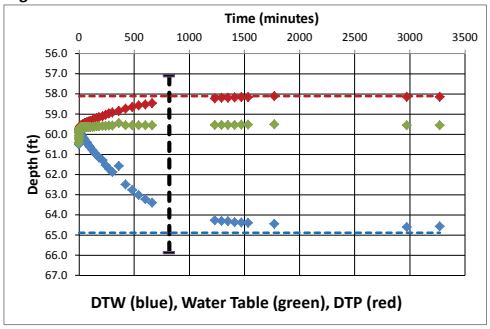
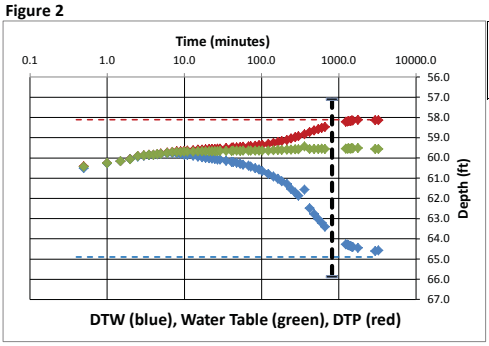


Figure 2



0.4	58.11
3273	58.11
0.4	64.89
3273	64.89
818.3	57.11
818.3	65.9

Figure 3

Q_n (ft³/d)	s_n (ft)
0	0
2	0.9

Drawdown Adjust.	
Δs_n (ft)	0.004

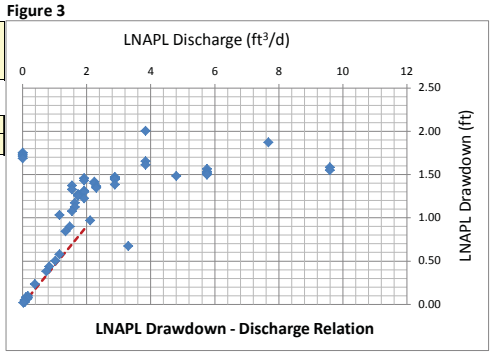
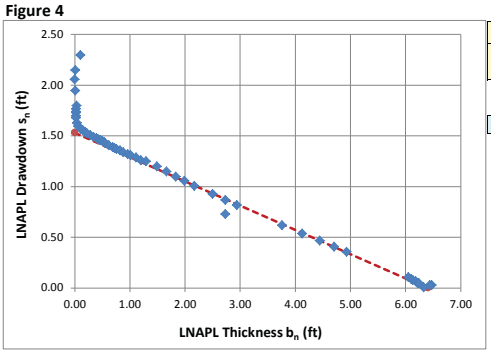


Figure 4



b_n	s_n
0	1.53
6.4	0

J-ratio	-0.239

Figure 5

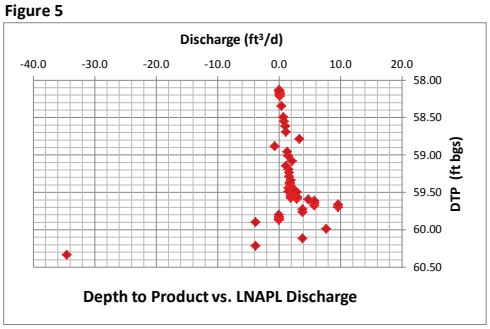


Figure 6

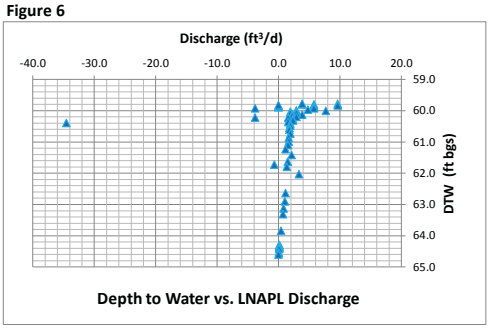


Figure 7

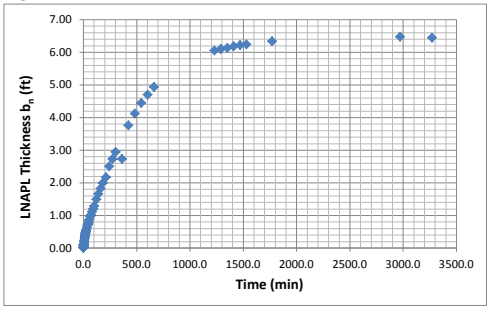


Figure 8

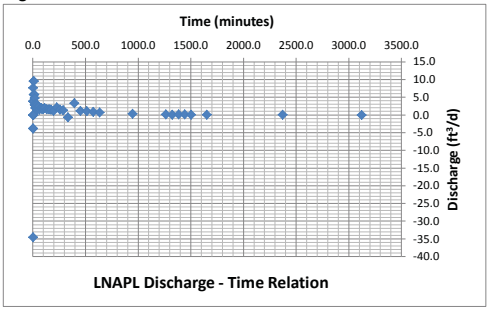


Figure 9

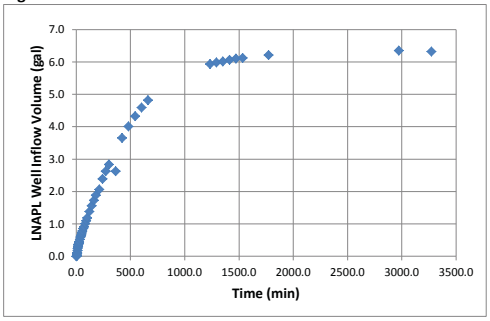
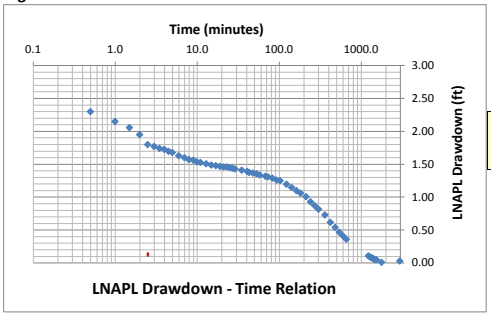


Figure 10



t (min)	s_n (ft)
2.5	0.115
2.5	0.145

Generalized Bouwer and Rice (1976)

Well Designation:	W-1
Date:	2-Jun-15

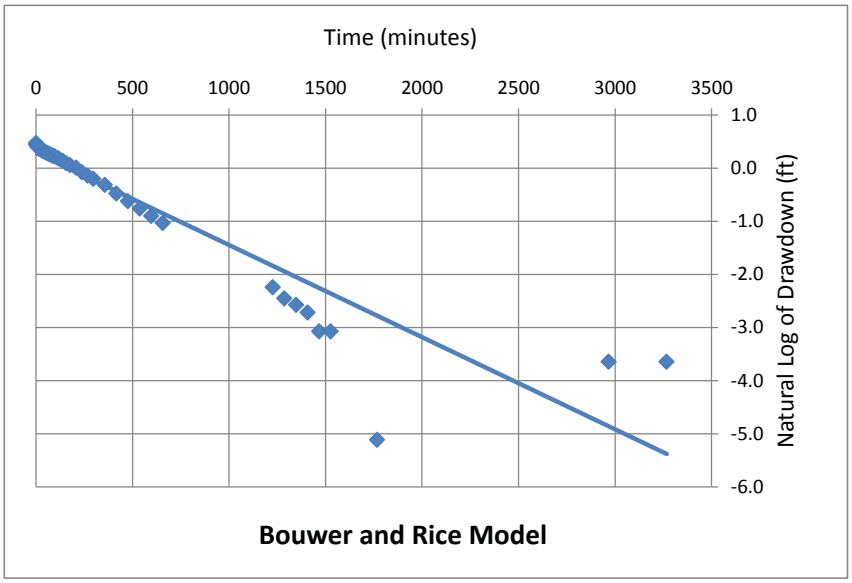
$$T_n = \frac{r_e^{\,2}\ln(R/r_e)\ln(s_n(t_1)/s_n(t))}{2(-J)(t-t_1)}$$

Enter early time cut-off for least-squares model fit

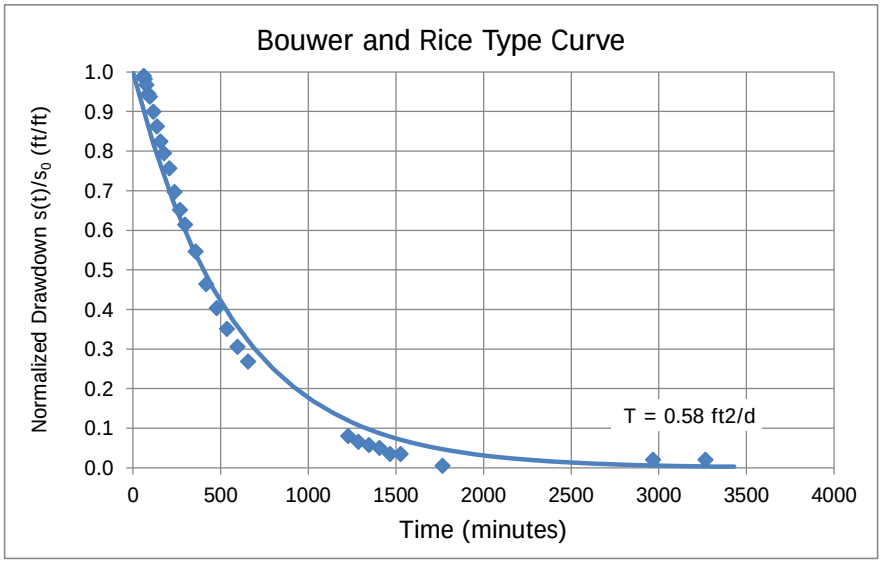
$Time_{cut}$	6	<- Enter or change value here

Model Results: T_n (ft^2/d) = 0.58 +/- 0.03 ft^2/d

L_e/r_e	32.9
C	2.11
R/r_e	14.01
J-Ratio	-0.239
Coef. Of Variation	0.06



C coefficient calculated from Eq. 6.5(c) of Butler, The Design, Performance, and Analysis of Slug Tests, CRC Press, 2000.



Cooper and Jacob (1946)

Well Designation:	W-1
Date:	date

$$V_n(t_i) = \sum_j^i \frac{4\pi T_n s_j}{\ln\left(\frac{2.25 T_n t_j}{r_e^{\,2} S_n}\right)} \Delta t_j$$

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	200	<- Enter or change values here
Time Adjustment (min):	1.5	

Trial S_n: d <-- Enter d for default or enter S_n value

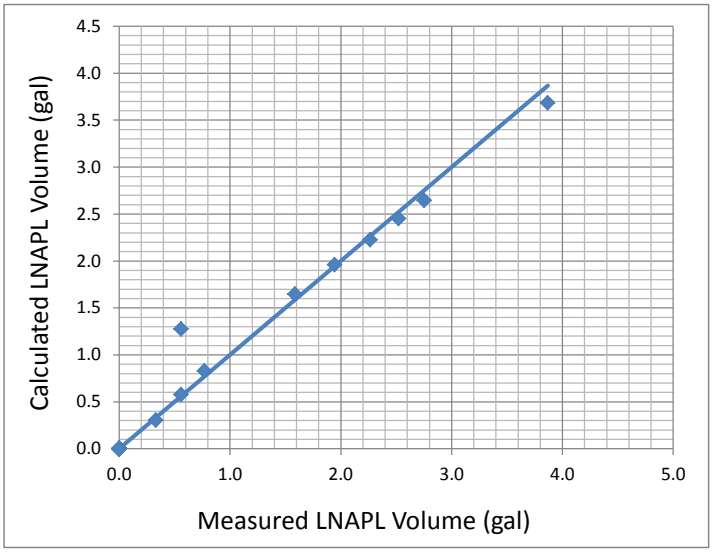
Root-Mean-Square Error: 0.756 <-- Minimize this using "Solver"

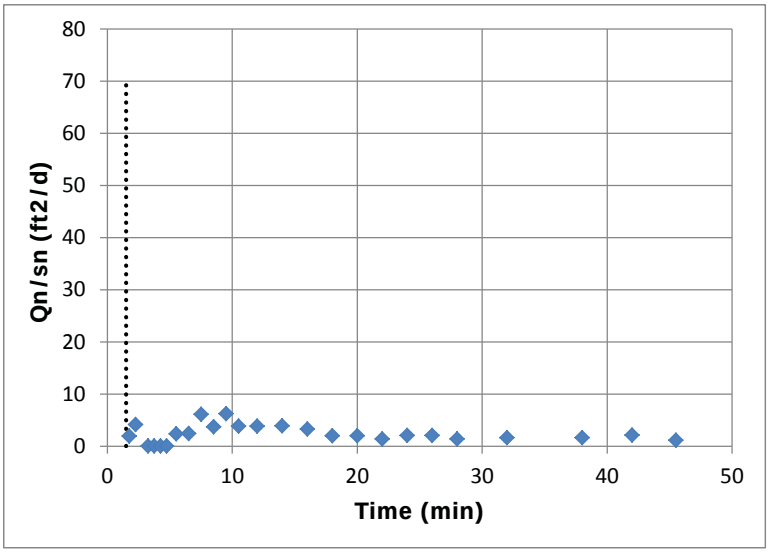
0.074 <-- Working S_n

Trial T_n (ft^2/d): 0.700 <-- By changing T_n through "Solver"

Add constraint T_n > 0.00001

Model Result: T_n (ft^2/d) = **0.70**





Height
70

Cooper, Bredehoeft and Papadopulos (1967)

Well Designation:	W-1
Date:	date

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	5	<- Enter or change values here
Initial Drawdown s_n (ft):	2.6	

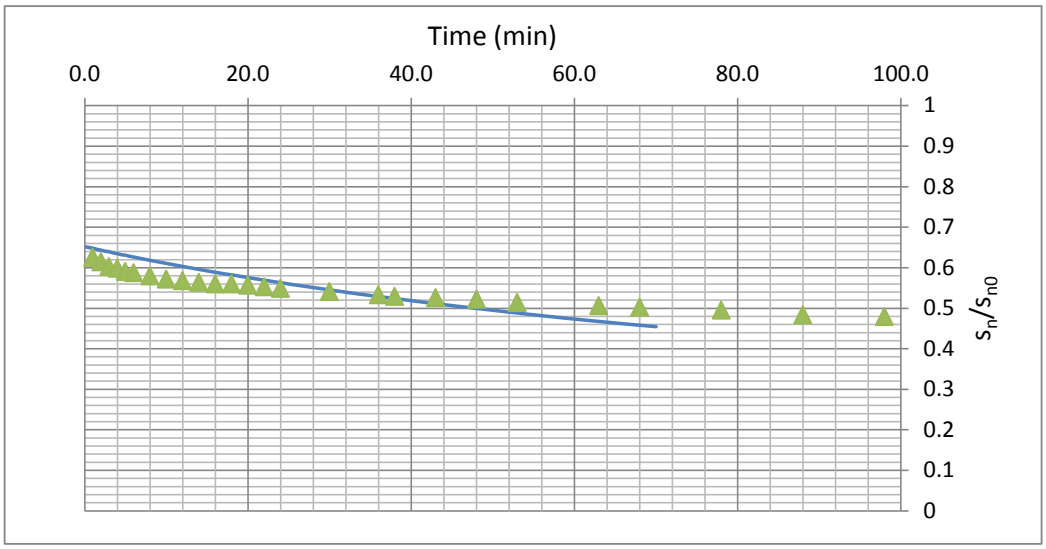
Trial S_n:	d	<-- Enter d for default
Root-Mean-Square Error:	0.259	<-- Minimize this using "Solver"
Trial T_n (ft^2/d):	0.700	<-- By changing T_n through "Solver"
	0.40000	<-- Working S_n

Add constraint Tn > 0.00001

T_{min}	0.2
T_{max}	70

Model Result:

T_n (ft^2/d) =	**0.70**



J-Ratio
-0.239

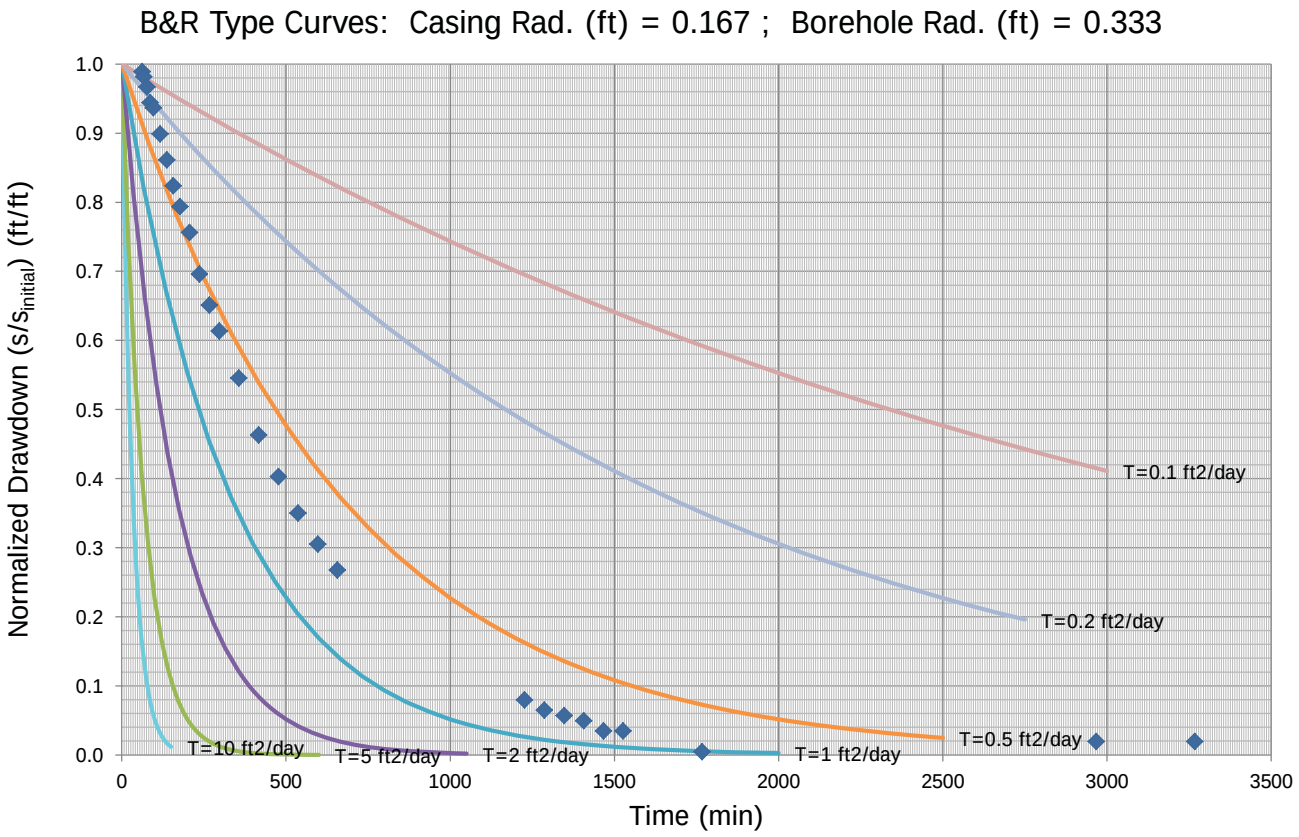
Bouwer and Rice Short Term LNAPL Mobility Test Type Curves

B&R Type Curves: Casing Rad. (ft) = 0.167 ; Borehole Rad. (ft) = 0.333

Enter these values

Type Curve ID	Type Curve Name	Notes	Max Time (min)	Transmissivity (ft^2/day)
1	T=10 ft2/day		150	10
2	T=5 ft2/day		600	5
3	T=2 ft2/day		1050	2
4	T=1 ft2/day		2000	1
5	T=0.5 ft2/day		2500	0.5
6	T=0.2 ft2/day		2750	0.2
7	T=0.1 ft2/day		3000	0.1

J-Ratio	
-0.239	<-- If uncertain us
	-0.22



API LNAPL Transmissivity Workbook

Calculation of LNAPL Transmissivity from Baildown Test Data

STEP 1: RESET OUTPUT SUMMARY

STEP 2: ENTER DATA & VIEW FIGURES

STEP 3: CHOOSE WELL CONDITIONS

STEP 4: LNAPL TRANSMISSIVITY SUMMARY

Mean LNAPL Transmissivity (ft^2/d)

0.39

Standard Deviation (ft^2/d)

0.17

Coefficient of Variation

0.43

NAPL Bailing Test Data and Interpretation
Well W-2
Walstad Lovington 66 LUST Site
June 2-4, 2015

Well Designation:	W-2	Walstad LUST Site
Date:	date	2-Jun-15

Ground Surface Elev (ft msl)	0.0	Enter These Data
Top of Casing Elev (ft msl)	0.0	
Well Casing Radius, r_c (ft):	0.167	r_{e1}
Well Radius, r_w (ft):	0.333	
LNAPL Specific Yield, S_y:	0.175	
LNAPL Density Ratio, ρ_r:	0.780	
Top of Screen (ft bgs):	0.0	
Bottom of Screen (ft bgs):	0.0	
LNAPL Baildown Vol. (gal.):	7.2	
Effective Radius, r_{e3} (ft):	0.206	Calculated Parameters
Effective Radius, r_{e2} (ft):	0.197	
Initial Casing LNAPL Vol. (gal.):	4.71	
Initial Filter LNAPL Vol. (gal.):	2.45	

Drawdown Adjustment (ft)
0.004

Enter Data Here

	Time (min)	DTP (ft btoc)	DTW (ft btoc)	DTP (ft bgs)	DTW (ft bgs)	Water Table Depth (ft)	LNAPL Drawdown s_n (ft)	Average Time (min)	LNAPL Discharge Q_n (ft^3/d)	s_n (ft)	b_n (ft)	r_e (ft)
Initial Fluid Levels:	0	57.07	64.26	57.07	64.26	58.65					7.19	
Enter Test Data:	0.5	59.14	59.32	59.14	59.32	59.18	2.07				0.18	
	1.0	59.01	59.06	59.01	59.06	59.02	1.94	0.8	-49.888	2.00	0.05	0.206
	1.5	58.94	59.02	58.94	59.02	58.96	1.87	1.3	11.513	1.90	0.08	0.206
	2.0	58.87	58.95	58.87	58.95	58.89	1.80	1.8	0.000	1.83	0.08	0.206
	2.5	58.82	58.95	58.82	58.95	58.85	1.75	2.3	19.188	1.77	0.13	0.206
	3.0	58.79	58.91	58.79	58.91	58.82	1.72	2.8	-3.838	1.73	0.12	0.206
	3.5	58.75	58.88	58.75	58.88	58.78	1.68	3.3	3.838	1.70	0.13	0.206
	4.0	58.73	58.86	58.73	58.86	58.76	1.66	3.8	0.000	1.67	0.13	0.206
	4.5	58.71	58.86	58.71	58.86	58.74	1.64	4.3	7.675	1.65	0.15	0.206
	5.0	58.70	58.86	58.70	58.86	58.74	1.63	4.8	3.838	1.63	0.16	0.206
	6.0	58.69	58.85	58.69	58.85	58.73	1.62	5.5	0.000	1.62	0.16	0.206
	7.0	58.66	58.85	58.66	58.85	58.70	1.59	6.5	5.756	1.60	0.19	0.206
	8.0	58.65	58.85	58.65	58.85	58.69	1.58	7.5	1.919	1.58	0.20	0.206
	9.0	58.64	58.85	58.64	58.85	58.69	1.57	8.5	1.919	1.57	0.21	0.206
	10.0	58.64	58.85	58.64	58.85	58.69	1.57	9.5	0.000	1.57	0.21	0.206
	12.0	58.63	58.85	58.63	58.85	58.68	1.56	11.0	0.959	1.56	0.22	0.206
	14.0	58.62	58.86	58.62	58.86	58.67	1.55	13.0	1.919	1.55	0.24	0.206
	16.0	58.61	58.88	58.61	58.88	58.67	1.54	15.0	2.878	1.54	0.27	0.206
	18.0	58.61	58.89	58.61	58.89	58.67	1.54	17.0	0.959	1.54	0.28	0.206
	20.0	58.61	58.89	58.61	58.89	58.67	1.54	19.0	0.000	1.54	0.28	0.206
	22.0	58.6	58.90	58.60	58.90	58.67	1.53	21.0	1.919	1.53	0.30	0.206
	24.0	58.6	58.91	58.60	58.91	58.67	1.53	23.0	0.959	1.53	0.31	0.206
	26.0	58.6	58.92	58.60	58.92	58.67	1.53	25.0	0.959	1.53	0.32	0.206
	28.00	58.59	58.93	58.59	58.93	58.66	1.52	27.0	1.919	1.52	0.34	0.206
	30.00	58.59	58.94	58.59	58.94	58.67	1.52	29.0	0.959	1.52	0.35	0.206
	35.00	58.58	58.96	58.58	58.96	58.66	1.51	32.5	1.151	1.51	0.38	0.206
	40.00	58.58	58.98	58.58	58.98	58.67	1.51	37.5	0.768	1.51	0.40	0.206
	45.00	58.57	58.99	58.57	58.99	58.66	1.50	42.5	0.768	1.50	0.42	0.206
	50.00	58.56	59.01	58.56	59.01	58.66	1.49	47.5	1.151	1.49	0.45	0.206
	55.00	58.55	59.03	58.55	59.03	58.66	1.48	52.5	1.151	1.48	0.48	0.206
	60.00	58.54	59.04	58.54	59.04	58.65	1.47	57.5	0.768	1.47	0.50	0.206
	70.00	58.53	59.08	58.53	59.08	58.65	1.46	65.0	0.959	1.46	0.55	0.206
	80.00	58.51	59.11	58.51	59.11	58.64	1.44	75.0	0.959	1.45	0.60	0.206
	90.00	58.5	59.14	58.50	59.14	58.64	1.43	85.0	0.768	1.43	0.64	0.206
	100.00	58.49	59.17	58.49	59.17	58.64	1.42	95.0	0.768	1.42	0.68	0.206
	110.00	58.48	59.20	58.48	59.20	58.64	1.41	105.0	0.768	1.41	0.72	0.206
	120.00	58.47	59.23	58.47	59.23	58.64	1.40	115.0	0.768	1.40	0.76	0.206
	130.00	58.46	59.27	58.46	59.27	58.64	1.39	125.0	0.959	1.39	0.81	0.206
	140	58.44	59.30	58.44	59.30	58.63	1.37	135.0	0.959	1.38	0.86	0.206
	160	58.42	59.35	58.42	59.35	58.62	1.35	150.0	0.672	1.36	0.93	0.206
	176	58.41	59.40	58.41	59.40	58.63	1.34	168.0	0.720	1.34	0.99	0.206
	206	58.39	59.51	58.39	59.51	58.64	1.32	191.0	0.831	1.33	1.12	0.206
	236	58.32	59.62	58.32	59.62	58.61	1.25	221.0	1.151	1.28	1.30	0.206
	296	58.30	59.74	58.30	59.74	58.62	1.23	266.0	0.448	1.24	1.44	0.206
	356	58.25	59.90	58.25	59.90	58.61	1.18	326.0	0.672	1.20	1.65	0.206
	416	58.21	60.05	58.21	60.05	58.61	1.14	386.0	0.608	1.16	1.84	0.206
	476	58.16	60.22	58.16	60.22	58.61	1.09	446.0	0.704	1.11	2.06	0.206
	536	58.11	60.37	58.11	60.37	58.61	1.04	506.0	0.640	1.06	2.26	0.206
	1114	57.72	61.67	57.72	61.67	58.59	0.65	825.0	0.561	0.84	3.95	0.206
	1174	57.68	61.78	57.68	61.78	58.58	0.61	1144.0	0.480	0.63	4.10	0.206
	1234	57.65	61.89	57.65	61.89	58.58	0.58	1204.0	0.448	0.59	4.24	0.206
	1294	57.61	61.97	57.61	61.97	58.57	0.54	1264.0	0.384	0.56	4.36	0.206
	1354	57.57	62.07	57.57	62.07	58.56	0.50	1324.0	0.448	0.52	4.50	0.206
	1414	57.55	62.17	57.55	62.17	58.57	0.48	1384.0	0.384	0.49	4.62	0.206
	1466	57.51	62.25	57.51	62.25	58.55	0.44	1440.0	0.443	0.46	4.74	0.206
	1526	57.48	62.33	57.48	62.33	58.55	0.41	1496.0	0.352	0.42	4.85	0.206
	1666	57.43	62.49	57.43	62.49	58.54	0.36	1596.0	0.288	0.38	5.06	0.206
	2866	57.22	63.47	57.22	63.47	58.60	0.15	2266.0	0.190	0.25	6.25	0.206
	3166	57.16	63.55	57.16	63.55	58.57	0.09	3016.0	0.090	0.12	6.39	0.206

Figure 1

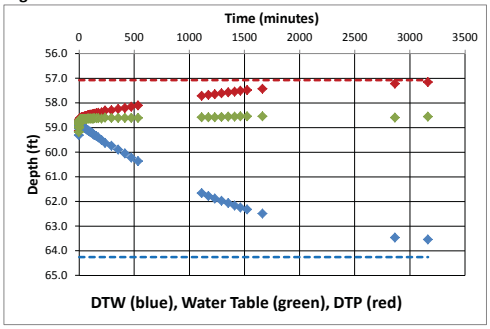
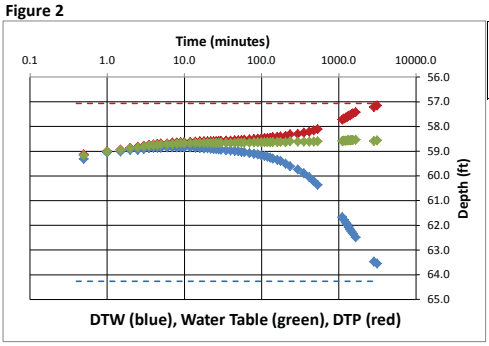


Figure 2



0.4	57.07
3166	57.07
0.4	64.26
3166	64.26

791.5	#N/A
791.5	#N/A

Figure 3

Q_n (ft³/d)	s_n (ft)
0	0
1	1.6

Drawdown Adjust.	
Δs_n (ft)	0.004

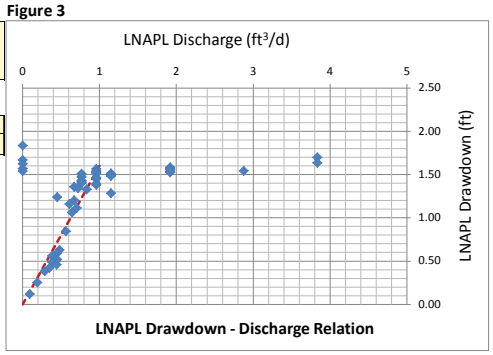
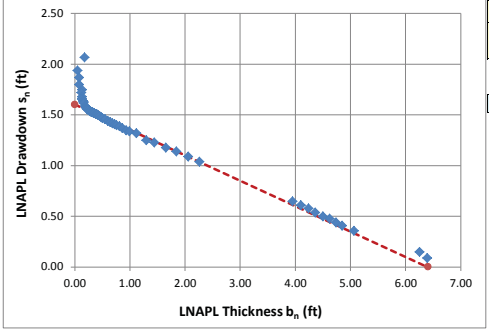


Figure 4



b_n	s_n
0	1.6
6.4	0

J-ratio	-0.250

Figure 5

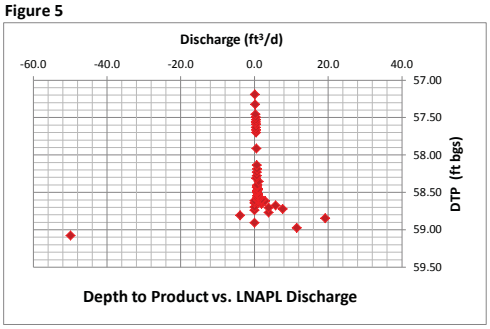


Figure 6

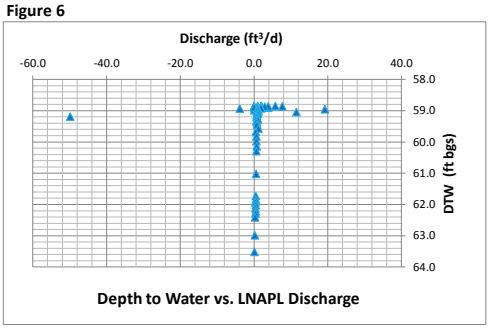


Figure 7

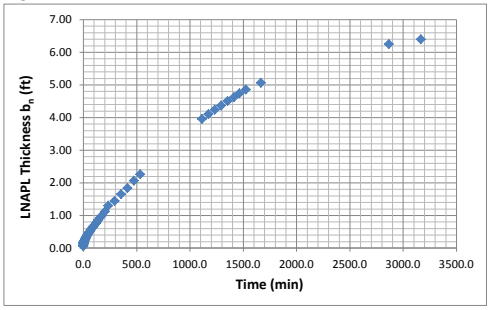


Figure 8

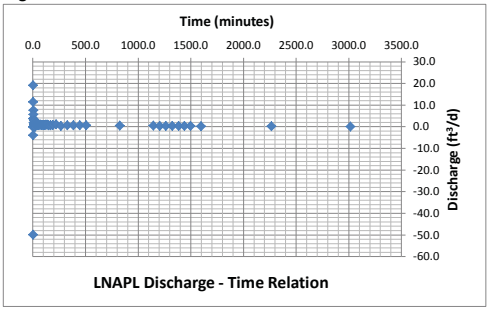


Figure 9

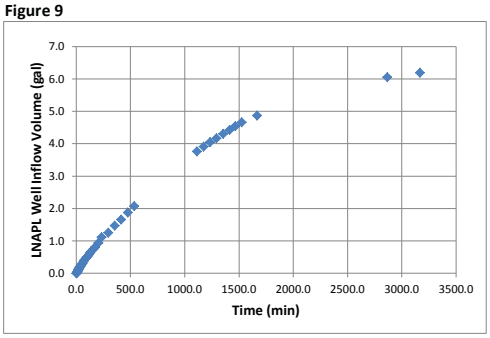
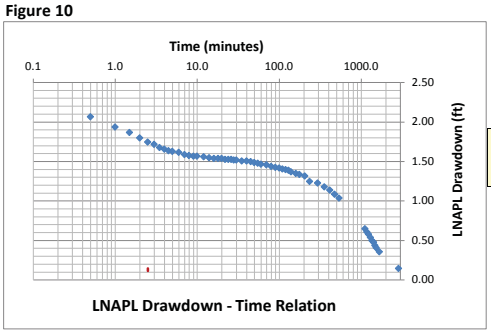


Figure 10



t (min)	s_n (ft)
2.5	0.115
2.5	0.145

Generalized Bouwer and Rice (1976)

Well Designation:	W-2
Date:	2-Jun-15

$$T_n = \frac{r_e^{\,2}\ln(R/r_e)\ln(s_n(t_1)/s_n(t))}{2(-J)(t-t_1)}$$

Enter early time cut-off for least-squares model fit

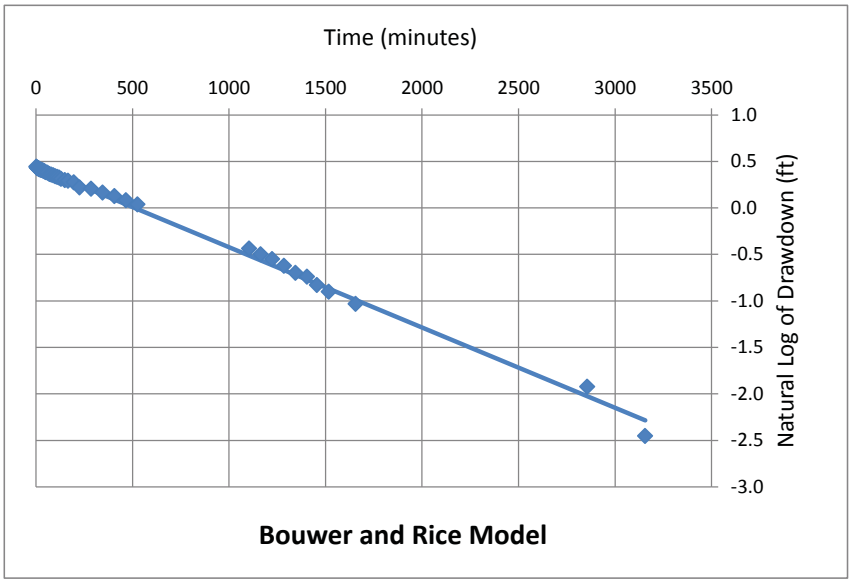
$Time_{cut}$	10	<- Enter or change value here

Model Results: T_n (ft^2/d) = 0.28 +/- 0.00 ft^2/d

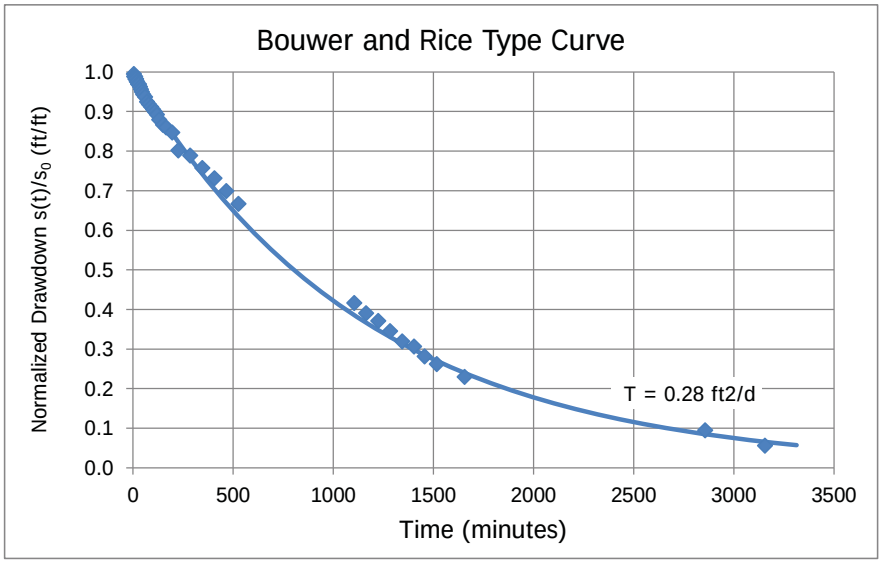
L_e/r_e
34.9
C
2.19
R/r_e
14.68

J-Ratio
-0.250

Coef. Of Variation
0.01



C coefficient calculated from Eq. 6.5(c) of Butler, The Design, Performance, and Analysis of Slug Tests, CRC Press, 2000.



Cooper and Jacob (1946)

Well Designation:	W-2
Date:	date

$$V_n(t_i) = \sum_j^i \frac{4\pi T_n s_j}{\ln\left(\frac{2.25 T_n t_j}{r_e^2 S_n}\right)} \Delta t_j$$

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	5	<- Enter or change values here
Time Adjustment (min):	2	

Trial S_n: d <-- Enter d for default or enter S_n value

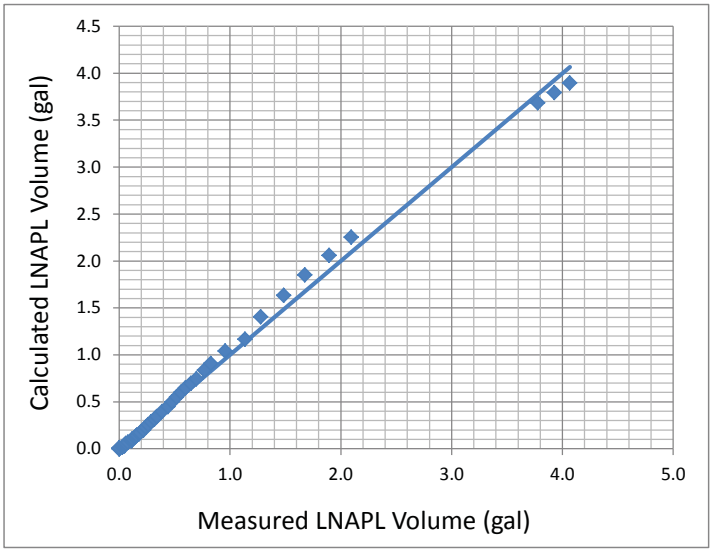
Root-Mean-Square Error: 0.460 <-- Minimize this using "Solver"

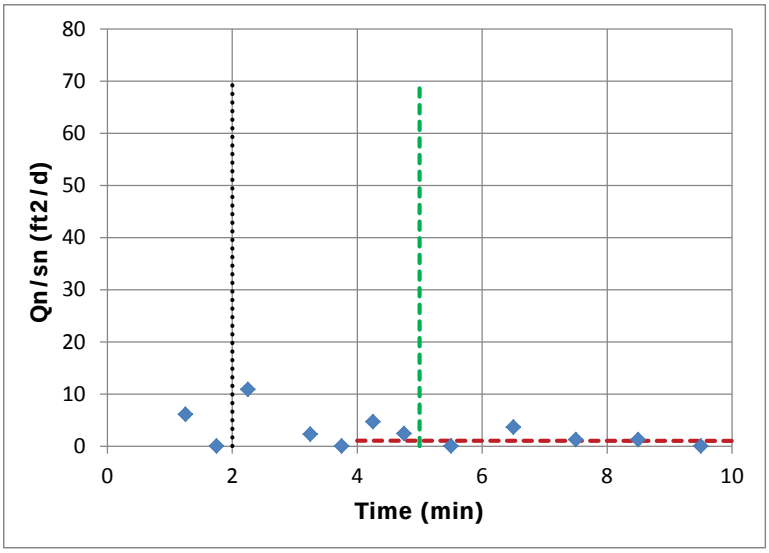
0.000046 <-- Working S_n

Trial T_n (ft^2/d): 0.58 <-- By changing T_n through "Solver"

Add constraint T_n > 0.00001

Model Result: T_n (ft^2/d) = **0.58**





Height
70

Cooper, Bredehoeft and Papadopulos (1967)

Well Designation:	W-2
Date:	date

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	9	<- Enter or change values here
Initial Drawdown s_n (ft):	2.5	

Trial S_n: d <-- Enter d for default

Root-Mean-Square Error: 0.197 <-- Minimize this using "Solver"

Trial T_n (ft^2/d): 0.300 <-- By changing T_n through "Solver"

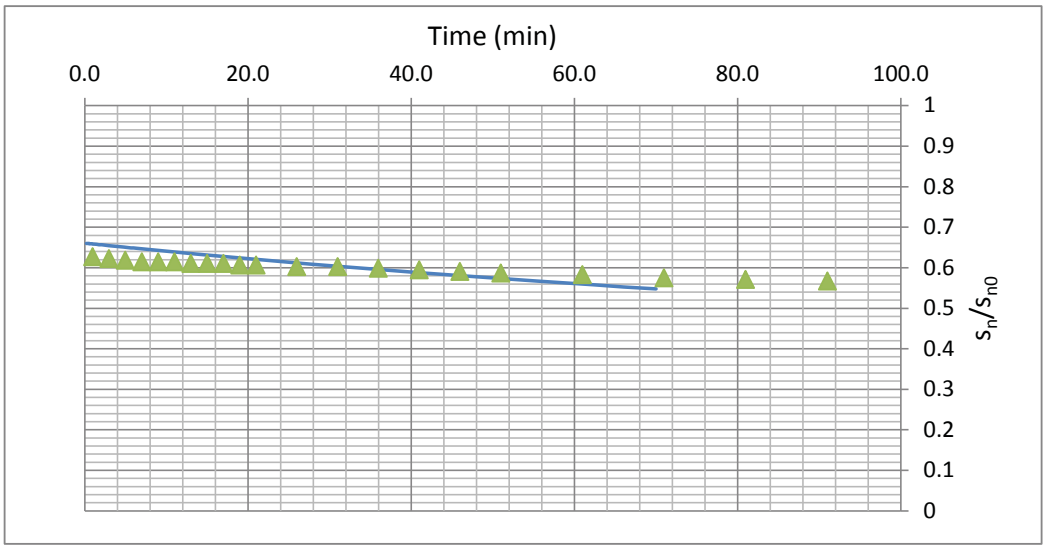
0.3900 <-- Working S_n

Add constraint Tn > 0.00001

T_{min}	0.2
T_{max}	70

Model Result:

T_n (ft^2/d) =	**0.30**



J-Ratio
-0.250

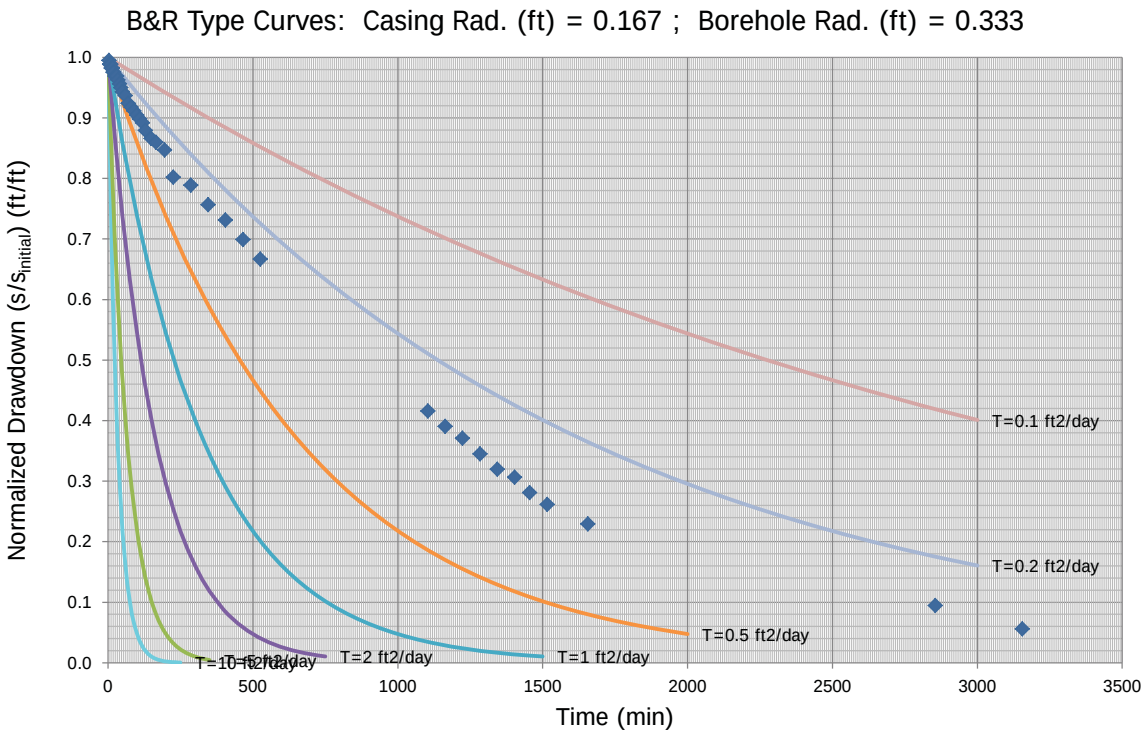
Bouwer and Rice Short Term LNAPL Mobility Test Type Curves

B&R Type Curves: Casing Rad. (ft) = 0.167 ; Borehole Rad. (ft) = 0.333

Enter these values

Type Curve ID	Type Curve Name	Notes	Max Time (min)	Transmissivity (ft^2/day)
1	T=10 ft2/day		250	10
2	T=5 ft2/day		350	5
3	T=2 ft2/day		750	2
4	T=1 ft2/day		1500	1
5	T=0.5 ft2/day		2000	0.5
6	T=0.2 ft2/day		3000	0.2
7	T=0.1 ft2/day		3000	0.1

J-Ratio	
-0.250	<-- If uncertain use
	-0.22



API LNAPL Transmissivity Workbook

Calculation of LNAPL Transmissivity from Baildown Test Data

STEP 1: RESET OUTPUT SUMMARY

STEP 2: ENTER DATA & VIEW FIGURES

STEP 3: CHOOSE WELL CONDITIONS

STEP 4: LNAPL TRANSMISSIVITY SUMMARY

Mean LNAPL Transmissivity (ft^2/d)

0.24

Standard Deviation (ft^2/d)

0.05

Coefficient of Variation

0.23

NAPL Bailing Test Data and Interpretation
Well W-3
Walstad Lovington 66 LUST Site
June 2-4, 2015

Well Designation:	W-3	Walstad LUST Site
Date:	2-Jun-15	

Ground Surface Elev (ft msl)	0.0	Enter These Data
Top of Casing Elev (ft msl)	0.0	
Well Casing Radius, r_c (ft):	0.167	r_{e1}
Well Radius, r_w (ft):	0.333	
LNAPL Specific Yield, S_y:	0.175	
LNAPL Density Ratio, ρ_r:	0.780	
Top of Screen (ft bgs):	0.0	
Bottom of Screen (ft bgs):	0.0	
LNAPL Baildown Vol. (gal.):	7.0	
Effective Radius, r_{e3} (ft):	0.206	Calculated Parameters
Effective Radius, r_{e2} (ft):	0.197	
Initial Casing LNAPL Vol. (gal.):	4.54	
Initial Filter LNAPL Vol. (gal.):	2.37	

Drawdown Adjustment (ft)
0.004

Enter Data Here

	Time (min)	DTP (ft btoc)	DTW (ft btoc)	DTP (ft bgs)	DTW (ft bgs)	Water Table Depth (ft)	LNAPL Drawdown s_n (ft)	Average Time (min)	LNAPL Discharge Q_n (ft^3/d)	s_n (ft)	b_n (ft)	r_e (ft)
Initial Fluid Levels:	0	57.17	64.1	57.17	64.1	58.69					6.93	
Enter Test Data:	0.5	59.55	59.80	59.55	59.80	59.61	2.38				0.25	
	1.0	59.50	59.77	59.50	59.77	59.56	2.33	0.8	7.675	2.35	0.27	0.206
	1.5	59.30	59.65	59.30	59.65	59.38	2.13	1.3	30.700	2.23	0.35	0.206
	2.0	59.23	59.54	59.23	59.54	59.30	2.06	1.8	-15.350	2.09	0.31	0.206
	2.5	59.16	59.47	59.16	59.47	59.23	1.99	2.3	0.000	2.02	0.31	0.206
	3.0	59.06	59.40	59.06	59.40	59.13	1.89	2.8	11.513	1.94	0.34	0.206
	3.5	58.99	59.34	58.99	59.34	59.07	1.82	3.3	3.838	1.85	0.35	0.206
	4.0	58.93	59.30	58.93	59.30	59.01	1.76	3.8	7.675	1.79	0.37	0.206
	4.5	58.89	59.26	58.89	59.26	58.97	1.72	4.3	0.000	1.74	0.37	0.206
	5.0	58.85	59.23	58.85	59.23	58.93	1.68	4.8	3.838	1.70	0.38	0.206
	6.0	58.80	59.20	58.80	59.20	58.89	1.63	5.5	3.838	1.65	0.40	0.206
	7.0	58.77	59.17	58.77	59.17	58.86	1.60	6.5	0.000	1.61	0.40	0.206
	8.0	58.74	59.15	58.74	59.15	58.83	1.57	7.5	1.919	1.58	0.41	0.206
	9.0	58.72	59.13	58.72	59.13	58.81	1.55	8.5	0.000	1.56	0.41	0.206
	10.0	58.7	59.13	58.70	59.13	58.79	1.53	9.5	3.838	1.54	0.43	0.206
	12.0	58.68	59.11	58.68	59.11	58.77	1.51	11.0	0.000	1.52	0.43	0.206
	14.0	58.66	59.10	58.66	59.10	58.76	1.49	13.0	0.959	1.50	0.44	0.206
	16.0	58.65	59.11	58.65	59.11	58.75	1.48	15.0	1.919	1.48	0.46	0.206
	18.0	58.64	59.11	58.64	59.11	58.74	1.47	17.0	0.959	1.47	0.47	0.206
	20.0	58.63	59.12	58.63	59.12	58.74	1.46	19.0	1.919	1.46	0.49	0.206
	22.0	58.63	59.13	58.63	59.13	58.74	1.46	21.0	0.959	1.46	0.50	0.206
	24.0	58.62	59.13	58.62	59.13	58.73	1.45	23.0	0.959	1.45	0.51	0.206
	26.0	58.62	59.14	58.62	59.14	58.73	1.45	25.0	0.959	1.45	0.52	0.206
	28.00	58.62	59.15	58.62	59.15	58.74	1.45	27.0	0.959	1.45	0.53	0.206
	30.00	58.62	59.15	58.62	59.15	58.74	1.45	29.0	0.000	1.45	0.53	0.206
	35.00	58.61	59.17	58.61	59.17	58.73	1.44	32.5	1.151	1.44	0.56	0.206
	40.00	58.6	59.18	58.60	59.18	58.73	1.43	37.5	0.768	1.43	0.58	0.206
	45.00	58.59	59.20	58.59	59.20	58.72	1.42	42.5	1.151	1.42	0.61	0.206
	50.00	58.59	59.21	58.59	59.21	58.73	1.42	47.5	0.384	1.42	0.62	0.206
	55.00	58.58	59.23	58.58	59.23	58.72	1.41	52.5	1.151	1.41	0.65	0.206
	60.00	58.57	59.25	58.57	59.25	58.72	1.40	57.5	1.151	1.40	0.68	0.206
	70.00	58.57	59.27	58.57	59.27	58.72	1.40	65.0	0.384	1.40	0.70	0.206
	80.00	58.56	59.30	58.56	59.30	58.72	1.39	75.0	0.768	1.39	0.74	0.206
	90.00	58.55	59.32	58.55	59.32	58.72	1.38	85.0	0.576	1.38	0.77	0.206
	100.00	58.53	59.34	58.53	59.34	58.71	1.36	95.0	0.768	1.37	0.81	0.206
	110.00	58.53	59.34	58.53	59.34	58.71	1.36	105.0	0.000	1.36	0.81	0.206
	120.00	58.53	59.40	58.53	59.40	58.72	1.36	115.0	1.151	1.36	0.87	0.206
	130.00	58.52	59.42	58.52	59.42	58.72	1.35	125.0	0.576	1.35	0.90	0.206
	140	58.51	59.45	58.51	59.45	58.72	1.34	135.0	0.768	1.34	0.94	0.206
	150	58.50	59.46	58.50	59.46	58.71	1.33	145.0	0.384	1.33	0.96	0.206
	160	58.50	59.49	58.50	59.49	58.72	1.33	155.0	0.576	1.33	0.99	0.206
	180	58.48	59.53	58.48	59.53	58.71	1.31	170.0	0.576	1.32	1.05	0.206
	217	58.47	59.62	58.47	59.62	58.72	1.30	198.5	0.519	1.30	1.15	0.206
	277	58.42	59.76	58.42	59.76	58.71	1.25	247.0	0.608	1.27	1.34	0.206
	337	58.39	59.89	58.39	59.89	58.72	1.22	307.0	0.512	1.23	1.50	0.206
	907	58.06	61.00	58.06	61.00	58.71	0.89	622.0	0.485	1.05	2.94	0.206
	967	58.02	61.09	58.02	61.09	58.70	0.85	937.0	0.416	0.87	3.07	0.206
	1027	58.00	61.18	58.00	61.18	58.70	0.83	997.0	0.352	0.84	3.18	0.206
	1087	57.96	61.26	57.96	61.26	58.69	0.79	1057.0	0.384	0.81	3.30	0.206
	1147	57.93	61.35	57.93	61.35	58.68	0.76	1117.0	0.384	0.77	3.42	0.206
	1207	57.90	61.44	57.90	61.44	58.68	0.73	1177.0	0.384	0.74	3.54	0.206
	1267	57.87	61.51	57.87	61.51	58.67	0.70	1237.0	0.320	0.71	3.64	0.206
	1327	57.84	61.59	57.84	61.59	58.67	0.67	1297.0	0.352	0.68	3.75	0.206
	1387	57.82	61.66	57.82	61.66	58.66	0.65	1357.0	0.288	0.66	3.84	0.206
	1447	57.79	61.72	57.79	61.72	58.65	0.62	1417.0	0.288	0.63	3.93	0.206
	2647	57.48	62.82	57.48	62.82	58.65	0.31	2047.0	0.225	0.46	5.34	0.206
	2947	57.42	62.96	57.42	62.96	58.64	0.25	2797.0	0.128	0.28	5.54	0.206
				#N/A	#N/A	#N/A	#N/A	0.0	#N/A	#N/A	#N/A	0.000
				#N/A	#N/A	#N/A	#N/A	0.0	#N/A	#N/A	#N/A	0.000

Figure 1

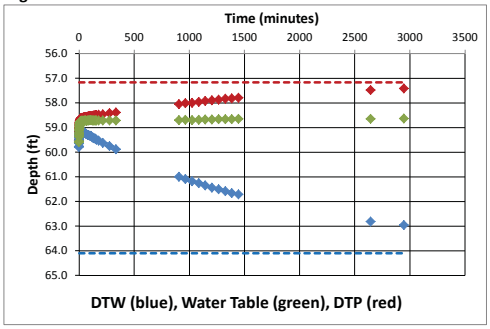
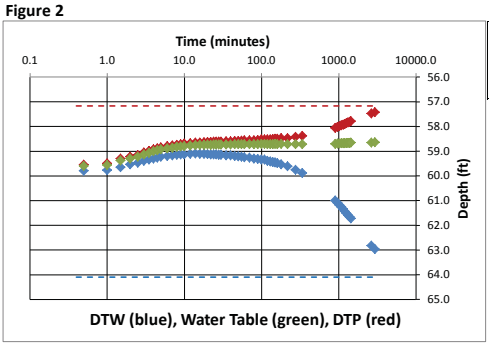


Figure 2



0.4	57.17
2947	57.17
0.4	64.1
2947	64.1
736.8	#N/A
736.8	#N/A

Figure 3

Q_n (ft³/d)	s_n (ft)
0	0
0.8	1.6

Drawdown Adjust.	
Δs_n (ft)	0.004

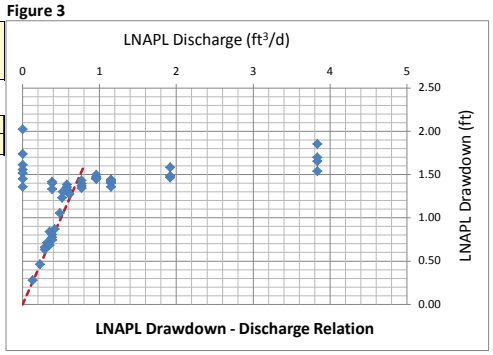
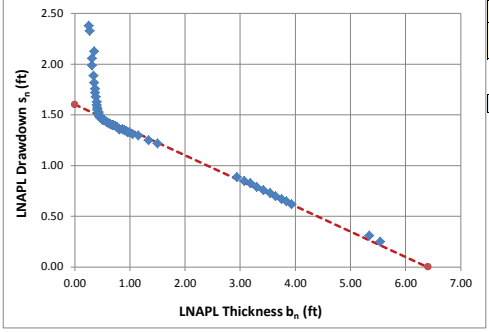


Figure 4



b_n	s_n
0	1.6
6.4	0

J-ratio	-0.250

Figure 5

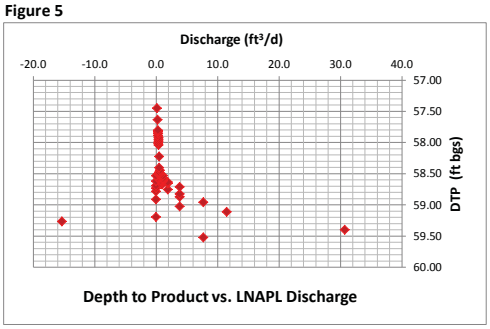


Figure 6

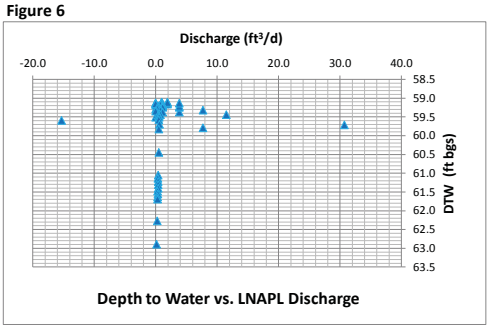


Figure 7

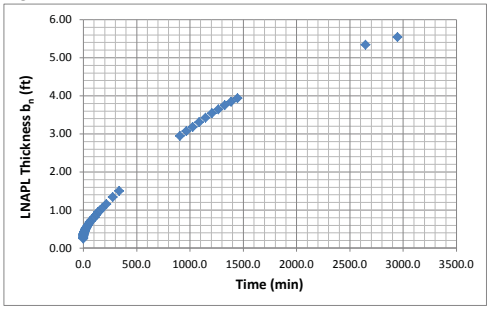


Figure 8

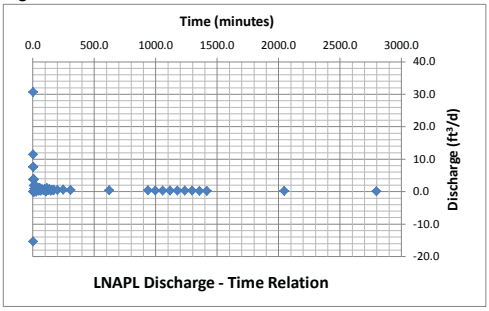


Figure 9

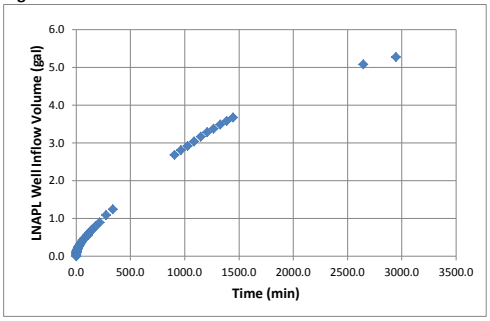
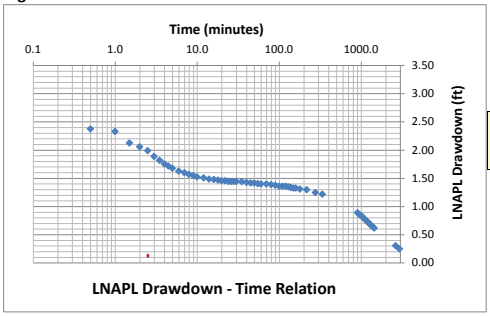


Figure 10



t (min)	s_n (ft)
2.5	0.115
2.5	0.145

Generalized Bouwer and Rice (1976)

Well Designation:	W-3
Date:	2-Jun-15

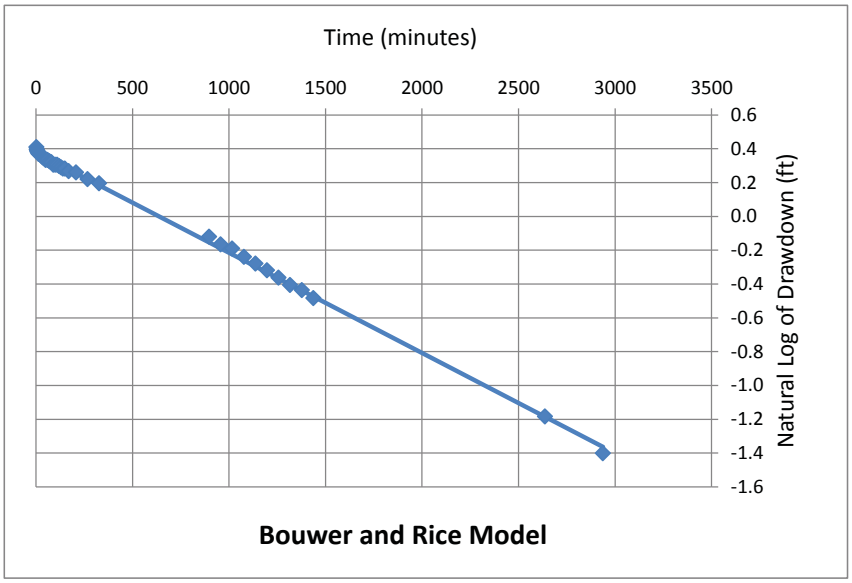
$$T_n = \frac{r_e^{\,2}\ln(R/r_e)\ln(s_n(t_1)/s_n(t))}{2(-J)(t-t_1)}$$

Enter early time cut-off for least-squares model fit

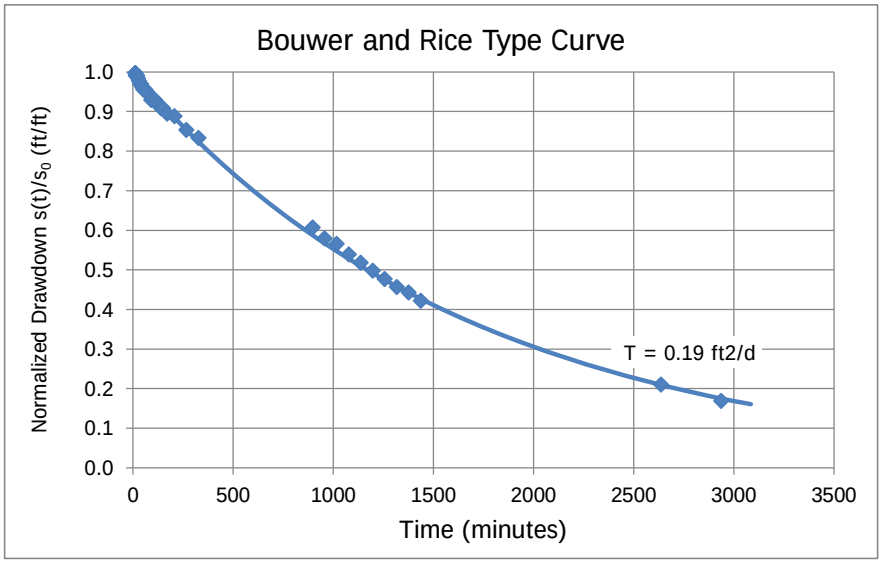
$Time_{cut}$	10	<- Enter or change value here

Model Results: T_n (ft^2/d) = 0.19 +/- 0.00 ft^2/d

L_e/r_e	33.6
C	2.14
R/r_e	14.25
J-Ratio	-0.250
Coef. Of Variation	0.01



C coefficient calculated from Eq. 6.5(c) of Butler, The Design, Performance, and Analysis of Slug Tests, CRC Press, 2000.



Cooper and Jacob (1946)

Well Designation:	W-3
Date:	2-Jun-15

$$V_n(t_i) = \sum_j^i \frac{4\pi T_n s_j}{\ln\left(\frac{2.25 T_n t_j}{r_e^{\,2} S_n}\right)} \Delta t_j$$

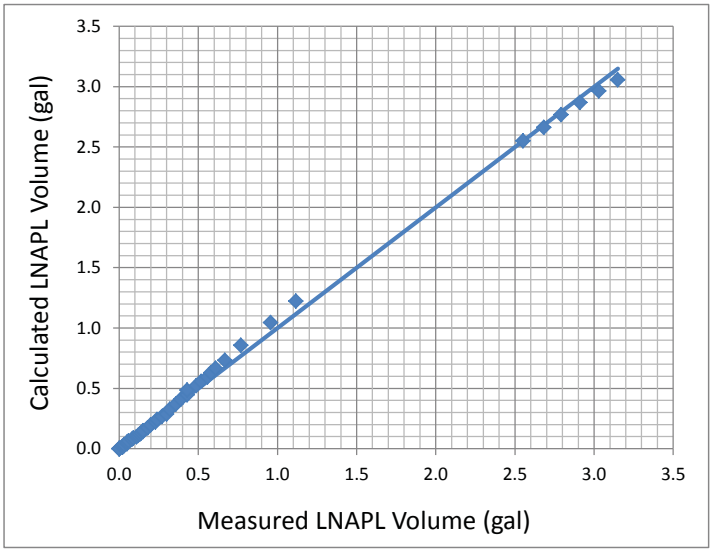
Enter early time cut-off for least-squares model fit

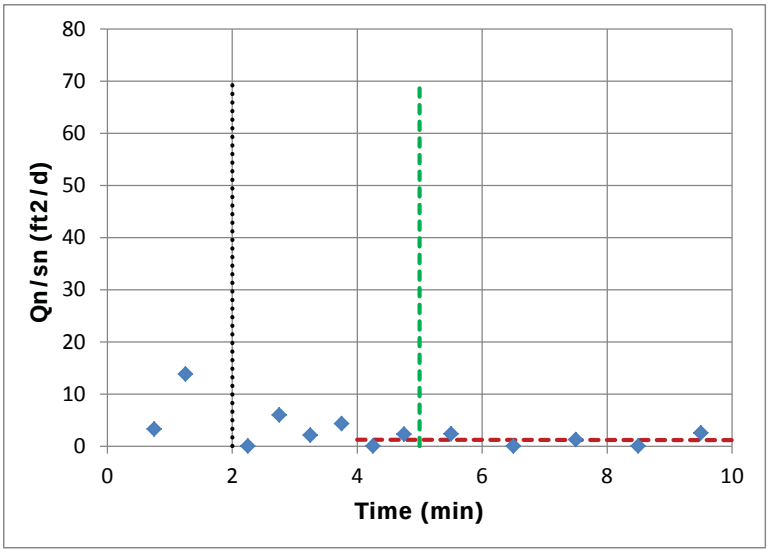
$Time_{cut}$ (min):	5	<- Enter or change values here
Time Adjustment (min):	2	

Trial S_n:	d	<-- Enter d for default or enter S_n value
Root-Mean-Square Error:	0.247	<-- Minimize this using "Solver"
	0.0010	<-- Working S_n
Trial T_n (ft^2/d):	0.3000	<-- By changing T_n through "Solver"

Add constraint T_n > 0.00001

Model Result: T_n (ft^2/d) = **0.30**





Height
70

Cooper, Bredehoeft and Papadopulos (1967)

Well Designation:	W-3
Date:	2-Jun-15

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	7	<- Enter or change values here
Initial Drawdown s_n (ft):	2.9	

Trial S_n: d <-- Enter d for default

Root-Mean-Square Error: 0.143 <-- Minimize this using "Solver"

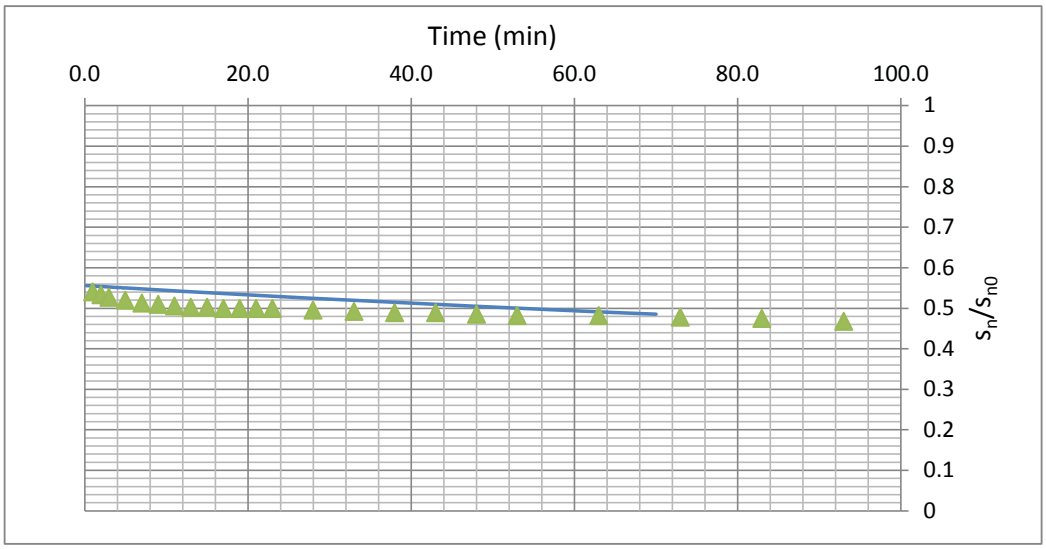
Trial T_n (ft^2/d): 0.230 <-- By changing T_n through "Solver"

0.5300 <-- Working S_n

Add constraint Tn > 0.00001

T_{min}	0.2
T_{max}	70

Model Result: T_n (ft^2/d) = **0.23**



J-Ratio
-0.250

Bouwer and Rice Short Term LNAPL Mobility Test Type Curves

B&R Type Curves: Casing Rad. (ft) = 0.167 ; Borehole Rad. (ft) = 0.333

Enter these values

Type Curve ID	Type Curve Name	Notes	Max Time (min)	Transmissivity (ft^2/day)
1	T=10 ft2/day		100	10
2	T=5 ft2/day		270	5
3	T=2 ft2/day		750	2
4	T=1 ft2/day		1500	1
5	T=0.5 ft2/day		2000	0.5
6	T=0.2 ft2/day		3000	0.2
7	T=0.1 ft2/day		3000	0.1

J-Ratio	
-0.250	<-- If uncertain us
	-0.22