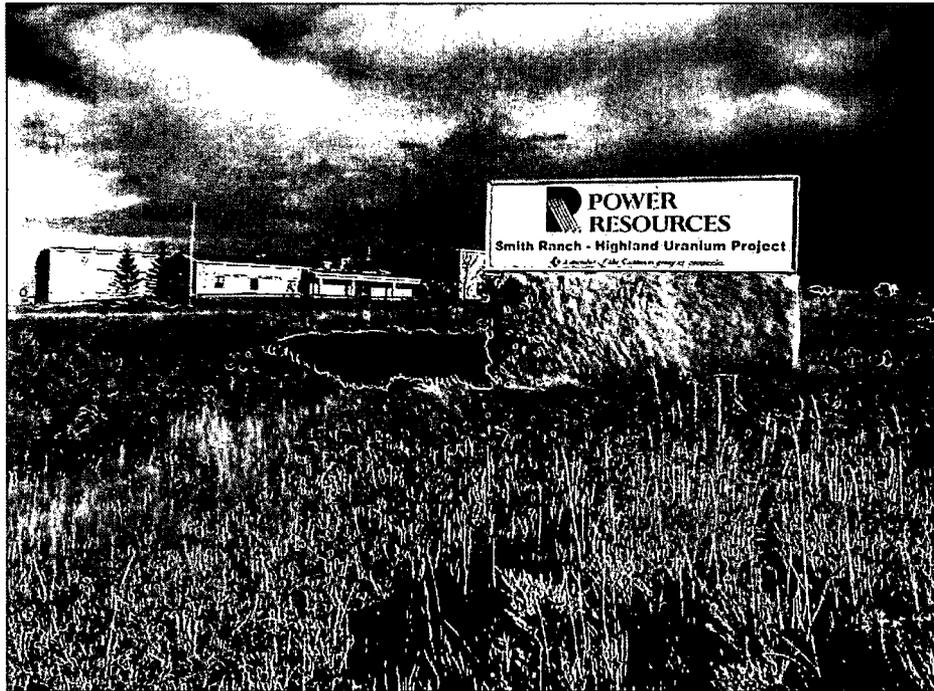


**CAMECO RESOURCES
HIGHLAND URANIUM PROJECT
MINE UNIT 9 HYDROLOGIC TEST REPORT**



**For:
WDEQ/LQD
Permit No. 633
NRC License No. SUA-1548
Docket 40-8964**

**BY:
CAMECO Resources
& Hydro-Engineering, L.L.C.**

January, 2008





August 7, 2008

Mr. Lowell Spackman, District I Supervisor
Land Quality Division
Wyoming Department of Environmental Quality
122 West 25th Street
Cheyenne, WY 82002

CAMECO RESOURCES
Smith Ranch-Highland
Operation
Mail:
P.O. Box 1210
Glenrock, WY
82637 USA

Tel: (307) 358-6541
Fax: (307) 358-4533
www.cameco.com

RE: Permit to Mine 633, License SUA-1548, Docket 40-8964
Mine Unit 9 Hydrologic Test Report
Baseline Water Quality Data & Upper Control Limits
Form 11: Application for Permit Revision

Dear Mr. Spackman:

In accordance with Section 5.1.2 Monitor Well Baseline Data and UCLs document of the approved permit application and Mine Unit Test Plan submitted under cover letter dated June 25, 2008, Power Resources Inc. (PRI) dba Cameco Resources is submitting herein, for your review and approval, two (2) copies of the "Mine Unit Hydrological Test Report", the form 11 application, and the baseline water quality data and associated upper control limits (UCLs). Approval of this report, the baseline water quality data and UCLs, will allow PRI to begin in situ recovery mining operations in Mine Unit 9.

BASELINE WATER QUALITY AND UCL CALCULATIONS

Baseline water quality data were collected at monitoring wells completed in the Production Zone Aquifer within the planned area of uranium recovery (MP-Wells), the monitor well ring outside the area of uranium recovery (M-Wells), the aquifer underlying (MU-Wells) the Production Zone Aquifer, and the aquifer overlying (MO-Wells) the Production Zone Aquifer. The MP-Well data set for the Production Zone Aquifer within the planned area of uranium currently commercially viable for recovery includes Wells 9MP-001 through 9MP-014. Appendix A contains the Excel spreadsheets with baseline water quality data in tabular form. Also included in these spreadsheets are the mean values for total dissolved solids (TDS), uranium, and radium-226, as determined from the 9MP-Well data from Mine Unit 9. The Excel spreadsheet in electronic format (Mine Unit 9 Baseline.xls) is included on the attached disk.

The proposed UCLs for the M, MU and MO Wells are shown in Table 1. The tabular data, summary statistics, and UCL calculations are included in Appendix A and on the attached disk in

electronic format. The UCLs for chloride were determined by adding 15 mg/L to the mean chloride concentration. The UCLs for alkalinity and conductivity were determined by adding 5 standard deviations to the mean value.

In accordance with WDEQ-LQD Guideline No. 4, outliers within each data set were determined using the "Tolerance Limit" method (Loftis, et. al., 1987) with the recommended alpha of 0.05 and a probability (p) of 0.99. Those data determined to be "outliers" are shaded on the Appendix A spreadsheets and included in "text" format on the electronic file in order that they are excluded from the summary statistics and UCL calculations. One iteration of the method was conducted to determine the outliers for the MU and MO Wells. Given the relatively large data sets, the exclusion of outliers did not significantly affect the determination of UCLs. The determination of UCLs for each aquifer was determined as follows:

M-Wells (Monitor Ring Wells)

The M-Well data set includes Wells M-901 through M-951. One iteration of data was obtained for chloride with no outliers. There were four iterations taken for alkalinity with one outlier each time. Two iterations of data were obtained for conductivity with one discarded each time. M-917 was sampled one additional round for UCL parameters as the alkalinity value for the third round of sampling was four times the average of the first two rounds.

MO-wells (Overlying Aquifer Wells)

The MO-Well data set includes Wells 9MO-001 through 9MO-014. One iteration of data was obtained with no outliers.

MU-wells (Underlying Aquifer Wells)

The MU-Well data set includes Wells 9MU-001 through 9MU-014. One iteration of data was obtained with no outliers.

TABLE 1

Proposed Upper Control Limits (UCLs) for Mine Unit 9 Monitoring Wells

Well Numbers	Zone Monitored	Upper Control limits (UCLs)		
		Chloride (mg/L)	Alkalinity	Conductivity
9M-901 – 951	Production Zone	18	335	1278
9MO-001 - 014	Overlying Aquifer	17	320	1779
9MU-001 – 014	Underlying Aquifer	17	320	1202

MINE UNIT STARTUP SEQUENCE AND OPERATIONAL CONTROLS

Startup of mining operations will begin in the northern portion of Mine Unit 9 and is sequenced as shown in the Table 2. The sequence is grouped by Headerhouse based on the potential uranium available for production. The Headerhouses within each group may be started randomly depending on the production requirements.

TABLE 2

Mine Unit 9 Startup Sequence

HEADERHOUSE	ORDER OF STARTUP
HH9-2	Group 1
HH9-3	
HH9-4	
HH9-5	Group 2
HH9-6	
HH9-7	
HH9-8	Group 3
HH9-9	
HH9-10	
HH9-11	Group 4
HH9-12	
HH9-13	

Two Stage Monitoring Plan

Plate 1 illustrates the M, MO, MU wells, planned patterns and monitoring stages for Mine Unit 9. Operational monitoring of the M, MO, and MU wells will be implemented in two stages. Stage 1 will commence prior to the startup of Group 1 through Group 3. The overlying aquifer will be monitored with wells MO-1A to MO-12. The underlying aquifer will be monitored with wells MU-1A to MU-12. The production zone will be monitored with wells M-920 to M-904 and M-950 to M-939. For sampling purposes 9MP-12 will be utilized as an M well, during stage 1, until it becomes production well 9P-171 with the startup of stage 2. Samples will not be collected for the other MP wells as they will become either injection or production wells.

Stage 2 monitoring will begin as development activities cease and safe entry is permissible, prior to startup of the remaining mining units. Stage 2 will incorporate the remaining monitor wells, MO-13 to MO-14, MU-13 to MU-14 and M-921 thru M-938, into the existing sampling schedule.

As several proposed patterns for Header House 1 are located outside of the current permitted boundary, the mine unit cannot be started until a permit boundary amendment is submitted and approved. Monitoring ring wells M-901 to M-903 and M-946 to M-949 will be included in the operational monitoring when Header House 1 becomes part of the approved permit area.

If you have any questions or require additional information, please call me at (307) 358-6541, ext. 46.

Sincerely,



John McCarthy
Manager, Safety, Health and Environmental, RSO.

Attachments

cc: S. Bakken
M. Bryson w/o atta
File SR 4.3.3.1

C. Foldenauer w/o atta
S. Hesse w/o atta
Courtesy copy: D. Manderville, USNRC w/o atta.

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. PLATE 1, "MU 9
MONITOR WELLS & MONITORING
STAGES"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
PLATE 1**

D-01

NOTE: **DO NOT CUT OR MODIFY THIS FORM.** Submit two (2) copies. Page 1 & 2 must be initialed and dated where indicated. *Signature preferred in blue ink.*

**State of Wyoming
Department of Environmental Quality
Land Quality Division
Application for Permit Revision**

An application for a permit revision shall be required whenever the operator proposes to conduct a revised mining or reclamation operation, as defined in Chapter 1, Section 2, of the Coal and Noncoal Land Quality Division (LQD) Rules and Regulations. An application for a permit revision shall be filed with the Administrator before the date on which the operator expects to conduct the revised mining or reclamation operation.

1. Name, mailing address and phone number of applicant: Cameco Resources
P.O. Box 1210 Glenrock, WY 82637 Telephone: 307-358-6541

2. Name, mailing address and phone number of the agent of the applicant to whom any notices under the provisions of the Wyoming Environmental Quality Act or the LQD Rules and Regulations adopted thereunder may be sent: John McCarthy
P.O. Box 1210 Glenrock, WY 82637
Telephone: 307-358-6541 Fax: 307-358-4533

3. The permit number and date approved: Permit #633 Date Approved: June 10, 1998

4. Brief description of permit revision: Submitted approval of wellfield under TFN 4 1/351
Legal Description: T35N R74W Sections 8, 17, & 18

5.

	Permit Acres	Acreage to Affect	Surface Ownership Acreage
Approved	<u>16,685,89</u>	<u>550</u>	Federal <u>2080</u>
Estimated Revision			
Increase or	<u>0</u>	<u>38</u>	State <u> </u>
Decrease			Private <u>16,685,89</u>
Total	<u>16,685,89</u>	<u>588</u>	<u> </u>

6. Attach revised permit elements and an index indicating what parts of the approved permit are affected by this revision. The revised elements and index shall be sufficient to fulfill the requirement of Chapter 13, Section 1(d) for coal permittees or Chapter VII, Section 1(d) for noncoal permittees.

7. If the applicant is a Partnership, Association, Corporation (circle one) and the revision is for changes to the name and addresses of all managers, partners and executives directly responsible for operations in this State, complete the following:

Name: Stephen P. Collings
Title: President

Address: 141 Union Blvd Ste. 330
Lakewood, CO 80227

Date of Appointment: April 1, 2006

Phone No.: 720-879-5500

Name: Steve Magnuson
Title: Vice President

Address: 141 Union Blvd St. 330
Lakewood, CO 80227

Date of Appointment: Jan. 1, 2006

Phone No.: 720-879-5500

Name: Charles J. Foldenauer
Title: General Manager

Address: PO Box 1210
Glenrock, WY 82637

Date of Appointment: Jan. 1, 2005

Phone No.: 307-358-6541

Name: Johns McCarthy
Title: Mgr-Safety, Health & Environment, RSO

Address: PO Box 1210
Glenrock, WY 82637

Date of Appointment: June 19, 2006

Phone No.: 307-358-6541

8. The provisions of this permit revision are severable, and if any provision of the permit revision or the application of any provision of this permit revision to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit revision shall not be affected thereby.
9. **For surface coal mining operations**, right of entry to or inspection of any operation, premises, records, or equipment shall not require advance notice.

Final Sworn Statement

State of Colorado)
)ss
County of Jefferson)

I Stephen P. Collings being duly sworn on my oath that I am the applicant (President or Vice President if the applicant is a corporation) for the foregoing permit revision; that I have read the said application and fully know the contents thereof; that all statements contained in the permit revision application are true, correct, and complete to the best of knowledge and belief, by execution of this statement I certify that Cameco Resources, applicant, or entities controlled by or under common control with the applicant has the right and power by legal estate owned to mine from the land for which this permit revision is desired; that applicant or entities controlled by or under common control with the applicant has not forfeited, or is not involved in forfeiture proceedings for, a bond posted for reclamation purposes; and if a surface coal mining operation, that applicant or entities controlled by or under common control with the applicant has paid the reclamation fees for this and all coal mining operations under the jurisdiction of PL. 95-87 as required by Title IV of that law; and that applicant or entities controlled by or under common control with the applicant has not had any Federal or State coal mining permits suspended or revoked in the five (5) years preceding the date of this application; and by completion and submission of this application, hereby give consent to allow the Director, the Administrator and/or his authorized representatives, at reasonable times and upon presentation of appropriate credentials, to enter upon and have access to any and all lands covered by this permit and amendments thereto and to inspect and copy any records or documents, obtain or monitor any samples or sampling, for any activities associated with the operation and permit.

Dated this 30th day of June, 2008.

Stephen P. Collings
Signature

(Corporate Seal)

Stephen P. Collings
Name (Printed or typed)

President
Title

The foregoing instrument was acknowledged to me by STEPHEN P. COLLINGS this 30th day of JUNE, 2008.

Witness my hand and official seal.

Margie R. Storms
(Notary Public or Secretary if a Corporation)

(Notary Seal)

MARGIE R. STORMS
(Name printed or typed)

My Commission Expires: 2-10-2012

The State of Wyoming)
)ss
Department of Environmental Quality)

This is to certify that I have examined the foregoing application and do hereby grant the same subject to the following limitations and conditions.

This permit revision grants only the right to affect the land described in Appendix "C" of the original permit and amendments. Any condition/special condition attached to approval of this revision shall supersede and/or replace any conflicts with the original permit, amendment, coal renewals or any other revision.

Approved: _____
Administrator
Land Quality Division
Department of Environmental Quality

Approved: _____
Director
Department of Environmental Quality

Smith Ranch Project

Mine Unit-9

Wells 9MP001 through 9MP014

Analyte	Units	Well ID	9MP001	9MP001	9MP001	9MP001	9MP002	9MP002	9MP002	9MP002	9MP003A	9MP003A	9MP003A	9MP003A	9MP004
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1
	PQL	10/23/07	11/06/07	11/20/07	12/04/07	10/23/07	11/06/07	11/20/07	12/04/07	10/23/07	11/06/07	11/20/07	12/04/07	10/23/07	
Major Ions															
Alkalinity, Total as CaCO3	mg/L	1	146	168	179	194	37	130	148	170	168	166	177	190	157
Carbonate as CO3	mg/L	1	ND	ND			ND	ND			4	ND			2
Bicarbonate as HCO3	mg/L	1	178	205			45	159			197	203			187
Calcium	mg/L	1	107	112			137	134			130	129			138
Chloride	mg/L	1	1	ND	ND	1	ND	ND	ND	1	ND	ND	1	1	ND
Fluoride	mg/L	0.1	0.4	0.05		0.5	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4
Magnesium	mg/L	1	24	34			7	21			35	37			36
Nitrogen, Ammonia as N	mg/L	0.05	0.22	0.09			0.54	0.38			0.16	0.13			0.1
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			1	ND			ND
Nitrogen, Nitrite as N	mg/L	0.1													
Potassium	mg/L	1	13	9			26	20			1	10			13
Silica	mg/L	0.1	16.8	16			12.9	14.7			18.3	16.4			17
Sodium	mg/L	1	27	26			41	36			27	27			29
Sulfate	mg/L	1	277	309		310	449	376	382	371	360	366	365	363	403
Physical Properties															
Conductivity	umhos/cm	1	791	897	909	919	942	960	989	1010	947	991	1000	1020	1000
pH	s.u.	0.01	8.04	7393		7.52	8.48	8.31	7.98	7.58	8.12	7.68	7.69	7.67	8.08
Solids, Total Dissolved TDS @ 180 C	mg/L	10	538	5.98		598	650	625	677	657	668	636	676	6.84	716
Trace Metals															
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Arsenic	mg/L	0.001	0.004	0.001		ND	0.002	0.002	0.001	ND	0.012	0.005	0.002	0.002	0.002
Barium	mg/L	0.1	ND	ND			ND	ND			0.1	ND			0.1
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND
Iron	mg/L	0.03	ND	ND			ND	ND			0.11	ND			ND
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Manganese	mg/L	0.01	0.05	0.13			ND	0.02			0.04	0.08			0.07
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Selenium	mg/L	0.001	ND	ND		ND	ND	ND	0.001	ND	ND	ND	0.001	ND	ND
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND
Radionuclides															
Uranium	mg/L	0.0003	0.103	0.217		0.0116	0.0421	0.0536	0.0372	0.0422	0.197	0.127	0.0654	0.0499	0.0554
Radium 226	pCi/L	0.2	277	226		284	170	196	196	214	372	364	373	398	66.3
Quality Control															
A/C Balance (± 5)	%	250	0.208	0.006			-0.888	0.506			-0.112	-0.176			-0.408
Anions	meq/L	250	8.75	9.8			10.1	10.5			10.9	11			11.6
Cations	meq/L	250	8.79	9.8			9.92	10.6			10.9	10.9			11.5
Solids, Total Dissolved Calculated	mg/L	250	554	607			695	681			685	686			733
TDS Balance (0.80 - 1.20)	dec. %	250	0.97	0.99			0.94	0.92			0.98	0.93			0.98

Smith Ranch Project

Mine Unit-9

Wells 9MP001 through 9MP014

Analyte	Units	Well ID	9MP004	9MP004	9MP004	9MP005	9MP005	9MP005	9MP005	9MP006	9MP006	9MP006	9MP006	9MP007	9MP007	9MP007
		Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	11/06/07	11/20/07	12/04/07	10/22/07	11/05/07	11/19/07	12/03/07	10/23/07	11/06/07	11/20/07	12/04/07	10/23/07	11/06/07	11/20/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	162	176	190	81	148	152	177	75	161	183	196	172	167	174
Carbonate as CO3	mg/L	1	ND			ND	ND	ND		ND	ND			ND	ND	
Bicarbonate as HCO3	mg/L	1	198			97	180	186		90	197			210	204	
Calcium	mg/L	1	138			91	101			68	110			121	119	
Chloride	mg/L	1	ND	1	1	ND	1	ND	ND	ND	ND	ND	ND	1	1	1
Fluoride	mg/L	0.1	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4
Magnesium	mg/L	1	38			14	22			15	30			28	29	
Nitrogen, Ammonia as N	mg/L	0.05	0.1			0.56	0.29			0.34	0.14			0.33	0.3	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	2			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	11			20	15			34	15			15	14	
Silica	mg/L	0.1	16.1			15.9	17.2			15	17.7			17.2	16.7	
Sodium	mg/L	1	28			27	24			38	26			30	30	
Sulfate	mg/L	1	417	431	431	278	276	311	349	276	307	318	307	327	326	337
Physical Properties																
Conductivity	umhos/cm	1	1080	1100	1120	707	872	908	964	707	902	924	934	909	937	944
pH	s.u.	0.01	8.02	7.66	7.7	7.67		8.39	7.68	8.47	8.05	7.7	7.83	7.95	8.04588	7.67
Solids, Total Dissolved TDS @ 180 C	mg/L	10	732	771	789	462	591	646	671	482	557	609	605	626		628
Trace Metals																
Aluminum	mg/L	0.1	ND			ND	ND			0.2	ND			ND	ND	
Arsenic	mg/L	0.001	0.001	ND	ND	0.027	3015	0.013	0.009	0.025	0.01	0.006	0.005	0.008	0.006	0.004
Barium	mg/L	0.1	ND			ND	ND			0.1	ND			ND	ND	
Boron	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	ND			ND	ND			ND	ND			0.08	0.07	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.12			ND	0.03			ND	0.06			0.04	0.05	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND	ND	ND	0.001	ND	0.001	ND	0.003	ND	ND	ND	ND	ND	0.001
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Radionuclides																
Uranium	mg/L	0.0003	0.0582	0.0471	0.0401	0.399	0.219	0.214	0.18	0.0695	0.0558	0.0314	0.0496	0.034	0.0249	0.0197
Radium 226	pCi/L	0.2	73.2	109	108	398	637	653	694	256	328	380	371	221	190	210
Quality Control																
A/C Balance (± 5)	%	250	-1.73			-0.304	-2.5			-0.89	-0.467			-1.1	-0.941	
Anions	meq/L	250	12			7.45	8.77			7.31	9.63			10.3	10.2	
Cations	meq/L	250	11.6			7.41	8.34			7.18	9.54			10.1	10	
Solids, Total Dissolved Calculated	mg/L	250	747			495	547			493	603			643	637	
TDS Balance (0.80 - 1.20)	dec. %	250	0.98			0.93	1.08			0.98	0.92			0.97	92	

Smith Ranch Project
 Mine Unit-9
 Wells 9MP001 through 9MP014

Analyte	Units	Well ID	9MP007	9MP008	9MP008	9MP008	9MP008	9MP009	9MP009	9MP009	9MP009	9MP010	9MP010	9MP010	9MP010	9MP011
		Round	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1
	PQL	12/04/07	10/24/07	11/07/07	11/21/07	12/05/07	10/31/07	11/14/07	11/28/07	12/12/07	10/31/07	11/15/07	12/13/07	11/01/07		
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	188	177	189	182	183	170	199	196	191	169	173	172	164	149
Carbonate as CO3	mg/L	1		9	ND			ND	ND			ND	ND			ND
Bicarbonate as HCO3	mg/L	1		197	230			207	243			206	211			181
Calcium	mg/L	1		125	137			138	154			142	145			91
Chloride	mg/L	1	1	ND	1	ND	ND	2	ND	1	1	1	1	1	1	3
Fluoride	mg/L	0.1	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.6
Magnesium	mg/L	1		30	42			40	48			44	46			22
Nitrogen, Ammonia as N	mg/L	0.05		0.31	0.09			0.3	0.16			0.19	0.18			0.61
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1		25	11			12	10			11	9			13
Silica	mg/L	0.1		19	19.6			19.1	18.7			21.8	21.3			21.2
Sodium	mg/L	1		30	28			33	29			32	30			27
Sulfate	mg/L	1	330	350	387	393	401	425	488	496	505	450	464	490	464	232
Physical Properties																
Conductivity	umhos/cm	1	959	936	1070	1070	1030	1060	1230	1260	1220	1110	1140	1180	1130	724
pH	s.u.	0.01	7.56	8.14	7.54	7.54	7.38	7.26	7.49	7.43	7.53	7.43	7.36	7.26	7.45	7.89
Solids, Total Dissolved TDS @ 180 C	mg/L	10	622	654	691	731	752	77	872	884	907	830	8.29	786	825	471
Trace Metals																
Aluminum	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Arsenic	mg/L	0.001	0.003	0.026	0.008	0.009	0.007	0.04	0.027	0.026	0.023	0.20	0.20	0.019	0.018	0.016
Barium	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Boron	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Cadmium	mg/L	0.005		ND	ND			ND	ND			ND	ND			ND
Chromium	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND
Copper	mg/L	0.01		ND	ND			ND	ND			ND	ND			ND
Iron	mg/L	0.03		0.1	ND			0.05	0.07			0.04	0.20			0.14
Lead	mg/L	0.05		ND	ND			ND	0.15			ND	ND			ND
Manganese	mg/L	0.01		0.04	0.1			0.08	ND			0.15	0.17			0.05
Mercury	mg/L	0.001		ND	ND			ND	ND			ND	ND			ND
Molybdenum	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Nickel	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND
Selenium	mg/L	0.001	ND	ND	ND	0.001	ND	ND	ND							
Vanadium	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Zinc	mg/L	0.01		ND	ND			0.02	0.02			ND	ND			0.02
Radionuclides																
Uranium	mg/L	0.0003	0.0171	0.104	0.0216	0.0397	0.02	0.201	0.0938	0.108	0.0452	0.0664	0.0301	0.0198	0.0161	0.0302
Radium 226	pCi/L	0.2	185	897	955	980	1000	759	1020	788	778	264	286	268	269	168
Quality Control																
A/C Balance (± 5)	%	250		-0.787	-0.147			-1.63	-3.7			-1.83	-2.15			-0.082
Anions	meq/L	250		10.8	11.9			12.3	14.2			12.8	13.2			7.91
Cations	meq/L	250		10.7	11.8			11.9	13.2			12.3	12.6			7.9
Solids, Total Dissolved Calculated	mg/L	250		686	740			771	868			803	822			498
TDS Balance (0.80 - 1.20)	dec. %	250		0.95	0.93			1.01	1			1.03	1.01			0.95

Smith Ranch Project

Mine Unit-9

Wells 9MP001 through 9MP014

Analyte	Units	Well ID	9MP011	9MP011	9MP011	9MP012	9MP012	9MP012	9MP012	9MP013	9MP013	9MP013	9MP013	9MP014	9MP014	9MP014
		Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	11/15/07		12/13/07	11/01/07	11/15/07		12/13/07	11/01/07	11/15/07		12/13/07	10/31/07	11/14/07	11/28/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	152	150	144	175	174	172	202	206	211	209	203	185	241	226
Carbonate as CO3	mg/L	1	ND			ND	ND			ND	ND			ND	ND	
Bicarbonate as HCO3	mg/L	1	185			213	212			252	258			225	294	
Calcium	mg/L	1	86			88	82			86	83			73	80	4
Chloride	mg/L	1	4	4	3	5	5	5	1	4	5	4	5	4	4	0.8
Fluoride	mg/L	0.1	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.09	0.9	
Magnesium	mg/L	1	26			26	26			27	27			17	24	
Nitrogen, Ammonia as N	mg/L	0.05	0.34			0.14	0.13			0.19	0.15			0.07	0.06	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	9			8	7			9	7			12	9	
Silica	mg/L	0.1	20			22.5	21.5			22.4	22.2			19.9	19.4	
Sodium	mg/L	1	24			26	23			25	23			22	20	
Sulfate	mg/L	1	248	252	259	198	201	199	296	168	163	167	168	119	133	164
Physical Properties																
Conductivity	umhos/cm	1	760	876	773	708	720	735	912	707	719	742	713	587	705	700
pH	s.u.	0.01	7.43	7.42	7.6	7.94	7.46	7.37	7.5	7.35	7.3	7.04	7.63	8.26	7.98	7.59
Solids, Total Dissolved TDS @ 180 C	mg/L	10	508	479	533	443	467	430	627	428	455	434	462	369	434	405
Trace Metals																
Aluminum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Arsenic	mg/L	0.001	0.015	0.013	0.012	0.017	0.016	0.016	0.036	0.024	0.017	0.017	0.015	0.022	0.014	0.014
Barium	mg/L	0.1	ND			ND	ND			ND	ND			0.1	0.1	
Boron	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	0.16			ND	ND			ND	0.07			ND	ND	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.07			0.03	0.07			0.07	0.08			0.01	0.03	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	ND			ND	0.01			0.01	ND			ND	ND	
Radionuclides																
Uranium	mg/L	0.0003	0.0272	0.024	0.0204	0.0143	0.0115	0.0084	0.053	0.0698	0.0191	0.0127	0.0082	0.359	0.382	0.433
Radium 226	pCi/L	0.2	212	181	201	22.1	33.2	35.2	4.9	831	1030	947	1040	349	418	315
Quality Control																
A/C Balance (± 5)	%	250	-3.41			0.549	-2.66			0.717	-1.03			0.063	-4.85	
Anions	meq/L	250	8.32			7.76	7.82			7.78	7.77			6.33	7.74	
Cations	meq/L	250	7.77			7.85	7.41			7.89	7.62			6.34	7.03	
Solids, Total Dissolved Calculated	mg/L	250	508			478	470			467	458			379	434	
TDS Balance (0.80 - 1.20)	dec. %	250	1			0.93	0.99			0.92	0.99			0.97	1	

Smith Ranch Project

Mine Unit-9

Wells 9MP001 through 9MP014

Well ID	9MP014
Round	Round 4
PQL	12/12/07

Analyte	Units	PQL	12/12/07
---------	-------	-----	----------

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	237
Carbonate as CO3	mg/L	1	
Bicarbonate as HCO3	mg/L	1	
Calcium	mg/L	1	
Chloride	mg/L	1	4
Fluoride	mg/L	0.1	0.8
Magnesium	mg/L	1	
Nitrogen, Ammonia as N	mg/L	0.05	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	
Nitrogen, Nitrite as N	mg/L	0.1	
Potassium	mg/L	1	
Silica	mg/L	0.1	
Sodium	mg/L	1	
Sulfate	mg/L	1	141

Physical Properties

Conductivity	umhos/cm	1	713
pH	s.u.	0.01	7.92
Solids, Total Dissolved TDS @ 180 C	mg/L	10	447

Trace Metals

Aluminum	mg/L	0.1	
Arsenic	mg/L	0.001	0.012
Barium	mg/L	0.1	
Boron	mg/L	0.1	
Cadmium	mg/L	0.005	
Chromium	mg/L	0.05	
Copper	mg/L	0.01	
Iron	mg/L	0.03	
Lead	mg/L	0.05	
Manganese	mg/L	0.01	
Mercury	mg/L	0.001	
Molybdenum	mg/L	0.1	
Nickel	mg/L	0.05	
Selenium	mg/L	0.001	ND
Vanadium	mg/L	0.1	
Zinc	mg/L	0.01	

Radionuclides

Uranium	mg/L	0.0003	0.394
Radium 226	pCi/L	0.2	359

Quality Control

A/C Balance (± 5)	%	250	
Anions	meq/L	250	
Cations	meq/L	250	
Solids, Total Dissolved Calculated	mg/L	250	
TDS Balance (0.80 - 1.20)	dec. %	250	

Smith Ranch Project

Mine Unit-9

Wells 9MU001 through 9MU014

Analyte	Units	Well ID Round	9MU001 Round 1 10/23/07	9MU001 Round 2 11/07/07	9MU001 Round 3 01/21/07	9MU001 Round 4 12/05/07	9MU002 Round 1 10/24/07	9MU002 Round 2 11/07/07	9MU002 Round 3 11/21/07	9MU002 Round 4 12/05/07	9MU003A Round 1 10/24/07	9MU003A Round 2 11/07/07	9MU003A Round 3 11/21/07	9MU003A Round 4 12/05/07	9MU004 Round 1 10/24/07
Major Ions															
Alkalinity, Total as CaCO3	mg/L	1	186	184	178	184	243	227	222	228	145	175	178	181	194
Carbonate as CO3	mg/L	1	4	ND			12	ND			8	ND			9
Bicarbonate as HCO3	mg/L	1	218	224			272	277			161	213			219
Calcium	mg/L	1	60	60			32	31			44	53			55
Chloride	mg/L	1	2	2	1	2	3	4	3	4	2	2	2	2	2
Fluoride	mg/L	0.1	0.4	0.4			0.5	0.5			0.5	0.5			0.4
Magnesium	mg/L	1	15	17			10	10			12	15			15
Nitrogen, Ammonia as N	mg/L	0.05	0.52	0.24			0.4	0.39			0.96	0.53			0.39
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Nitrogen, Nitrite as N	mg/L	0.1													
Potassium	mg/L	1	9	8			8	7			13	10			8
Silica	mg/L	0.1	9	9.4			9.9	9			8.3	8.9			9.2
Sodium	mg/L	1	35	35			54	50			33	34			39
Sulfate	mg/L	1	117	114			3	1			101	98			103
Physical Properties															
Conductivity	umhos/cm	1	567	594	599	582	439	449	453	441	471	564	569	554	548
pH	s.u.	0.01	7.92	7.98			7.95	8.13			8.35	8.08			9.71
Solids, Total Dissolved TDS @ 180 C	mg/L	10	322	306			215	218			261	338			306
Trace Metals															
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Arsenic	mg/L	0.001	0.002	ND			ND	ND			0.006	0.002			0.001
Barium	mg/L	0.1	ND	ND			0.2	0.2			ND	ND			ND
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND
Iron	mg/L	0.03	ND	ND			ND	ND			0.06	0.1			0.09
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Manganese	mg/L	0.01	0.02	0.05			0.03	0.03			0.03	0.06			0.05
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Selenium	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Zinc	mg/L	0.01	ND	0.03			ND	0.2			ND	ND			ND
Radionuclides															
Uranium	mg/L	0.0003	0.0009	ND			0.0005				0.0009	0.0007			0.0007
Radium 226	pCi/L	0.2	1	1			3.7	2.2			1.1	3.3			11.1
Quality Control															
A/C Balance (± 5)	%	250	-1.11	-0.138			-0.678	0.266			-0.647	1.13			-1.12
Anions	meq/L	250	6.22	6.12			5.02	4.71			5.08	5.6			6.11
Cations	meq/L	250	6.08	6.1			4.95	4.74			5.02	5.73			5.97
Solids, Total Dissolved Calculated	mg/L	250	360	355			265	249			301	327			349
TDS Balance (0.80 - 1.20)	dec. %	250	0.89	0.86			0.81	0.88			0.87	1.03			0.88

Smith Ranch Project

Mine Unit-9

Wells 9MU001 through 9MU014

Well ID	9MU004	9MU004	9MU004	9MU005	9MU005	9MU005	9MU005	9MU006	9MU006	9MU006	9MU006	9MU007	9MU007	9MU007		
Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3		
Analyte	Units	PQL	11/07/07	11/21/07	12/05/07	10/25/07	11/08/07	11/26/07	12/10/07	10/24/07	11/07/07	11/21/07	12/05/07	12/26/07	11/09/07	11/27/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	181	179	183	215	212	221	218	183	180	177	180	219	234	228
Carbonate as CO3	mg/L	1	ND			14	8			9	ND			ND	ND	
Bicarbonate as HCO3	mg/L	1	221			235	242			206	219			267	285	
Calcium	mg/L	1	54			27	22			57	54			34	35	
Chloride	mg/L	1	2	2	1	4	4	4	4	1	2	2	2	2	4	4
Fluoride	mg/L	0.1	0.5			0.5	0.4			0.4	0.5			0.5	0.5	
Magnesium	mg/L	1	15			5	5			14	16			10	10	
Nitrogen, Ammonia as N	mg/L	0.05	0.33			0.81	0.65			0.48	0.28			0.58	0.64	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	0.1			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	7			11	9			9	7			7	7	
Silica	mg/L	0.1	8.4			14.9	10.7			9.2	8.7			8.4	8.5	
Sodium	mg/L	1	35			57	52			36	36			45	44	
Sulfate	mg/L	1	96			6	5			101	103			20	12	

Physical Properties

Conductivity	umhos/cm	1	568	570	556	408	421	435	429	528	569	571	557	443	464	458
pH	s.u.	0.01	8.02			8.69	8.67			8.05	7.96			5.19	8.28	
Solids, Total Dissolved TDS @ 180 C	mg/L	10	299			229	243			282	297			212	268	

Trace Metals

Aluminum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Arsenic	mg/L	0.001	ND			0.003	0.002			ND	ND			ND	ND	
Barium	mg/L	0.1	ND			0.1	0.2			ND	ND			0.1	0.2	
Boron	mg/L	0.1	ND			0.1	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	ND			ND	ND			ND	ND			ND	ND	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.05			ND	ND			0.03	0.07			0.02	0.02	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	ND			ND	ND			ND	0.02			ND	ND	

Radionuclides

Uranium	mg/L	0.0003	0.0003			0.0016	0.0011			0.0006				0.0014	0.0019	
Radium 226	pCi/L	0.2	2.1			1.2	1.9			1.4	2.6			1.4	1.7	

Quality Control

A/C Balance (± 5)	%	250	0.102			0.189	-4.35			-0.372	-0.379			-2.49	-2.99	
Anions	meq/L	250	5.71			4.57	4.47			5.82	5.81			4.9	5.06	
Cations	meq/L	250	5.72			4.59	4.1			5.77	5.77			4.66	4.76	
Solids, Total Dissolved Calculated	mg/L	250	328			255	237			337	335			259	262	
TDS Balance (0.80 - 1.20)	dec. %	250	0.91			0.9	1.03			0.84	0.89			0.82	1.02	

Smith Ranch Project

Mine Unit-9

Wells 9MU001 through 9MU014

Analyte	Units	Well ID Round	9MU007	9MU008	9MU008	9MU008	9MU008	9MU008	9MU009	9MU009	9MU009	9MU009	9MU010	9MU010	9MU010	9MU010	9MU011
			Round 4 12/11/07	Round 1 10/30/07	Round 2 11/13/07	Round 3 11/28/07	Round 4 12/12/07	Round 1 10/26/07	Round 2 11/09/07	Round 3 11/27/07	Round 4 12/11/07	Round 1 10/29/07	Round 2 11/12/07	Round 3 11/27/07	Round 4 12/11/07	Round 1 10/29/07	
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	232	139	156	138	149	190	184	182	179	188	190	184	183	158	
Carbonate as CO3	mg/L	1		10	3			ND	ND			ND	ND			3	
Bicarbonate as HCO3	mg/L	1		149	184			232	224			229	232			186	
Calcium	mg/L	1		19	25			56	56			64	63			76	
Chloride	mg/L	1	ND	2	2	4	3	1	2	2	1	2	ND	1	2	2	
Fluoride	mg/L	0.1		0.4	0.4			0.4	0.4			0.4	.5			0.5	
Magnesium	mg/L	1		2	4			15	16			20	19			19	
Nitrogen, Ammonia as N	mg/L	0.05		0.64	0.66			0.24	0.26			0.22	0.22			0.35	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Nitrogen, Nitrite as N	mg/L	0.1		10													
Potassium	mg/L	1		10	10			9	7			8	8			9	
Silica	mg/L	0.1		11.1	9.1			9.5	8.8			9.3	9.1			9	
Sodium	mg/L	1		47	50			42	39			31	29			27	
Sulfate	mg/L	1		11	50			118	126			143	132			175	
Physical Properties																	
Conductivity	umhos/cm	1	462	390	429	393	402	586	598	614	591	591	609	621	599	642	
pH	s.u.	0.01		8.9	8.94			8.03	8.2			7.51	7.72			8.22	
Solids, Total Dissolved TDS @ 180 C	mg/L	10		241	260			325	378			347	351			404	
Trace Metals																	
Aluminum	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Arsenic	mg/L	0.001		0.001	ND			ND	ND			ND	ND			0.001	
Barium	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Boron	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Cadmium	mg/L	0.005		ND	ND			ND	ND			ND	ND			ND	
Chromium	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND	
Copper	mg/L	0.01		ND	ND			ND	ND			ND	ND			ND	
Iron	mg/L	0.03		ND	ND			0.06	ND			ND	ND			ND	
Lead	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND	
Manganese	mg/L	0.01		ND	ND			0.03	0.04			0.04	0.03			0.04	
Mercury	mg/L	0.001		ND	ND			ND	ND			ND	ND			ND	
Molybdenum	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Nickel	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND	
Selenium	mg/L	0.001		ND	ND			ND	ND			ND	ND			ND	
Vanadium	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND	
Zinc	mg/L	0.01		ND	ND			ND	ND			ND	ND			0.02	
Radionuclides																	
Uranium	mg/L	0.0003		0.0021	0.0013												
Radium 226	pCi/L	0.2		1.1	0.7			1.3	1.8			0.8	0.2			ND	
Quality Control																	
A/C Balance (± 5)	%	250		-3.99	-4.65			-1.6	-2.91			-2.92	-2.56			-0.529	
Anions	meq/L	250		3.77	4.45			6.31	6.38			6.81	6.56			6.87	
Cations	meq/L	250		3.48	4.06			6.11	6.02			6.42	6.24			6.8	
Solids, Total Dissolved Calculated	mg/L	250		219	250			365	366			391	375			412	
TDS Balance (0.80 - 1.20)	dec. %	250		1.1	1.04			0.89	1.03			0.89	0.94			0.98	

Smith Ranch Project

Mine Unit-9

Wells 9MU001 through 9MU014

Analyte	Units	Well ID	9MU011	9MU011	9MU011	9MU012	9MU012	9MU012	9MU012	9MU013	9MU013	9MU013	9MU013	9MU014	9MU014	9MU014
		Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	11/12/07	11/27/07	12/11/07	10/29/07	11/12/07	11/27/07	12/11/07	10/29/07	11/12/07	11/27/07	12/11/07	10/29/07	11/12/07	11/27/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	164	161	167	171	176	173	179	172	181	186	190	234	236	230
Carbonate as CO3	mg/L	1	ND			4	ND			ND	ND			ND	ND	
Bicarbonate as HCO3	mg/L	1	200			202	215			210	221			285	288	
Calcium	mg/L	1	75			69	65			76	80			105	103	
Chloride	mg/L	1	2	2	3	2	2	2	2	2	2	ND	2	2	3	2
Fluoride	mg/L	0.1	0.5			0.4	0.4			0.5	0.5			0.5	0.5	
Magnesium	mg/L	1	20			18	18			22	24			33	32	
Nitrogen, Ammonia as N	mg/L	0.05	0.27			0.23	0.25			0.41	0.39			0.16	0.16	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	9			10	9			9	9			10	9	
Silica	mg/L	0.1	9			9.3	8.6			8.7	8.6			9.6	9.2	
Sodium	mg/L	1	25			30	27			27	27			31	29	
Sulfate	mg/L	1	193			145	140			194	210			239	251	
Physical Properties																
Conductivity	umhos/cm	1	669	690	712	602	625	646	646	654	717	764	757	852	875	897
pH	s.u.	0.01	7.97			8.21	7.84			7.53	7.8			7.58	7.78	
Solids, Total Dissolved TDS @ 180 C	mg/L	10	417			363	0.75			388	444			564	565	
Trace Metals																
Aluminum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Arsenic	mg/L	0.001	0.001			0.002	0.001			0.002	0.001			ND	ND	
Barium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Boron	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	ND			0.07	0.01			ND	0.05			ND	ND	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.03			0.02	0.004			0.05	0.05			0.07	0.05	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Radionuclides																
Uranium	mg/L	0.0003				0.0004	0.0007			0.0004	0.0008			0.0008	0.0006	
Radium 226	pCi/L	0.2	0.9			0.06	0.08			1.2	1.1			1.1	1.6	
Quality Control																
A/C Balance (± 5)	%	250	-4.42			-0.075	-2.85			-3.78	-4.22			-1.01	-3.62	
Anions	meq/L	250	7.4			6.51	6.5			7.57	8.08			9.75	10	
Cations	meq/L	250	6.77			6.5	6.14			7.02	7.42			9.55	9.34	
Solids, Total Dissolved Calculated	mg/L	250	434			386	375			443	471			571	579	
TDS Balance (0.80 - 1.20)	dec. %	250	0.96			0.94	0.99			0.88	0.94			0.99	0.98	

Smith Ranch Project

Mine Unit-9

Wells 9MO-001 through 9MO-014

Analyte	Units	Well ID	9MO001	9MO001	9MO001	9MO001	9MO002	9MO002	9MO002	9MO002	9MO003A	9MO003A	9MO003A	9MO003A	9MO004
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1
		PQL	10/23/07	11/07/07	11/20/07	12/04/07	10/22/07	11/05/07	11/18/07	12/03/07	10/23/07	11/06/07	11/20/07	12/04/07	10/23/07
Major Ions															
Alkalinity, Total as CaCO3	mg/L	1	156	150	157	166	132	152	155	166	160	153	162	175	172
Carbonate as CO3	mg/L	1	ND	ND			ND	ND	ND		ND	ND			ND
Bicarbonate as HCO3	mg/L	1	190	183			161	185	189		195	187			209
Calcium	mg/L	1	82	82			101	67			90	86			92
Chloride	mg/L	1	ND	1	1	1	2	1	ND						
Fluoride	mg/L	0.1	0.05	0.05			0.5	0.5			0.05	0.5			0.5
Magnesium	mg/L	1	25	25			19	19			28	26			23
Nitrogen, Ammonia as N	mg/L	0.05	0.05	ND			0.41	0.20			0.10	ND			ND
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	0.1	ND			ND	0.2			0.1	ND			ND
Nitrogen, Nitrite as N	mg/L	0.1													
Potassium	mg/L	1	8	7			15	13			7	7			9
Silica	mg/L	0.1	22.4	20.2			14.9	20.1			20.7	18.9			20.1
Sodium	mg/L	1	19	19			28	20			20	20			21
Sulfate	mg/L	1	188	187			263	163			211	209			208
Physical Properties															
Conductivity	umhos/cm	1	650	671	675	679	751	655	675	683	684	708	716	730	707
pH	s.u.	0.01	7.82	7.96			8.09				7.71	7.8			7.87
Solids, Total Dissolved TDS @ 180 C	mg/L	10	430	402			510	433			444	420			474
Trace Metals															
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Arsenic	mg/L	0.001	0.031	0.028			0.008	0.037			0.051	0.052			0.057
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND
Iron	mg/L	0.03	ND	ND			0.1	ND			ND	ND			ND
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Manganese	mg/L	0.01	0.08	0.011			0.04	0.10			0.17	0.17			0.1
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND
Selenium	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND
Zinc	mg/L	0.01	0.02	ND			ND	0.01			ND	0.01			ND
Radionuclides															
Uranium	mg/L	0.0003	0.0039	0.0034			0.0047	0.0043			0.0046	0.0048			0.0051
Radium 226	pCi/L	0.2	1.5	4.7			3.9	2			1.7	1.3			2.9
Quality Control															
A/C Balance (± 5)	%	250	0.69	1.48			0.029	-2.9			1.36	0.111			-0.9
Anions	meq/L	250	7.09	6.95			8.19	6.49			7.64	7.47			7.78
Cations	meq/L	250	7.19	7.16			8.2	6.12			7.85	7.48			7.64
Solids, Total Dissolved Calculated	mg/L	250	440	432			522	0.395			474	460			476
TDS Balance (0.80 - 1.20)	dec. %	250	0.98	0.93			0.98	1.1			0.94	0.91			1

Smith Ranch Project

Mine Unit-9

Wells 9MO-001 through 9MO-014

Analyte	Units	Well ID	9MO004	9MO004	9MO004	9MO005	9MO005	9MO005	9MO005	9MO006	9MO006	9MO006	9MO006	9MO007	9MO007	9MO007
		Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	11/06/07	11/20/07	12/04/07	10/23/07	11/07/07	11/20/07	12/04/07	10/23/07	11/07/07	11/20/07	12/04/07	10/24/07	11/07/07	11/21/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	164	182	184	187	183	192	207	117	159	167	176	157	144	143
Carbonate as CO3	mg/L	1	ND			1	ND			4	ND			4	ND	
Bicarbonate as HCO3	mg/L	1	200			226	223			134	194			184	176	
Calcium	mg/L	1	90			103	103			70	85			84	78	
Chloride	mg/L	1	ND	ND	1	ND	ND	ND	1	ND	ND	ND	ND	ND	1	ND
Fluoride	mg/L	0.1	0.5			0.4	0.4			0.05	0.5			0.5	0.5	
Magnesium	mg/L	1	25			24	25			17	24			24	24	
Nitrogen, Ammonia as N	mg/L	0.05	ND			0.39	0.39			0.08	ND			ND	ND	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	8			11	12			11	8			8	7	
Silica	mg/L	0.1	19.6			19.2	18.6			18.2	18.7			20.4	20.6	
Sodium	mg/L	1	22			25	26			24	20			19	19	
Sulfate	mg/L	1	206			229	226			189	196			189	188	
Physical Properties																
Conductivity	umhos/cm	1	723	728	740	768	798	805	818	594	697	699	705	643	659	661
pH	s.u.	0.01	7.93			8	8.1			8.43	8.17			7.56	7.63	
Solids, Total Dissolved TDS @ 180 C	mg/L	10	425			508	508			374	440			398	397	
Trace Metals																
Aluminum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Arsenic	mg/L	0.001	0.044			0.022	0.026			0.096	0.04			0.043	0.034	
Barium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Boron	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	ND			ND	ND			ND	ND			ND	ND	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.13			0.07	0.07			0.01	0.12			0.08	0.12	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	0.03			ND	ND			ND	ND			ND	ND	
Radionuclides																
Uranium	mg/L	0.0003	0.0052			0.0055	0.0055			0.0036	0.0048			0.0028	0.0026	
Radium 226	pCi/L	0.2	1.6			2.4	2.4			1.6	4.9			1.9	6.5	
Quality Control																
A/C Balance (± 5)	%	250	0.394			-0.102	1.75			-0.258	0.027			0.397	0.492	
Anions	meq/L	250	7.6			8.54	8.4			6.3	7.27			7.13	6.85	
Cations	meq/L	250	7.66			8.52	8.7			6.26	7.28			7.18	63.92	
Solids, Total Dissolved Calculated	mg/L	250	469			525	522			401	447			440	425	
TDS Balance (0.80 - 1.20)	dec. %	250	0.91			0.97	0.97			0.93	0.98			0.9	0.93	

Smith Ranch Project

Mine Unit-9

Wells 9MO-001 through 9MO-014

Analyte	Units	PQL	9MO007 Round 4 12/05/07	9MO008 Round 1 10/25/07	9MO008 Round 2 11/08/07	9MO008 Round 3 11/26/07	9MO008 Round 4 12/10/07	9MO009 Round 1 10/25/07	9MO009 Round 2 11/08/07	9MO009 Round 3 11/26/07	9MO009 Round 4 12/10/07	9MO010 Round 1 11/01/07	9MO010 Round 2 11/15/07	9MO010 Round 3 11/29/07	9MO010 Round 4 12/13/07	9MO11 Round 1 11/01/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	139	150	134	142	140	169	153	185	158	178	180	179	169	163
Carbonate as CO3	mg/L	1		ND	ND			ND	ND			ND	ND			ND
Bicarbonate as HCO3	mg/L	1		183	164			206	187			218	220			199
Calcium	mg/L	1		81	73			81	80			92	92			90
Chloride	mg/L	1	ND	ND	ND	ND	ND	ND	1	1	1	1	ND	ND	ND	ND
Fluoride	mg/L	0.1		0.5	0.6			0.05	0.05			0.6	0.6			0.5
Magnesium	mg/L	1		24	22			23	24			29	29			19
Nitrogen, Ammonia as N	mg/L	0.05		0.05	ND			0.09	ND			0.45	0.16			1.36
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND	0.01			ND	0.01			ND	ND			ND
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1		8	6			9	7			7	7			10
Silica	mg/L	0.1		23.4	19.8			22.2	20.9			21	21.5			20.9
Sodium	mg/L	1		21	18			19	18			22	20			22
Sulfate	mg/L	1		186	191			196	208			213	227			191
Physical Properties																
Conductivity	umhos/cm	1	637	632	640	654	632	671	680	692	667	744	747	769	741	686
pH	s.u.	0.01		7.49	7.6			7.68	7.79			7.32	7.28			7.47
Solids, Total Dissolved TDS @ 180 C	mg/L	10		421	423			425	449			479	473			440
Trace Metals																
Aluminum	mg/L	0.1		ND	ND			ND	0.04			ND	ND			ND
Arsenic	mg/L	0.001		0.099	0.073			0.03	0.034			1.18	0.086			0.095
Barium	mg/L	0.1		ND	ND			ND	ND			ND	ND			0.1
Boron	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Cadmium	mg/L	0.005		ND	ND			ND	ND			ND	ND			ND
Chromium	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND
Copper	mg/L	0.01		ND	ND			ND	ND			ND	ND			ND
Iron	mg/L	0.03		0.06	ND			ND	ND			0.05	0.13			ND
Lead	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND
Manganese	mg/L	0.01		0.14	0.16			0.06	0.12			0.15	0.15			0.05
Mercury	mg/L	0.001		ND	ND			ND	ND			ND	ND			ND
Molybdenum	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Nickel	mg/L	0.05		ND	ND			ND	ND			ND	ND			ND
Selenium	mg/L	0.001		ND	ND			ND	ND			ND	ND			ND
Vanadium	mg/L	0.1		ND	ND			ND	ND			ND	ND			ND
Zinc	mg/L	0.01		ND	ND			ND	ND			ND	ND			ND
Radionuclides																
Uranium	mg/L	0.0003		0.0021	0.0023			0.003	0.0037			0.0047	0.0038			0.0053
Radium 226	pCi/L	0.2		1.5	2.1			1.9	1.7			1	1.9			2.3
Quality Control																
A/C Balance (± 5)	%	250		1.71	-2.21			-3.35	-3.02			0.521	-1.82			0.441
Anions	meq/L	250		6.91	6.71			7.51	7.45			8.08	8.39			7.29
Cations	meq/L	250		7.15	6.42			7.02	7.02			8.16	8.09			7.35
Solids, Total Dissolved Calculated	mg/L	250		434	412			453	452			494	507			452
TDS Balance (0.80 - 1.20)	dec. %	250		0.97	1.03			0.94	0.99			0.97	0.93			0.97

Smith Ranch Project

Mine Unit-9

Wells 9MO-001 through 9MO-014

Analyte	Units	Well ID	9MO11	9MO11	9MO11	9MO12	9MO12	9MO12	9MO12	9MO13	9MO13	9MO13	9MO13	9MO14	9MO14	9MO14
		Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	11/12/07	11/29/07	12/13/07	11/01/07	11/15/07	11/29/07	12/13/07	11/01/07	11/15/07	11/29/07	12/13/07	10/31/07	11/14/07	11/28/07
Major Ions																
Alkalinity, Total as CaCO3	mg/L	1	180	185	179	214	216	214	161	225	233	231	221	224	229	223
Carbonate as CO3	mg/L	1	ND			ND	ND			ND	ND			ND	ND	
Bicarbonate as HCO3	mg/L	1	219			261	264			274	284			276	280	
Calcium	mg/L	1	93			122	117			142	142			182	175	
Chloride	mg/L	1	ND	1	1	1	2	2	5	1	2	2	1	2	2	2
Fluoride	mg/L	0.1	0.5			0.5	0.5			0.5	0.6			0.5	0.5	
Magnesium	mg/L	1	23			37	37			47	46			56	57	
Nitrogen, Ammonia as N	mg/L	0.05	1.08			0.14	0.11			0.21	0.16			0.19	0.13	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nitrogen, Nitrite as N	mg/L	0.1														
Potassium	mg/L	1	9			9	8			9	9			11	9	
Silica	mg/L	0.1	20.9			22.8	22.3			22.5	22.2			24.1	23	
Sodium	mg/L	1	21			24	23			26	24			28	25	
Sulfate	mg/L	1	203			277	293			377	376			528	555	
Physical Properties																
Conductivity	umhos/cm	1	738	778	763	914	921	947	708	1070	1090	1120	1090	1320	1370	1380
pH	s.u.	0.01	7.33			7.52	7.29			7.28	7.17			7.15	7.19	
Solids, Total Dissolved TDS @ 180 C	mg/L	10	482			597	621			755	787			1010	1020	
Trace Metals																
Aluminum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Arsenic	mg/L	0.001	0.101			0.043	0.038			0.032	0.033			0.044	0.042	
Barium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Boron	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Cadmium	mg/L	0.005	ND			ND	ND			ND	ND			ND	ND	
Chromium	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Copper	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Iron	mg/L	0.03	ND			ND	ND			0.05	0.09			0.03	0.11	
Lead	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Manganese	mg/L	0.01	0.07			0.11	0.16			0.18	0.18			0.21	0.25	
Mercury	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Molybdenum	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Nickel	mg/L	0.05	ND			ND	ND			ND	ND			ND	ND	
Selenium	mg/L	0.001	ND			ND	ND			ND	ND			ND	ND	
Vanadium	mg/L	0.1	ND			ND	ND			ND	ND			ND	ND	
Zinc	mg/L	0.01	ND			ND	ND			ND	ND			ND	ND	
Radionuclides																
Uranium	mg/L	0.0003	0.0032			0.0068	0.00561.6			0.0079	0.0074			0.0075	0.007	
Radium 226	pCi/L	0.2	1.5			1.4				6.9	2			7.7	10.6	
Quality Control																
A/C Balance (± 5)	%	250	-0.621			1.58	-1.91			-0.244	-1.67			-1.03	-4.92	
Anions	meq/L	250	7.82			10.1	10.5			12.4	12.6			15.5	16.2	
Cations	meq/L	250	7.74			10.4	10.1			12.3	12.2			15.2	14.7	
Solids, Total Dissolved Calculated	mg/L	250	478			622	632			760	761			966	984	
TDS Balance (0.80 - 1.20)	dec. %	250	1.01			0.96	0.98			0.99	1.03			1.05	1.04	

Smith Ranch Project

Mine Unit-9

Wells M-901 through M-951

Analyte	Units	Well ID	M-901	M-901	M-901	M-901	M-902	M-902	M-902	M-902	M-903	M-903	M-903	M-903	M-904	M-904	M-904
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3
		PQL	10/22/07	11/05/07	11/19/07	12/03/07	10/22/07	11/05/07	11/19/07	12/03/07	10/22/07	11/05/07	11/19/07	12/03/07	10/22/07	11/05/07	11/19/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	155	164	173	187	152	155	168	184	137	153	177	177	158	165	170
Carbonate as CO3	mg/L	1	ND				ND				3				ND		ND
Bicarbonate as HCO3	mg/L	1	190		211		185				160		199		193		207
Calcium	mg/L	1	91				77				113				139		
Chloride	mg/L	1	ND	ND	ND	ND	ND	1	ND	ND	1	1	ND	1	ND	1	ND
Fluoride	mg/L	0.1	0.5				0.5				0.5				0.5		
Magnesium	mg/L	1	24				21				24				36		
Nitrogen, Ammonia as N	mg/L	0.05	0.22				0.27				0.4				0.5		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND		
Potassium	mg/L	1	15				12				14				12		
Silica	mg/L	0.1	16.7				20.3				14.6				17.3		
Sodium	mg/L	1	25				21				28				30		
Sulfate	mg/L	1	232				186				313				416		
Physical Properties																	
Conductivity	umhos/cm	1	721	748	790	802	640	834	898	919	839	918	988	1010	1040	1080	1130
pH	s.u.	0.01	7.84				7.74				8.21				8.03		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	472				404				578				740		
Trace Metals																	
Aluminum	mg/L	0.1	ND				ND				ND				ND		
Arsenic	mg/L	0.001	0.002				0.037				0.007				0.003		
Barium	mg/L	0.1	ND				ND				ND				ND		
Boron	mg/L	0.1	ND				ND				ND				ND		
Cadmium	mg/L	0.005	ND				ND				ND				ND		
Chromium	mg/L	0.05	ND				ND				ND				ND		
Copper	mg/L	0.01	ND				ND				ND				ND		
Iron	mg/L	0.03	ND				ND				0.08				0.24		
Lead	mg/L	0.05	ND				ND				ND				ND		
Manganese	mg/L	0.01	0.09				0.09				0.04				0.09		
Mercury	mg/L	0.001	ND				ND				ND				ND		
Molybdenum	mg/L	0.1	ND				ND				ND				ND		
Nickel	mg/L	0.05	ND				ND				ND				ND		
Selenium	mg/L	0.001	ND				ND				ND				ND		
Vanadium	mg/L	0.1	ND				ND				ND				ND		
Zinc	mg/L	0.01	ND				ND				ND				ND		
Radionuclides																	
Uranium	mg/L	0.0003	0.0026				0.0038				0.0051				0.0037		
Radium 226			4.6				1				3.5				6.7		
Quality Control																	
A/C Balance (± 5)	%	250	0.506				-0.757				-0.381				-1.09		
Anions	meq/L	250	7.99				6.93				9.31				11.9		
Cations	meq/L	250	8.07				6.82				9.24				11.6		
Solids, Total Dissolved Calculated	mg/L	250	499				429				591				747		
TDS Balance (0.80 - 1.20)	dec. %	250	0.95				0.94				0.98				0.99		

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Analyte	Units	Well ID Round	M-904	M-905A	M-905A	M-905A	M-905A	M-906	M-906	M-906	M-906	M-907	M-907	M-907	M-907	M-908	M-908
			Round 4 12/03/07	Round 1 10/22/07	Round 2 11/05/07	Round 3 11/19/07	Round 4 12/03/07	Round 1 10/22/07	Round 2 11/05/07	Round 3 11/19/08	Round 4 12/03/07	Round 1 10/23/07	Round 2 11/06/08	Round 3 11/20/07	Round 4 12/04/07	Round 1 10/23/07	Round 2 11/06/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	182	37	136	153	174	132	158	165	182	175	167	178	193	169	155
Carbonate as CO3	mg/L	1		ND				ND				ND				ND	
Bicarbonate as HCO3	mg/L	1		45		187		161		201		213	204			206	
Calcium	mg/L	1		76				111				128				155	
Chloride	mg/L	1	1	1	1	1	1	1	2	ND	1	1	ND	ND	ND	ND	ND
Fluoride	mg/L	0.1		0.5				0.5				0.4				0.4	
Magnesium	mg/L	1		10				25				37				46	
Nitrogen, Ammonia as N	mg/L	0.05		0.37				0.97				0.16				0.15	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND				ND				0.1				ND	
Potassium	mg/L	1		21				11				9				11	
Silica	mg/L	0.1		15				14.5				16.1				16	
Sodium	mg/L	1		39				25				27				31	
Sulfate	mg/L	1		307				317				346				460	
Physical Properties																	
Conductivity	umhos/cm	1	1150	696	994	1070	1100	835	981	1040	1060	943	982	994	1000	1110	1140
pH	s.u.	0.01		8.36				8.08				7.72				7.71	
Solids, Total Dissolved TDS @ 180 C	mg/L	10		470				576				666				832	
Trace Metals																	
Aluminum	mg/L	0.1		ND				ND				ND				ND	
Arsenic	mg/L	0.001		0.005				0.004				0.002				ND	
Barium	mg/L	0.1		ND				ND				ND				ND	
Boron	mg/L	0.1		ND				ND				ND				ND	
Cadmium	mg/L	0.005		ND				ND				ND				ND	
Chromium	mg/L	0.05		ND				ND				ND				ND	
Copper	mg/L	0.01		ND				ND				ND				ND	
Iron	mg/L	0.03		ND				0.18				ND				ND	
Lead	mg/L	0.05		ND				ND				ND				ND	
Manganese	mg/L	0.01		ND				0.05				0.13				0.13	
Mercury	mg/L	0.001		ND				ND				ND				ND	
Molybdenum	mg/L	0.1		ND				ND				ND				ND	
Nickel	mg/L	0.05		ND				ND				ND				ND	
Selenium	mg/L	0.001		ND				ND				ND				ND	
Vanadium	mg/L	0.1		ND				ND				ND				ND	
Zinc	mg/L	0.01		ND				ND				ND				ND	
Radionuclides																	
Uranium	mg/L	0.0003		0.0064				0.0032				0.0021				0.0024	
Radium 226				2.3				4.1				5.4				14.8	
Quality Control																	
A/C Balance (± 5)	%	250		-2.71				-1.5				0.608				0.724	
Anions	meq/L	250		7.2				9.32				10.8				13	
Cations	meq/L	250		6.82				9.05				10.9				13.2	
Solids, Total Dissolved Calculated	mg/L	250		491				585				671				821	
TDS Balance (0.80 - 1.20)	dec. %	250		0.96				0.98				0.99				1.01	

Smith Ranch Project

Mine Unit-9

Wells M-901 through M-951

Well ID	M-908	M-908	M-909A	M-909A	M-909A	M-909A	M-910	M-910	M-910	M-910	M-911	M-911	M-911	M-911	M-912		
Round	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1		
Analyte	Units	PQL	11/20/07	12/04/07	10/23/07	11/06/07	11/20/07	12/04/07	10/24/07	11/06/07	11/20/07	12/04/07	10/23/07	11/06/07	11/20/07	12/04/08	10/24/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	168	182	175	166	165	184	147	115	126	145	124	166	184	197	192
Carbonate as CO3	mg/L	1			ND				4				6				4
Bicarbonate as HCO3	mg/L	1			213	202			170				139				225
Calcium	mg/L	1			159				112				90				123
Chloride	mg/L	1	1	ND	ND	ND	1	1	ND	1	1	1	2	2	ND	ND	ND
Fluoride	mg/L	0.1			0.4				0.4				0.5				0.4
Magnesium	mg/L	1			46				29				14				37
Nitrogen, Ammonia as N	mg/L	0.05			0.1				0.17				0.57				0.1
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1			ND				ND				ND				ND
Potassium	mg/L	1			10				10				16				9
Silica	mg/L	0.1			16.5				14.8				15.6				18.1
Sodium	mg/L	1			30				26				34				26
Sulfate	mg/L	1			483				332				245				339

Physical Properties

Conductivity	umhos/cm	1	1140	1170	1140	1170	1170	1200	843	703	929	650	710	860	646	941	923
pH	s.u.	0.01			7.9				7.73				8.37				7.45
Solids, Total Dissolved TDS @ 180 C	mg/L	10			852				559				466				651

Trace Metals

Aluminum	mg/L	0.1			ND				ND				ND				ND
Arsenic	mg/L	0.001			0.002				0.003				0.007				0.005
Barium	mg/L	0.1			ND				ND				ND				ND
Boron	mg/L	0.1			ND				ND				ND				ND
Cadmium	mg/L	0.005			ND				ND				ND				ND
Chromium	mg/L	0.05			ND				ND				ND				ND
Copper	mg/L	0.01			ND				ND				ND				ND
Iron	mg/L	0.03			ND				ND				ND				ND
Lead	mg/L	0.05			ND				ND				ND				ND
Manganese	mg/L	0.01			0.14				0.06				ND				0.08
Mercury	mg/L	0.001			ND				ND				ND				ND
Molybdenum	mg/L	0.1			ND				ND				ND				ND
Nickel	mg/L	0.05			ND				ND				ND				ND
Selenium	mg/L	0.001			ND				ND				ND				ND
Vanadium	mg/L	0.1			ND				ND				ND				ND
Zinc	mg/L	0.01			ND				ND				ND				ND

Radionuclides

Uranium	mg/L	0.0003			0.0122				0.0117				0.0269				0.0153
Radium 226					13.6				25.5				17				17.2

Quality Control

A/C Balance (± 5)	%	250			-1.08				-2.56				-0.367				-1.79
Anions	meq/L	250			13.6				9.88				7.66				10.9
Cations	meq/L	250			13.3				9.38				7.6				10.6
Solids, Total Dissolved Calculated	mg/L	250			850				613				492				669
TDS Balance (0.80 - 1.20)	dec. %	250			1				0.91				0.95				0.97

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Analyte	Units	Well ID Round	M-912	M-912	M-912	M-913	M-913	M-913	M-913	M-914	M-914	M-914	M-914	M-915	M-915	M-915	M-915
			Round 2 11/07/07	Round 3 11/21/07	Round 4 12/05/07	Round 1 10/23/07	Round 2 11/06/07	Round 3 11/20/07	Round 4 12/04/07	Round 1 10/24/07	Round 2 11/07/07	Round 3 11/21/07	Round 4 12/05/07	Round 1 10/24/07	Round 2 11/08/07	Round 3 11/26/07	Round 4 12/10/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	184	186	180	162	171	184	206	166	181	192	186	156	161	164	165
Carbonate as CO3	mg/L	1				3				4				6			
Bicarbonate as HCO3	mg/L	1				192	209			195				178			
Calcium	mg/L	1				128				133				139			
Chloride	mg/L	1	ND	1	ND	ND	ND	1	ND	1	1	ND	ND	1	1	1	1
Fluoride	mg/L	0.1				0.5				0.4				0.4			
Magnesium	mg/L	1				28				31				36			
Nitrogen, Ammonia as N	mg/L	0.05				0.91				0.39				0.16			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1				ND				ND				ND			
Potassium	mg/L	1				11				11				18			
Silica	mg/L	0.1				17.5				17.4				20.3			
Sodium	mg/L	1				30				29				31			
Sulfate	mg/L	1				342				363				429			
Physical Properties																	
Conductivity	umhos/cm	1	958	966	936	908	1040	1080	1120	925	1080	1140	1100	1030	1110	1150	1090
pH	s.u.	0.01				7.95				7.6				7.97			
Solids, Total Dissolved TDS @ 180 C	mg/L	10				622				655				722			
Trace Metals																	
Aluminum	mg/L	0.1				ND				ND				ND			
Arsenic	mg/L	0.001				0.006				0.008				0.024			
Barium	mg/L	0.1				ND				ND				ND			
Boron	mg/L	0.1				ND				ND				ND			
Cadmium	mg/L	0.005				ND				ND				ND			
Chromium	mg/L	0.05				ND				ND				ND			
Copper	mg/L	0.01				ND				ND				ND			
Iron	mg/L	0.03				0.29				ND				ND			
Lead	mg/L	0.05				ND				ND				ND			
Manganese	mg/L	0.01				0.05				0.06				0.06			
Mercury	mg/L	0.001				ND				ND				ND			
Molybdenum	mg/L	0.1				ND				ND				ND			
Nickel	mg/L	0.05				ND				ND				ND			
Selenium	mg/L	0.001				ND				ND				ND			
Vanadium	mg/L	0.1				ND				ND				ND			
Zinc	mg/L	0.01				ND				ND				ND			
Radionuclides																	
Uranium	mg/L	0.0003				0.0183				0.0303				0.0412			
Radium 226						15.6				13.7				16.3			
Quality Control																	
A/C Balance (± 5)	%	250				-0.203				-0.897				-1.54			
Anions	meq/L	250				10.4				10.9				12.1			
Cations	meq/L	250				10.4				10.7				11.7			
Solids, Total Dissolved Calculated	mg/L	250				656				685				768			
TDS Balance (0.80 - 1.20)	dec. %	250				0.95				0.96				0.94			

Smith Ranch Project

Mine Unit-9

Wells M-901 through M-951

Well ID	M-916	M-916	M-916	M-916	M-917	M-917	M-917	M-917	M-917	M-917	M-918	M-918	M-918	M-918	M-919	M-919	
Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Addtl Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2		
Analyte	Units	PQL	10/24/07	11/07/07	11/21/07	12/05/07	10/25/07	11/08/07	11/26/07	12/10/07	01/28/08	10/24/07	11/07/07	11/21/07	12/05/07	10/25/07	11/08/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	155	139	151	148	150	146	451	144	148	167	171	172	171	190	187
Carbonate as CO3	mg/L	1	4				ND					7				ND	
Bicarbonate as HCO3	mg/L	1	182				183					190				232	
Calcium	mg/L	1	105				86					95				93	
Chloride	mg/L	1	2	2	2	2	4	4	4	4	4	5	5	5	4	5	5
Fluoride	mg/L	0.1	0.5				0.5					0.5				0.5	
Magnesium	mg/L	1	30				25					21				30	
Nitrogen, Ammonia as N	mg/L	0.05	ND				0.25					0.41				0.28	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND					ND				ND	
Potassium	mg/L	1	9				8					14				8	
Silica	mg/L	0.1	20.1				19.7					18.5				22.2	
Sodium	mg/L	1	25				24					27				26	
Sulfate	mg/L	1	295				229					230				209	

Physical Properties

Conductivity	umhos/cm	1	810	852	854	828	741	756	770	744	735	730	803	803	789	756	782
pH	s.u.	0.01	7.69				7.8					7.95				7.46	
Solids, Total Dissolved TDS @ 180 C	mg/L	10	547				497					466				487	

Trace Metals

Aluminum	mg/L	0.1	ND				ND					ND				ND	
Arsenic	mg/L	0.001	0.017				0.013					0.013				0.009	
Barium	mg/L	0.1	ND				ND					ND				ND	
Boron	mg/L	0.1	ND				ND					ND				ND	
Cadmium	mg/L	0.005	ND				ND					ND				ND	
Chromium	mg/L	0.05	ND				ND					ND				ND	
Copper	mg/L	0.01	ND				ND					ND				ND	
Iron	mg/L	0.03	0.13				ND					0.18				0.21	
Lead	mg/L	0.05	ND				ND					ND				ND	
Manganese	mg/L	0.01	0.07				0.07					0.03				0.09	
Mercury	mg/L	0.001	ND				ND					ND				ND	
Molybdenum	mg/L	0.1	ND				ND					ND				ND	
Nickel	mg/L	0.05	ND				ND					ND				ND	
Selenium	mg/L	0.001	ND				ND					ND				ND	
Vanadium	mg/L	0.1	ND				ND					ND				ND	
Zinc	mg/L	0.01	ND				ND					ND				ND	

Radionuclides

Uranium	mg/L	0.0003	0.0161				0.0136					0.0224				0.0049	
Radium 226			16.1				17.3					8.7				16.5	

Quality Control

A/C Balance (± 5)	%	250	-1.52				-1.66					-1.63				1.21	
Anions	meq/L	250	9.33				7.91					8.29				8.32	
Cations	meq/L	250	9.05				7.66					8.02				8.52	
Solids, Total Dissolved Calculated	mg/L	250	580				487					511				509	
TDS Balance (0.80 - 1.20)	dec. %	250	0.94				1.02					0.91				0.96	

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Well ID	M-919	M-919	M-920	M-920	M-920	M-920	M-921A	M-921A	M-921A	M-921A	M-922	M-922	M-922	M-922	M-923
Round	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1
Analyte	Units														
PQL	11/26/07	12/10/07	10/25/07	11/08/07	11/26/07	12/10/07	10/25/07	11/08/07	11/26/07	12/10/07	10/26/07	11/09/07	11/26/07	12/10/07	10/26/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	187	183	186	170	177	182	234	223	229	221	211	228	223	223	231
Carbonate as CO3	mg/L	1			ND				ND				ND				ND
Bicarbonate as HCO3	mg/L	1			227				286				258				282
Calcium	mg/L	1			86				87				76				87
Chloride	mg/L	1	4	4	2	4	5	5	3	4	4	4	3	3	3	3	3
Fluoride	mg/L	0.1			0.5				0.69				0.7				0.6
Magnesium	mg/L	1			26				28				19				25
Nitrogen, Ammonia as N	mg/L	0.05			0.21				0.24				0.3				0.19
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1			ND				ND				ND				ND
Potassium	mg/L	1			8				9				15				10
Silica	mg/L	0.1			20.2				22.3				19.3				25.7
Sodium	mg/L	1			24				24				28				24
Sulfate	mg/L	1			202				167				137				140

Physical Properties

Conductivity	umhos/cm	1	798	764	730	748	771	753	745	753	769	738	673	914	739	713	696
pH	s.u.	0.01			7.49				7.5				7.81				8.08
Solids, Total Dissolved TDS @ 180 C	mg/L	10			473				483				421				435

Trace Metals

Aluminum	mg/L	0.1			ND				ND				ND				ND
Arsenic	mg/L	0.001			0.009				0.014				0.012				0.019
Barium	mg/L	0.1			ND				ND				ND				0.1
Boron	mg/L	0.1			ND				ND				ND				ND
Cadmium	mg/L	0.005			ND				ND				ND				ND
Chromium	mg/L	0.05			ND				ND				ND				ND
Copper	mg/L	0.01			ND				ND				ND				ND
Iron	mg/L	0.03			0.05				0.09				0.06				0.06
Lead	mg/L	0.05			ND				ND				ND				ND
Manganese	mg/L	0.01			0.07				0.08				0.03				0.03
Mercury	mg/L	0.001			ND				ND				ND				ND
Molybdenum	mg/L	0.1			ND				ND				ND				ND
Nickel	mg/L	0.05			ND				ND				ND				ND
Selenium	mg/L	0.001			ND				ND				ND				0.001
Vanadium	mg/L	0.1			ND				ND				ND				ND
Zinc	mg/L	0.01			ND				ND				ND				ND

Radionuclides

Uranium	mg/L	0.0003			0.0117				0.04				0.0712				0.111
Radium 226					18.9				1140				121				204

Quality Control

A/C Balance (± 5)	%	250			-2.04				-2.11				-1.44				0.417
Anions	meq/L	250			8.02				8.27				7.21				7.66
Cations	meq/L	250			7.7				7.93				7				7.72
Solids, Total Dissolved Calculated	mg/L	250			481				481				426				454
TDS Balance (0.80 - 1.20)	dec. %	250			0.98				1				0.99				0.96

Smith Ranch Project

Mine Unit-9

Wells M-901 through M-951

Well ID	M-923	M-923	M-923	M-924	M-924	M-924	M-924	M-925	M-925	M-925	M-925	M-926	M-926	M-926	M-926		
Round	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4		
Analyte	Units	PQL	11/09/08	11/27/08	12/11/07	10/26/07	11/09/07	11/27/07	12/11/07	10/26/07	11/09/07	11/27/07	12/11/07	10/25/07	11/08/07	11/26/07	12/10/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	228	231	227	245	240	226	232	235	222	223	227	203	213	230	232
Carbonate as CO3	mg/L	1				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1				299				286				248			
Calcium	mg/L	1				86				84				80			
Chloride	mg/L	1	4	3	4	5	5	5	5	5	6	6	6	5	5	5	5
Fluoride	mg/L	0.1				0.7				0.8				0.7			
Magnesium	mg/L	1				26				26				16			
Nitrogen, Ammonia as N	mg/L	0.05				0.11				0.08				0.59			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1				ND				ND				ND			
Potassium	mg/L	1				8				10				11			
Silica	mg/L	0.1				21.9				21.1				15.4			
Sodium	mg/L	1				22				23				24			
Sulfate	mg/L	1				139				140				125			

Physical Properties

Conductivity	umhos/cm	1	713	753	725	724	719	759	733	710	975	748	705	635	685	728	720
pH	s.u.	0.01				7.83				7.88				8.02			
Solids, Total Dissolved TDS @ 180 C	mg/L	10				435				421				394			

Trace Metals

Aluminum	mg/L	0.1				ND				ND				ND			
Arsenic	mg/L	0.001				0.005				0.006				0.003			
Barium	mg/L	0.1				ND				ND				ND			
Boron	mg/L	0.1				ND				ND				ND			
Cadmium	mg/L	0.005				ND				ND				ND			
Chromium	mg/L	0.05				ND				ND				ND			
Copper	mg/L	0.01				ND				ND				ND			
Iron	mg/L	0.03				ND				ND				ND			
Lead	mg/L	0.05				ND				ND				ND			
Manganese	mg/L	0.01				0.05				0.06				ND			
Mercury	mg/L	0.001				ND				ND				ND			
Molybdenum	mg/L	0.1				ND				ND				ND			
Nickel	mg/L	0.05				ND				ND				ND			
Selenium	mg/L	0.001				ND				ND				0.008			
Vanadium	mg/L	0.1				ND				ND				ND			
Zinc	mg/L	0.01				ND				ND				ND			

Radionuclides

Uranium	mg/L	0.0003				0.0189				0.0263				0.0498			
Radium 226						20.4				8.1				24.4			

Quality Control

A/C Balance (± 5)	%	250				-2.22				-1.53				-0.834			
Anions	meq/L	250				7.98				7.8				6.84			
Cations	meq/L	250				7.63				7.56				6.72			
Solids, Total Dissolved Calculated	mg/L	250				456				451				400			
TDS Balance (0.80 - 1.20)	dec. %	250				0.95				0.93				0.99			

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Analyte	Units	Well ID Round	M-927A	M-927A	M-927A	M-927A	M-928	M-928	M-928	M-928	M-929	M-929	M-929	M-929	M-930	M-930	M-930
			Round 1 10/30/07	Round 2 11/13/07	Round 3 11/28/07	Round 4 12/12/07	Round 1 10/31/07	Round 2 11/14/07	Round 3 11/28/07	Round 4 12/12/07	Round 1 10/30/07	Round 2 11/13/07	Round 3 11/28/07	Round 4 12/12/07	Round 1 10/30/07	Round 2 11/13/07	Round 3 11/28/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	198	232	244	242	265	275	270	258	264	267	266	254	174	193	209
Carbonate as CO3	mg/L	1	ND				ND				ND				ND		
Bicarbonate as HCO3	mg/L	1	241				323				322				213		
Calcium	mg/L	1	69				102				93				69		
Chloride	mg/L	1	5	6	6	6	7	7	7	7	7	8	7	7	5	6	6
Fluoride	mg/L	0.1	0.8				0.7				.8/				1		
Magnesium	mg/L	1	20				31				31				12		
Nitrogen, Ammonia as N	mg/L	0.05	0.31				0.07				ND				0.15		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	0.3				3.6				5.8				5.2		
Potassium	mg/L	1	9				10				9				13		
Silica	mg/L	0.1	18.3				21.7				21.3				19.1		
Sodium	mg/L	1	24				24				20				20		
Sulfate	mg/L	1	127				160				143				99		
Physical Properties																	
Conductivity	umhos/cm	1	676	749	785	767	821	850	864	827	852	866	892	854	614	672	736
pH	s.u.	0.01	7.34				7.58				7.34				8.02		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	436				536				550				384		
Trace Metals																	
Aluminum	mg/L	0.1	ND				ND				ND				ND		
Arsenic	mg/L	0.001	0.015				0.004				0.01				0.015		
Barium	mg/L	0.1	ND				ND				ND				ND		
Boron	mg/L	0.1	ND				ND				ND				ND		
Cadmium	mg/L	0.005	ND				ND				ND				ND		
Chromium	mg/L	0.05	ND				ND				ND				ND		
Copper	mg/L	0.01	ND				ND				ND				ND		
Iron	mg/L	0.03	0.04				ND				ND				ND		
Lead	mg/L	0.05	ND				ND				ND				ND		
Manganese	mg/L	0.01	0.06				0.05				0.07				0.02		
Mercury	mg/L	0.001	ND				ND				ND				ND		
Molybdenum	mg/L	0.1	ND				ND				ND				ND		
Nickel	mg/L	0.05	ND				ND				ND				ND		
Selenium	mg/L	0.001	0.013				0.044				0.073				0.038		
Vanadium	mg/L	0.1	ND				ND				ND				ND		
Zinc	mg/L	0.01	ND				ND				ND				ND		
Radionuclides																	
Uranium	mg/L	0.0003	0.047				0.196				0.142				0.0074		
Radium 226			18.2				32.1				46.9				3.3		
Quality Control																	
A/C Balance (± 5)	%	250	-3.25				-0.866				-3.55				-3.49		
Anions	meq/L	250	6.79				9.1				8.92				6.1		
Cations	meq/L	250	6.36				8.95				8.31				5.69		
Solids, Total Dissolved Calculated	mg/L	250	392				530				509				366		
TDS Balance (0.80 - 1.20)	dec. %	250	1.11				1.01				1.08				1.05		

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Well ID	M-930	M-931	M-931	M-931	M-931	M-932	M-932	M-932	M-932	M-933A	M-933A	M-933A	M-933A	M-934	M-934		
Round	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2		
Analyte	Units	PQL	12/12/07	10/30/07	11/13/07	11/28/07	12/12/07	10/30/07	11/13/07	11/28/07	12/12/07	10/30/07	11/13/07	11/28/07	12/12/07	10/30/07	11/13/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	211	150	215	227	221	158	169	167	166	203	203	201	193	200	204
Carbonate as CO3	mg/L	1		ND				ND				ND				ND	
Bicarbonate as HCO3	mg/L	1		183				193				248				244	
Calcium	mg/L	1		57				69				72				78	
Chloride	mg/L	1	6	3	5	5	4	5	5	5	5	5	5	4	4	5	5
Fluoride	mg/L	0.1		1.2				0.96				0.6				0.5	
Magnesium	mg/L	1		12				19				24				20	
Nitrogen, Ammonia as N	mg/L	0.05		0.09				ND				0.08				0.12	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND				ND				ND				ND	
Potassium	mg/L	1		8				8				7				9	
Silica	mg/L	0.1		17.2				22.6				22				23.1	
Sodium	mg/L	1		18				21				21				20	
Sulfate	mg/L	1		94				149				141				139	

Physical Properties

Conductivity	umhos/cm	1	729	518	631	666	646	650	684	701	686	700	714	728	697	696	717
pH	s.u.	0.01		8.02				7.6				7.53				7.5	
Solids, Total Dissolved TDS @ 180 C	mg/L	10		320				417				443				449	

Trace Metals

Aluminum	mg/L	0.1		ND				ND				ND				ND	
Arsenic	mg/L	0.001		ND				0.014				0.016				0.012	
Barium	mg/L	0.1		ND				ND				ND				ND	
Boron	mg/L	0.1		ND				ND				ND				ND	
Cadmium	mg/L	0.005		ND				ND				ND				ND	
Chromium	mg/L	0.05		ND				ND				ND				ND	
Copper	mg/L	0.01		ND				ND				ND				ND	
Iron	mg/L	0.03		ND				ND				ND				ND	
Lead	mg/L	0.05		ND				ND				ND				ND	
Manganese	mg/L	0.01		0.02				0.04				0.08				ND	
Mercury	mg/L	0.001		ND				ND				ND				ND	
Molybdenum	mg/L	0.1		ND				ND				ND				ND	
Nickel	mg/L	0.05		ND				ND				ND				ND	
Selenium	mg/L	0.001		0.009				ND				ND				ND	
Vanadium	mg/L	0.1		ND				ND				ND				ND	
Zinc	mg/L	0.01		ND				ND				ND				ND	

Radionuclides

Uranium	mg/L	0.0003		0.0106				0.0026				0.0049				0.006	
Radium 226				1.8				1.2				2.6				3.6	

Quality Control

A/C Balance (± 5)	%	250		-3.18				-2.57				-3.56				-2.91	
Anions	meq/L	250		5.11				6.45				7.15				7.05	
Cations	meq/L	250		4.8				6.12				6.66				6.65	
Solids, Total Dissolved Calculated	mg/L	250		301				389				414				414	
TDS Balance (0.80 - 1.20)	dec. %	250		1.06				1.07				1.07				1.08	

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Well ID	M-934	M-934	M-935	M-935	M-935	M-935	M-936	M-936	M-936	M-936	M-937	M-937	M-937	M-937	M-938		
	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1		
Analyte	Units	PQL	11/28/07	12/12/07	10/30/07	11/13/07	11/28/07	12/12/07	10/30/07	11/13/07	11/28/07	12/12/07	10/29/07	11/12/07	11/27/07	12/11/07	10/26/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	198	189	148	149	162	140	147	147	146	139	152	150	140	141	140
Carbonate as CO3	mg/L	1			ND				ND				ND				ND
Bicarbonate as HCO3	mg/L	1			181				179				185				171
Calcium	mg/L	1			92				87				100				121
Chloride	mg/L	1	5	5	4	4	5	4	3	3	4	4	2	ND	2	2	1
Fluoride	mg/L	0.1			0.5				0.5				0.5				0.5
Magnesium	mg/L	1			30				26				31				29
Nitrogen, Ammonia as N	mg/L	0.05			0.11				0.12				0.24				0.34
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1			ND				ND				ND				ND
Potassium	mg/L	1			8				9				9				10
Silica	mg/L	0.1			22.2				22.1				20.4				19.8
Sodium	mg/L	1			23				22				25				29
Sulfate	mg/L	1			263				234				288				356
Physical Properties																	
Conductivity	umhos/cm	1	724	696	852	878	904	863	803	816	838	807	816	873	904	887	920
pH	s.u.	0.01			7.46				7.61				7.53				7.62
Solids, Total Dissolved TDS @ 180 C	mg/L	10			600				538				545				627
Trace Metals																	
Aluminum	mg/L	0.1			ND				ND				ND				ND
Arsenic	mg/L	0.001			0.014				0.014				0.016				0.011
Barium	mg/L	0.1			ND				ND				ND				ND
Boron	mg/L	0.1			ND				ND				ND				ND
Cadmium	mg/L	0.005			ND				ND				ND				ND
Chromium	mg/L	0.05			ND				ND				ND				ND
Copper	mg/L	0.01			ND				ND				ND				ND
Iron	mg/L	0.03			ND				ND				ND				ND
Lead	mg/L	0.05			ND				ND				ND				ND
Manganese	mg/L	0.01			0.09				0.05				0.09				0.04
Mercury	mg/L	0.001			ND				ND				ND				ND
Molybdenum	mg/L	0.1			ND				ND				ND				ND
Nickel	mg/L	0.05			ND				ND				ND				ND
Selenium	mg/L	0.001			ND				ND				ND				ND
Vanadium	mg/L	0.1			ND				ND				ND				ND
Zinc	mg/L	0.01			ND				ND				ND				ND
Radionuclides																	
Uranium	mg/L	0.0003							0.0029				0.0014				0.0036
Radium 226									4.7				1.9				4.9
Quality Control																	
A/C Balance (± 5)	%	250							-1.84				-1.3				-1.49
Anions	meq/L	250							7.92				9.12				10.3
Cations	meq/L	250							7.63				8.88				9.99
Solids, Total Dissolved Calculated	mg/L	250							491				567				652
TDS Balance (0.80 - 1.20)	dec. %	250							1.1				0.96				0.96

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Well ID	M-938	M-938	M-938	M-939	M-939	M-939	M-939	M-940	M-940	M-940	M-940	M-941	M-941	M-941	M-941		
	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4		
Analyte	Units	PQL	11/09/07	11/27/07	12/11/07	10/26/07	11/09/07	11/27/07	12/11/07	10/26/07	11/09/07	11/26/07	12/10/07	10/25/07	11/08/07	11/26/07	12/10/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	142	151	148	143	146	150	145	171	166	165	161	164	162	176	176
Carbonate as CO3	mg/L	1				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1				174				208				199			
Calcium	mg/L	1				102				127				115			
Chloride	mg/L	1	2	2	2	2	ND	3	2	1	1	1	ND	2	ND	ND	ND
Fluoride	mg/L	0.1				0.4				0.5				0.4			
Magnesium	mg/L	1				26				41				29			
Nitrogen, Ammonia as N	mg/L	0.05				0.24				0.1				0.46			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1				ND				ND				ND			
Potassium	mg/L	1				11				9				11			
Silica	mg/L	0.1				20.6				19.7				19.7			
Sodium	mg/L	1				28				28				27			
Sulfate	mg/L	1				288				401				335			
Physical Properties																	
Conductivity	umhos/cm	1	830	1080	1040	821	1000	986	958	1030	727	1070	1020	918	1030	1140	1100
pH	s.u.	0.01				7.46				7.44				7.56			
Solids, Total Dissolved TDS @ 180 C	mg/L	10				549				706				637			
Trace Metals																	
Aluminum	mg/L	0.1				ND				ND				ND			
Arsenic	mg/L	0.001				0.035				0.031				0.009			
Barium	mg/L	0.1				ND				ND				ND			
Boron	mg/L	0.1				ND				ND				ND			
Cadmium	mg/L	0.005				ND				ND				ND			
Chromium	mg/L	0.05				ND				ND				ND			
Copper	mg/L	0.01				ND				ND				ND			
Iron	mg/L	0.03				0.19				0.05				0.04			
Lead	mg/L	0.05				ND				ND				ND			
Manganese	mg/L	0.01				0.08				0.17				0.05			
Mercury	mg/L	0.001				ND				ND				ND			
Molybdenum	mg/L	0.1				ND				ND				ND			
Nickel	mg/L	0.05				ND				ND				ND			
Selenium	mg/L	0.001				ND				ND				ND			
Vanadium	mg/L	0.1				ND				ND				ND			
Zinc	mg/L	0.01				ND				ND				ND			
Radionuclides																	
Uranium	mg/L	0.0003				0.002				0.0053				0.0051			
Radium 226						3				53				2.5			
Quality Control																	
A/C Balance (± 5)	%	250				-0.917				-2.8				-3.34			
Anions	meq/L	250				8.94				11.8				10.3			
Cations	meq/L	250				8.78				11.2				9.64			
Solids, Total Dissolved Calculated	mg/L	250				564				730				637			
TDS Balance (0.80 - 1.20)	dec. %	250				0.97				0.97				1			

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Well ID	M-942	M-942	M-942	M-942	M-943	M-943	M-943	M-943	M-944	M-944	M-944	M-944	M-945	M-945	M-945		
																Round	Round 1
Analyte	Units	PQL	10/25/07	11/08/07	11/26/07	12/10/07	10/26/07	11/09/07	11/27/07	12/11/07	10/26/07	11/09/07	11/26/07	12/10/07	10/26/07	11/09/07	11/27/07
Major Ions																	
Alkalinity, Total as CaCO3	mg/L	1	177	176	182	183	185	182	184	179	184	180	174	177	161	164	183
Carbonate as CO3	mg/L	1	ND				ND				ND				ND		
Bicarbonate as HCO3	mg/L	1	216				226				225				197		
Calcium	mg/L	1	128				119				112				96		
Chloride	mg/L	1	ND	1	ND	ND											
Fluoride	mg/L	0.1	0.4				0.5				0.4				0.5		
Magnesium	mg/L	1	31				38				35				25		
Nitrogen, Ammonia as N	mg/L	0.05	0.64				0.15				0.17				0.36		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND		
Potassium	mg/L	1	14				9				11				10		
Silica	mg/L	0.1	19.9				18				18.7				16.4		
Sodium	mg/L	1	27				26				26				26		
Sulfate	mg/L	1	364				337				307				258		
Physical Properties																	
Conductivity	umhos/cm	1	990	1040	1120	1060	966	938	1030	979	905	19200	952	911	785	1930	904
pH	s.u.	0.01	7.81				7.53				7.69				7.67		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	695				646				594				490		
Trace Metals																	
Aluminum	mg/L	0.1	ND				ND				ND				ND		
Arsenic	mg/L	0.001	0.006				0.003				0.002				0.002		
Barium	mg/L	0.1	ND				ND				ND				ND		
Boron	mg/L	0.1	ND				ND				ND				ND		
Cadmium	mg/L	0.005	ND				ND				ND				ND		
Chromium	mg/L	0.05	ND				ND				ND				ND		
Copper	mg/L	0.01	ND				ND				ND				ND		
Iron	mg/L	0.03	ND				0.04				0.03				ND		
Lead	mg/L	0.05	ND				ND				ND				ND		
Manganese	mg/L	0.01	0.04				0.09				0.09				0.06		
Mercury	mg/L	0.001	ND				ND				ND				ND		
Molybdenum	mg/L	0.1	ND				ND				ND				ND		
Nickel	mg/L	0.05	ND				ND				ND				ND		
Selenium	mg/L	0.001	0.001				ND				ND				ND		
Vanadium	mg/L	0.1	ND				ND				ND				ND		
Zinc	mg/L	0.01	ND				ND				ND				ND		
Radionuclides																	
Uranium	mg/L	0.0003	0.006				0.0055				0.006				0.0055		
Radium 226			3.7				2.7				6				11		
Quality Control																	
A/C Balance (± 5)	%	250	-2.76				-1.56				-0.858				-2.37		
Anions	meq/L	250	11.2				10.7				10.1				8.66		
Cations	meq/L	250	10.6				10.4				9.93				8.26		
Solids, Total Dissolved Calculated	mg/L	250	692				659				622				530		
TDS Balance (0.80 - 1.20)	dec. %	250	1				0.98				0.95				0.92		

Smith Ranch Project

Mine Unit-9

Wells M-901 through M-951

Well ID	M-945	M-946	M-946	M-946	M-946	M-947	M-947	M-947	M-947	M-948	M-948	M-948	M-948	M-949	M-949		
Round	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2		
Analyte	Units	PQL	12/11/07	10/25/07	11/08/07	11/26/07	12/10/07	10/25/07	11/08/07	11/26/07	12/10/07	10/25/07	11/08/07	11/26/07	12/10/07	10/25/07	11/08/07

Major Ions

Alkalinity, Total as CaCO3	mg/L	1	177	150	150	162	162	187	178	181	174	178	169	181	177	162	176
Carbonate as CO3	mg/L	1		ND				ND				ND				ND	
Bicarbonate as HCO3	mg/L	1		182				228				217				197	
Calcium	mg/L	1		92				96				102				95	
Chloride	mg/L	1	ND	1	1	2	ND	ND	1	2	ND	1	ND	ND	ND	1	ND
Fluoride	mg/L	0.1		0.4				0.4				0.4				0.4	
Magnesium	mg/L	1		24				30				28				27	
Nitrogen, Ammonia as N	mg/L	0.05		0.68				0.56				0.22				0.35	
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1		ND				ND				ND				ND	
Potassium	mg/L	1		9				8				9				9	
Silica	mg/L	0.1		16.2				18.3				18				17.2	
Sodium	mg/L	1		23				23				23				23	
Sulfate	mg/L	1		246				261				262				245	

Physical Properties

Conductivity	umhos/cm	1	878	743	789	841	824	822	868	907	881	810	865	880	840	764	862
pH	s.u.	0.01		7.73				7.46				7.73				7.71	
Solids, Total Dissolved TDS @ 180 C	mg/L	10		486				544				554				503	

Trace Metals

Aluminum	mg/L	0.1		ND				ND				ND				ND	
Arsenic	mg/L	0.001		0.002				0.003				0.001				0.002	
Barium	mg/L	0.1		ND				0.1				ND				ND	
Boron	mg/L	0.1		ND				ND				ND				ND	
Cadmium	mg/L	0.005		ND				ND				ND				ND	
Chromium	mg/L	0.05		ND				ND				ND				ND	
Copper	mg/L	0.01		ND				ND				ND				ND	
Iron	mg/L	0.03		NDND				0.27				ND				ND	
Lead	mg/L	0.05		ND				ND				ND				ND	
Manganese	mg/L	0.01						0.07				0.06				0.09	
Mercury	mg/L	0.001		0.05				ND				ND				ND	
Molybdenum	mg/L	0.1		ND				ND				ND				ND	
Nickel	mg/L	0.05		ND				ND				ND				ND	
Selenium	mg/L	0.001		ND				ND				ND				ND	
Vanadium	mg/L	0.1		ND				ND				ND				ND	
Zinc	mg/L	0.01		ND				ND				ND				ND	

Radionuclides

Uranium	mg/L	0.0003		0.0057				0.0028				0.0115				0.003	
Radium 226				10.9				2.5				9.6				7.4	

Quality Control

A/C Balance (± 5)	%	250		-2.17				-3.61				-2.13				-0.977	
Anions	meq/L	250		8.16				9.21				9.07				8.39	
Cations	meq/L	250		7.82				8.57				8.69				8.24	
Solids, Total Dissolved Calculated	mg/L	250		501				550				552				515	
TDS Balance (0.80 - 1.20)	dec. %	250		0.97				0.99				1				0.98	

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Analyte	Units	Well ID	M-949	M-949	M-950	M-950	M-950	M-950	M-951	M-951	M-951	M-951
		Round	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
		PQL	11/26/07	12/10/07	10/30/07	11/13/07	11/27/07	12/11/07	10/30/2007	11/13/2007	11/27/2007	12/11/2007
Major Ions												
Alkalinity, Total as CaCO3	mg/L	1	182	177	173	179	170	167	159	169	160	165
Carbonate as CO3	mg/L	1			ND				ND			
Bicarbonate as HCO3	mg/L	1			211				194			
Calcium	mg/L	1			93				114			
Chloride	mg/L	1	ND	ND	ND	1						
Fluoride	mg/L	0.1			0.5				0.5			
Magnesium	mg/L	1			26				30			
Nitrogen, Ammonia as N	mg/L	0.05			0.2				0.16			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1			ND				ND			
Potassium	mg/L	1			10				12			
Silica	mg/L	0.1			16.8				16			
Sodium	mg/L	1			23				24			
Sulfate	mg/L	1			231				315			
Physical Properties												
Conductivity	umhos/cm	1	882	845	822	853	872	840	969	1000	1020	989
pH	s.u.	0.01			7.75				7.73			
Solids, Total Dissolved TDS @ 180 C	mg/L	10			546				673			
Trace Metals												
Aluminum	mg/L	0.1			ND				ND			
Arsenic	mg/L	0.001			0.002				ND			
Barium	mg/L	0.1			ND				ND			
Boron	mg/L	0.1			ND				ND			
Cadmium	mg/L	0.005			ND				ND			
Chromium	mg/L	0.05			ND				ND			
Copper	mg/L	0.01			ND				ND			
Iron	mg/L	0.03			ND				ND			
Lead	mg/L	0.05			ND				ND			
Manganese	mg/L	0.01			0.09				0.1			
Mercury	mg/L	0.001			ND				ND			
Molybdenum	mg/L	0.1			ND				ND			
Nickel	mg/L	0.05			ND				ND			
Selenium	mg/L	0.001			ND				ND			
Vanadium	mg/L	0.1			ND				ND			
Zinc	mg/L	0.01			ND				ND			
Radionuclides												
Uranium	mg/L	0.0003			0.033				0.0043			
Radium 226					231				10.1			
Quality Control												
A/C Balance (± 5)	%	250			-1.45				-1.36			
Anions	meq/L	250			8.28				9.79			
Cations	meq/L	250			8.05				9.53			
Solids, Total Dissolved Calculated	mg/L	250			504				608			
TDS Balance (0.80 - 1.20)	dec. %	250			1.08				1.11			

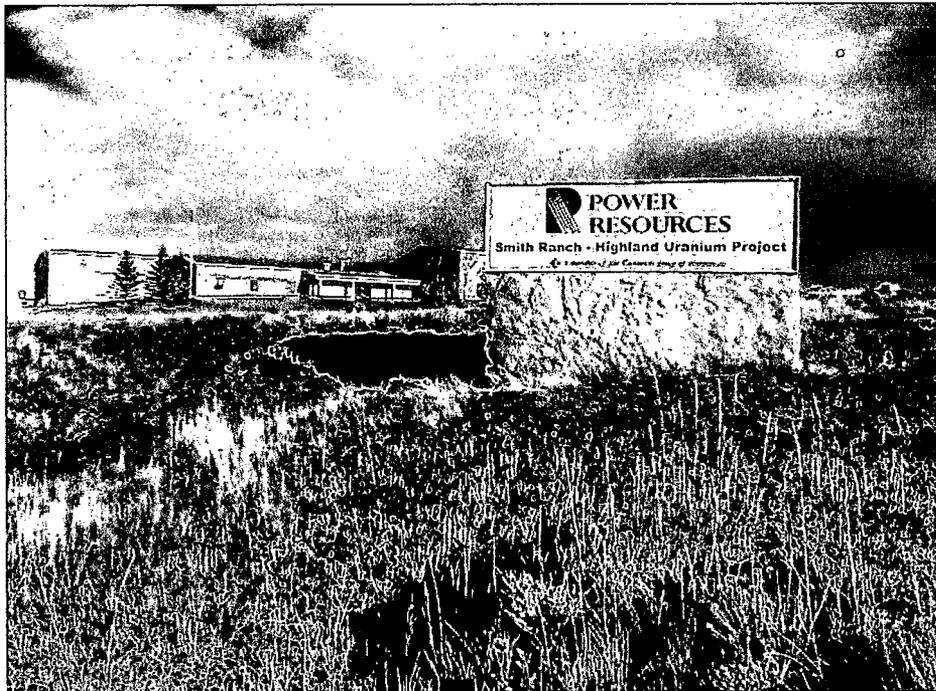
MEAN	STANDARD DEVIATION	MIN	MAX
180	31	115	267
3	2	1	8
867	146	518	1200

Smith Ranch Project
 Mine Unit-9
 Wells M-901 through M-951

Analyte	Units	Well ID Round	PQL	TOLERANCE		
				MIN	MAX	UCL
Major Ions						
Alkalinity, Total as CaCO3	mg/L	1	93	267	335	
Carbonate as CO3	mg/L	1				
Bicarbonate as HCO3	mg/L	1				
Calcium	mg/L	1				
Chloride	mg/L	1	-6	9	18	
Fluoride	mg/L	0.1				
Magnesium	mg/L	1				
Nitrogen, Ammonia as N	mg/L	0.05				
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1				
Potassium	mg/L	1				
Silica	mg/L	0.1				
Sodium	mg/L	1				
Sulfate	mg/L	1				
Physical Properties						
Conductivity	umhos/cm	1	456	1278	1597	
pH	s.u.	0.01				
Solids, Total Dissolved TDS @ 180 C	mg/L	10				
Trace Metals						
Aluminum	mg/L	0.1				
Arsenic	mg/L	0.001				
Barium	mg/L	0.1				
Boron	mg/L	0.1				
Cadmium	mg/L	0.005				
Chromium	mg/L	0.05				
Copper	mg/L	0.01				
Iron	mg/L	0.03				
Lead	mg/L	0.05				
Manganese	mg/L	0.01				
Mercury	mg/L	0.001				
Molybdenum	mg/L	0.1				
Nickel	mg/L	0.05				
Selenium	mg/L	0.001				
Vanadium	mg/L	0.1				
Zinc	mg/L	0.01				
Radionuclides						
Uranium	mg/L	0.0003				
Radium 226						
Quality Control						
A/C Balance (± 5)	%	250				
Anions	meq/L	250				
Cations	meq/L	250				
Solids, Total Dissolved Calculated	mg/L	250				
TDS Balance (0.80 - 1.20)	dec. %	250				

**CAMECO RESOURCES
HIGHLAND URANIUM PROJECT**

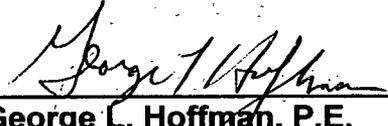
MINE UNIT 9 HYDROLOGIC TEST REPORT



**For:
WDEQ/LQD
Permit No. 63
NRC License SUA-1548
Docket 40-8964**

**By:
CAMECO Resources
and
Hydro-Engineering, L.L.C.**

January, 2008


**George L. Hoffman, P.E.
Hydrologist**

4/17/08

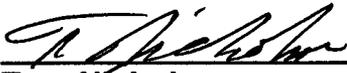

**Tom Nicholson
Geologist**



TABLE OF CONTENTS

Executive Summary.....	x
1.0 INTRODUCTION.....	1-1
2.0 SITE-SPECIFIC HYDROGEOLOGIC CONDITIONS.....	2-1
2.1 Overlying Units: L Shale Confining Unit and M Sand.....	2-2
2.2 Underlying Units: J Shale Confining Unit and I Sand.....	2-2
2.3 Production Zone: K Sand.....	2-2
2.4 Potentiometric Surface of the K Sand.....	2-3
3.0 MONITOR WELL SPACING AND COMPLETION.....	3-1
3.1 Well Spacing.....	3-1
3.2 Well Installation and Completion.....	3-1
3.3 Abandonment of Existing Wells.....	3-2
4.0 PUMP TEST DESIGN AND WATER LEVEL DATA FOR 9PW-2A TEST.....	4-1
4.1 Test Design.....	4-1
4.2 Equipment Layout.....	4-1
4.3 Background Monitoring, Test Procedures and Data Collection.....	4-2
5.0 ANALYTICAL METHODS AND TEST RESULTS – PRODUCTION ZONES FOR 9PW-2A TEST.....	5-1
5.1 Analytical Methods.....	5-1
5.2 Background Trends.....	5-2
5.3 Test Results.....	5-2
5.3.1 Drawdown.....	5-2
5.3.2 Analytical Results.....	5-3
5.4 Directional Transmissivity.....	5-3
6.0 TEST RESULTS – CONFINING UNITS FOR 9PW-2A TEST.....	6-1
6.1 Hydraulic Conductivity of Confining Units.....	6-1
6.2 Overlying Aquifers.....	6-1
6.3 Underlying Aquifers.....	6-1
6.4 Integrity of Confining Units.....	6-2
7.0 PUMP TEST DESIGN AND WATER LEVEL DATA FOR 9PW-1 TEST.....	7-1
7.1 Test Design.....	7-1
7.2 Equipment Layout.....	7-1
7.3 Background Monitoring, Test Procedures and Data Collection.....	7-2
8.0 ANALYTICAL METHODS AND TEST RESULTS – PRODUCTION ZONES FOR 9PW-1 TEST.....	8-1
8.1 Analytical Methods.....	8-1

TABLE OF CONTENTS
(continued)

8.2 Background Trends.....	8-1
8.3 Test Results	8-2
8.3.1 Drawdown	8-2
8.3.2 Analytical Results.....	8-3
8.4 Directional Transmissivity	8-3
9.0 TEST RESULTS – CONFINING UNITS FOR 9PW-1 TEST.....	9-1
9.1 Hydraulic Conductivity of Confining Units	9-1
9.2 Overlying Aquifers.....	9-1
9.3 Underlying Aquifers.....	9-1
9.4 Integrity of Confining Units	9-2
10.0 SUMMARY AND CONCLUSIONS.....	10-1
11.0 REFERENCES	11-1

LIST OF TABLES

Table	Page
3-1 MU-9 MONITOR WELL INFORMATION	3-3
4-1 MONITORING WELLS DISTANCE AND DRAWDOWN AT THE END OF THE 9PW-2A TEST	4-3
4-2 DATA LOGGER AND TRANSDUCER EQUIPMENT FOR MONITORING WELLS FOR THE 9PW-2A TEST	4-4
4-3 FLOWRATE VS. TIME FOR PUMPING WELL 9PW-2A	4-5
5-1 SUMMARY OF AQUIFER PROPERTIES FOR 9PW-2A TEST	5-4
7-1 MONITORING WELLS DISTANCE AND DRAWDOWN AT THE END OF 9PW-1 TEST	7-1
7-2 DATA LOGGER AND TRANSDUCER EQUIPMENT FOR MONITORING WELLS FOR THE 9PW-1 TEST	7-2
7-3 FLOWRATE VS. TIME FOR PUMPING WELL 9PW-1	7-3
8-1 SUMMARY OF AQUIFER PROPERTIES FOR 9PW-1 TEST	8-1

LIST OF FIGURES

Figure	Page
1-1 MINE UNIT 9 LOCATION MAP	1-2
1-2 MINE UNIT 9 PLAN MAP	1-3
2-1 MINE UNIT 9 CROSS SECTION INDEX AND MONITOR WELL LOCATION MAP	2-4
2-2 GEOLOGIC CROSS SECTION A-A ¹	2-5
2-3 GEOLOGIC CROSS SECTION B-B ¹	2-6
2-4 GEOLOGIC CROSS SECTION 1-1 ¹	2-7
2-5 GEOLOGIC CROSS SECTION 2-2 ¹	2-8
2-6 GEOLOGIC CROSS SECTION 3-3 ¹	2-9
2-7 GEOLOGIC CROSS SECTION 4-4 ¹	2-10
2-8 MINE UNIT 9 OVERLYING M SAND ISOPACH MAP	2-11
2-9 MINE UNIT 9 OVERLYING L SHALE ISOPACH MAP	2-12
2-10 MINE UNIT 9 PRODUCTION K SAND ISOPACH MAP	2-13
2-11 MINE UNIT 9 UNDERLYING J SHALE ISOPACH MAP	2-14
2-12 MINE UNIT 9 UNDERLYING I SAND ISOPACH MAP	2-15
2-13 INITIAL POTENTIOMETRIC SURFACE MAP: K SAND; FT-MSL	2-16
4-1 DATA LOGGER AND TRANSDUCER EQUIPMENT LAYOUT FOR THE 9PW-2A TEST	4-6

LIST OF FIGURES (continued)

Figure		Page
4-2	DEPTH TO WATER VERSUS TIME FOR PUMPING WELL 9PW-2A.....	4-7
4-3	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-3A, 9MP-7A AND M-950.....	4-8
4-4	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-6, 9MP-2, M-948 AND M-903.....	4-9
4-5	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-5 AND M-949.....	4-10
4-6	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-901, M-902, M-904 AND M-906.....	4-11
4-7	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-1A AND M-947.....	4-12
4-8	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-8 AND M-945.....	4-13
4-9	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-9, M-913, M-914, M-943 AND M-944.....	4-14
4-10	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-10 AND M-917.....	4-15
4-11	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-905A, M-909A AND M-910.....	4-16
4-12	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-907 AND M-908.....	4-17
4-13	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-911.....	4-18
4-14	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-912 AND M-951.....	4-19
4-15	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-915 AND M-916.....	4-20
4-16	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-941, M-942 AND M-946.....	4-21
5-1	K SAND MAXIMUM DRAWDOWN FOR THE MU 9PW-2A PUMP TEST, IN FEET.....	5-5
5-2	DRAWDOWN IN PUMPING WELL 9PW-2A, SEMI-LOG.....	5-6
5-3	RECOVERY IN PUMPING WELL 9PW-2A.....	5-7
5-4	DRAWDOWN IN OBSERVATION WELLS 9MP-2, 9MP-3A, 9MP-6 AND 9MP-7A, SEMI-LOG.....	5-8
5-5	DRAWDOWN IN OBSERVATION WELL 9MP-7A, LOG-LOG.....	5-9
5-6	DRAWDOWN IN OBSERVATION WELLS 9MP-4, 9MP-5, 9MP-8 AND 9MP-9, SEMI-LOG.....	5-10
5-7	DRAWDOWN IN OBSERVATION WELL 9MP-4, LOG-LOG.....	5-11
5-8	DRAWDOWN IN OBSERVATION WELL 9MP-9, LOG-LOG.....	5-12

LIST OF FIGURES

(continued)

Figure		Page
5-9	DRAWDOWN IN OBSERVATION WELLS 9MP-1A, 9MP-10, M-901 AND M-902 SEMI-LOG	5-13
5-10	DRAWDOWN IN OBSERVATION WELL 9MP-1A, LOG-LOG	5-14
5-11	DRAWDOWN IN OBSERVATION WELL 9MP-10, LOG-LOG	5-15
5-12	DRAWDOWN IN OBSERVATION WELL M-901, LOG-LOG	5-16
5-13	DRAWDOWN IN OBSERVATION WELL M-902, LOG-LOG	5-17
5-14	DRAWDOWN IN OBSERVATION WELLS M-903, M-904, M-905A M-906 AND M-907 SEMI-LOG	5-18
5-15	DRAWDOWN IN OBSERVATION WELL M-903, LOG-LOG	5-19
5-16	DRAWDOWN IN OBSERVATION WELL M-904, LOG-LOG	5-20
5-17	DRAWDOWN IN OBSERVATION WELL M-905A, LOG-LOG	5-21
5-18	DRAWDOWN IN OBSERVATION WELL M-906, LOG-LOG	5-22
5-19	DRAWDOWN IN OBSERVATION WELL M-907, LOG-LOG	5-23
5-20	DRAWDOWN IN OBSERVATION WELLS M-908, M-909A, M-910 M-911 AND M-912 SEMI-LOG	5-24
5-21	DRAWDOWN IN OBSERVATION WELL M-908, LOG-LOG	5-25
5-22	DRAWDOWN IN OBSERVATION WELL M-909A, LOG-LOG	5-26
5-23	DRAWDOWN IN OBSERVATION WELL M-910, LOG-LOG	5-27
5-24	DRAWDOWN IN OBSERVATION WELLS M-913, M-914, M-915, M-916 AND M-917 SEMI-LOG	5-28
5-25	DRAWDOWN IN OBSERVATION WELL M-915, LOG-LOG	5-29
5-26	DRAWDOWN IN OBSERVATION WELL M-916, LOG-LOG	5-30
5-27	DRAWDOWN IN OBSERVATION WELL M-917, LOG-LOG	5-31
5-28	DRAWDOWN IN OBSERVATION WELLS M-941, M-942, M-943, M-944 AND M-945, SEMI-LOG	5-32
5-29	DRAWDOWN IN OBSERVATION WELL M-941, LOG-LOG	5-33
5-30	DRAWDOWN IN OBSERVATION WELL M-942, LOG-LOG	5-34
5-31	DRAWDOWN IN OBSERVATION WELL M-943, LOG-LOG	5-35
5-32	DRAWDOWN IN OBSERVATION WELL M-944, LOG-LOG	5-36
5-33	DRAWDOWN IN OBSERVATION WELLS M-946, M-947, M-948, M-949 M-950 AND M-951, SEMI-LOG	5-37
5-34	DRAWDOWN IN OBSERVATION WELL M-946, LOG-LOG	5-38
5-35	DRAWDOWN IN OBSERVATION WELL M-947, LOG-LOG	5-39
5-36	DRAWDOWN IN OBSERVATION WELL M-948, LOG-LOG	5-40
5-37	DRAWDOWN IN OBSERVATION WELL M-949, LOG-LOG	5-41
5-38	DRAWDOWN IN OBSERVATION WELL M-950, LOG-LOG	5-42
5-39	DRAWDOWN IN OBSERVATION WELL M-951, LOG-LOG	5-43
6-1	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-3 & 9MO-7	6-3
6-2	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-5 & 9MO-6A	6-4

LIST OF FIGURES
(continued)

Figure		Page
6-3	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-2 & 9MO-4	6-5
6-4	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-1B & 9MO-8	6-6
6-5	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELL 9MO-9A	6-7
6-6	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELL 9MU-7A	6-8
6-7	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELLS 9MU-1A AND 9MU-6A	6-9
6-8	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELLS 9MU-2, 9MU-5A & 9MU-8	6-10
6-9	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELLS 9MU-3 & MU-9B	6-11
6-10	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELL 9MU-4	6-12
7-1	DATA LOGGER AND TRANSDUCER EQUIPMENT LAYOUT FOR THE 9PW-1 TEST	7-6
7-2	DEPTH TO WATER VERSUS TIME OF PUMPING WELL 9PW-1	7-7
7-3	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-11, 9MP-12 AND M-937	7-8
7-4	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-13, 9MP-14, M-918, M-919 AND M-927A	7-9
7-5	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-10, M-917, M-921A, M-923, M-925A	7-10
7-6	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-9, M-939, M-940	7-11
7-7	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-916	7-12
7-8	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-920, M-926, M-929 AND M-936	7-13
7-9	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-922	7-14
7-10	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-924A AND M-930	7-15
7-11	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-928 AND M-931	7-16
7-12	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-932	7-17
7-13	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-933A	7-18

LIST OF FIGURES
(continued)

Figure		Page
7-14	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-934 AND M-935	7-19
7-15	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-938	7-20
7-16	DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-941 AND M-942	7-21
8-1	K SAND MAXIMUM DRAWDOWN FOR THE MU 9PW-1 PUMP TEST, IN FEET	8-5
8-2	DRAWDOWN IN PUMPING WELL 9PW-1, SEMI-LOG	8-6
8-3	RECOVERY IN PUMPING WELL 9PW-1	8-7
8-4	DRAWDOWN IN OBSERVATION WELLS 9MP-11, 9MP-12, M-921A AND M-922, SEMI-LOG	8-8
8-5	DRAWDOWN IN OBSERVATION WELL 9MP-11, LOG-LOG	8-9
8-6	DRAWDOWN IN OBSERVATION WELL 9MP-12, LOG-LOG	8-10
8-7	DRAWDOWN IN OBSERVATION WELLS 9MP-10, 9MP-13, 9MP-14 AND M-916, SEMI-LOG	8-11
8-8	DRAWDOWN IN OBSERVATION WELL 9MP-10, LOG-LOG	8-12
8-9	DRAWDOWN IN OBSERVATION WELL 9MP-13, LOG-LOG	8-13
8-10	DRAWDOWN IN OBSERVATION WELL 9MP-14, LOG-LOG	8-14
8-11	DRAWDOWN IN OBSERVATION WELL M-916, LOG-LOG	8-15
8-12	DRAWDOWN IN OBSERVATION WELLS M-917, M-918, M-919, M-920 AND 9MP-9, SEMI-LOG	8-16
8-13	DRAWDOWN IN OBSERVATION WELL M-917, LOG-LOG	8-17
8-14	DRAWDOWN IN OBSERVATION WELL M-918, LOG-LOG	8-18
8-15	DRAWDOWN IN OBSERVATION WELL M-919, LOG-LOG	8-19
8-16	DRAWDOWN IN OBSERVATION WELLS M-923, M-924A, M-925A, AND M-926 SEMI-LOG	8-20
8-17	DRAWDOWN IN OBSERVATION WELL M-924A, LOG-LOG	8-21
8-18	DRAWDOWN IN OBSERVATION WELL M-925A, LOG-LOG	8-22
8-19	DRAWDOWN IN OBSERVATION WELL M-926, LOG-LOG	8-23
8-20	DRAWDOWN IN OBSERVATION WELLS M-927A, M-928, M-929 AND M-930, SEMI-LOG	8-24
8-21	DRAWDOWN IN OBSERVATION WELL M-927A, LOG-LOG	8-25
8-22	DRAWDOWN IN OBSERVATION WELL M-928, LOG-LOG	8-26
8-23	DRAWDOWN IN OBSERVATION WELL M-929, LOG-LOG	8-27
8-24	DRAWDOWN IN OBSERVATION WELL M-930, LOG-LOG	8-28
8-25	DRAWDOWN IN OBSERVATION WELLS M-931, M-932, M-933A AND M-934, SEMI-LOG	8-29
8-26	DRAWDOWN IN OBSERVATION WELL M-931, LOG-LOG	8-30
8-27	DRAWDOWN IN OBSERVATION WELL M-932, LOG-LOG	8-31
8-28	DRAWDOWN IN OBSERVATION WELL M-933A, LOG-LOG	8-32

LIST OF FIGURES
(continued)

Figure		Page
8-29	DRAWDOWN IN OBSERVATION WELL M-934, LOG-LOG	8-33
8-30	DRAWDOWN IN OBSERVATION WELLS M-935, M-936, M-937 AND M-938, SEMI-LOG	8-34
8-31	DRAWDOWN IN OBSERVATION WELL M-935, LOG-LOG	8-35
8-32	DRAWDOWN IN OBSERVATION WELL M-936, LOG-LOG	8-36
8-33	DRAWDOWN IN OBSERVATION WELL M-937, LOG-LOG	8-37
8-34	DRAWDOWN IN OBSERVATION WELL M-938, LOG-LOG	8-38
8-35	DRAWDOWN IN OBSERVATION WELLS M-939, M-940, M-941 AND M-942, SEMI-LOG	8-39
8-36	DRAWDOWN IN OBSERVATION WELL M-939, LOG-LOG	8-40
8-37	DRAWDOWN IN OBSERVATION WELL M-940, LOG-LOG	8-41
8-38	DRAWDOWN IN OBSERVATION WELL M-941, LOG-LOG	8-42
8-39	DRAWDOWN IN OBSERVATION WELL M-942, LOG-LOG	8-43
9-1	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-10, 9MO-11A AND 9MO-12	9-3
9-2	DEPTH TO WATER VERSUS TIME FOR OVERLYING AQUIFER WELLS 9MO-13 AND 9MO-14.....	9-4
9-3	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELL 9MU-10.....	9-5
9-4	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELLS 9MU-11, 9MU-13 AND 9MU-14	9-6
9-5	DEPTH TO WATER VERSUS TIME FOR UNDERLYING AQUIFER WELL 9MU-12.....	9-7

APPENDICES

A – GEOLOGIC LOGS

B – COMPLETION REPORTS

C – WATER LEVEL DATA FOR 9PW-2A

C.1 - TRANSDUCER WATER LEVEL DATA FOR 9PW-2A TEST

C.1-1 DEPTH TO WATER DATA: 9PW-2A

C.1-2 DEPTH TO WATER DATA: MP WELLS FOR 9PW-2A TEST

C.1-3 DEPTH TO WATER DATA: M WELLS FOR 9PW-2A TEST

C.1-4 DEPTH TO WATER DATA: OVERLYING AND UNDERLYING
WELLS FOR 9PW-2A TEST

C.2 – MANUAL WATER LEVEL DATA FOR 9PW-2A TEST

D - WATER LEVEL DATA FOR 9PW-1

D.1 – TRANSDUCER WATER LEVEL DATA FOR 9PW-1 TEST

D.1-1 DEPTH TO WATER DATA: 9PW-1

D.1-2 DEPTH TO WATER DATA: MP WELLS FOR 9PW-1 TEST

D.1-3 DEPTH TO WATER DATA: M WELLS FOR 9PW-1 TEST

D.1-4 DEPTH TO WATER DATA: OVERLYING AND UNDERLYING
WELLS FOR 9PW-1 TEST

D.2 – MANUAL WATER LEVEL DATA FOR 9PW-1 TEST

E – AQUIFER-TEST THEORY

F - ALL WATER LEVEL DATA – CD ROM

EXECUTIVE SUMMARY

The Mine Unit 9 (MU9) Hydrologic Test Plan was submitted in 2007 by Power Resources, Inc. (PRI 2007), now Cameco Resources, and two multi-well pump tests were conducted in September of 2007. The wells were pumped at rates of 29.0 and 26.5 gpm each for roughly 3 days creating greater than 45 and 63 feet of drawdown. These two separate stresses on the K Sand aquifer resulted in drawdowns in the K Sand monitoring wells including the monitoring ring wells of 1.4 to 20.5 feet. Communication with each of the monitoring ring was defined.

The MU9 pump test data shows adequate confinement between the K Sand and the Overlying and Underlying aquifers.

The two MU9 pump tests produced average transmissivities of 121 and 166 ft²/day and average hydraulic conductivities of 1.47 and 1.84 ft/day. The average storage coefficients were 7.7E-5 and 7.0E-5 for the two tests.

This MU9 hydrologic test demonstrated the following:

- 1) All K Sand monitoring ring wells are in communication with the K Sand production zone.**
- 2) Adequate confinement exists between the K Sand aquifer and the Overlying and Underlying aquifers.**
- 3) The K Sand aquifer characteristics have been adequately defined.**

1.0 INTRODUCTION

The Smith Ranch-Highland Uranium Project (SR-HUP) is located in the southern Powder River Basin of east central Wyoming, within Converse County. Power Resources, Inc. (PRI) has been developing and extracting uranium from in-situ leach (ISL) wellfields within the Smith Ranch-Highland Sand Group since 1988. This pump test provides the hydrogeologic testing results for Mine Unit 9. The report presents the information necessary to initiate operation of the MU9.

Mine Unit 9 is located in Sections 7, 8, 17 and 18 of T35N, R74W. The present mine permit does not include Section 7 and therefore the request for approval to mine MU9 does not include Section 7. An amendment to the permit area will be obtained prior to the request to mine the Section 7 portion of MU9. Figure 1-1 shows MU9 and its relationship to adjacent wellfields and the Central Processing Plant. Figure 1-2 presents a preliminary wellfield outline, monitoring well locations, and the pumping well locations. Two separate multi-well pump tests were used to define conditions for MU9. Mining operations in Mine Unit 9 are regulated under PRI's Source Material License #SUA-1548 and the Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD) permit #633.

The objectives of the pump tests described, as stated in the NRC License Application, are to:

1. Determine the hydrologic characteristics of the Production Zone (K Sand) Aquifer;
2. Demonstrate hydrologic communication between the Production Zone and the surrounding Production Zone monitor well ring;
3. Assess the presence of hydrologic boundaries, if any, within the Production Zone Aquifer;
4. Evaluate the degree of hydrologic communication, if any, between the Production Zone and the Overlying and Underlying aquifers; and,
5. Evaluate, if applicable, the vertical hydraulic conductivity of the overlying and underlying confining units.

Mine Unit 9 production is anticipated to begin in 2008. The pump tests were conducted in September of 2007 with pumping beginning at 11:00 on September 10, 2007 ending at 13:10 on September 13, 2007 for the 9PW-2A multi-well test while pumping for the 9PW-1 multi-well test was from 9:15 September 25, 2007 through 21:00 on September 28, 2007.

The nearest existing ISL Wellfield production is Mine Unit 15 which is approximately two miles east of Mine Unit 9, in the O Sand (Figure 1-1). Mine Units 4 and 4A with production in the M Sand exist slightly greater than two and one-half miles to the northeast. No previously existing surface or underground uranium mining operations exist within a mile of MU9. A closed surface coal mine is located just southwest of the monitoring ring.

The site-specific hydrogeologic conditions are presented in Section 2 while monitor well information is given in Section 3. Pump test details are given in Sections 4 and 7 respectively for the 9PW-2A and the 9PW-1 pump tests. Sections 5 and 8 present the results from the production zone (K Sand) for the 9PW-2A and 9PW-1 multi-well tests respectively. Sections 6 and 9 give the confining unit results. Conclusions and references are presented in Sections 10 and 11 respectively.

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,**

**THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 1-2, "MINE
UNIT 9 PLAN MAP"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 1-2**

D-02

2.0 SITE-SPECIFIC HYDROGEOLOGIC CONDITIONS

Ore-grade uranium deposits underlying Smith Ranch are predominantly located at the top of the Paleocene Age Fort Union Formation. The upper portion of the Fort Union Formation is composed of interbedded, uranium-enriched, fluvial sandstones and shales. Sandstones vary widely in thickness depending on the coalescing nature of the fluvial deposited sandstone. The confining layers of the sandstones consist of the shales deposited from the distal overbank facies that thin away from the channels of major deposition. Based on site data, these confining layers are continuous across the MU9 area. The general stratigraphy underlying the site is summarized in the following tabulation.

GENERALIZED STRATIGRAPHIC SECTION WITHIN THE SMITH RANCH SOUTHWEST PERMIT AREA	
Depth (feet)	Description
0-70	Qal / E & G Sands (<i>of Kerr McGee</i>)
70-100	Glenrock Coal (<i>School Coal ??</i>)
100-120	X Shale
120-170	W Sand
170-260	V Shale
260-370	U Sand
370-400	T Shale
400-450	Q/S Sand
450-470	Coal (<i>Badger/Felix ??</i>)
470-500	R Shale
500-560	O Sand (<i>upper</i>)
560-600	P Shale
600-720	O Sand
720-730	N Shale
730-810	M Sand; Overlying Aquifer
810-830	L Shale; Confining Aquifer
830-920	K Sand; Production Aquifer
920-980	J Shale; Confining Layer
980-1090	I Sand; Underlying Aquifer

Commercial uranium deposits in the vicinity of MU9 are encountered in the K Sand, and consist of stacked, braided, fluvial sandstone units. The thickness of the K Sand is irregular as indicated by variable net sand thicknesses, grain size, and shale content, that is characteristic of many production host sand units in the Southern Powder River Basin. Six cross sections present the aquifer and aquitard information for MU9. Figure 2-1 shows the location of these cross sections. Cross sections A-A' (Figure 2-2) is a west-east cross section located in the northern portion of MU9 and cross section B-B' (Figure 2-3) is a southwest-northeast cross section. Cross sections 1-1' (Figure 2-4), 2-2' (Figure 2-5), 3-3' (Figure 2-6) and 4-4' (Figure 2-7) are generally north-south cross

sections. The K Sand generally has an Upper and Lower portion which are typically separated by 10 to 20 feet of shale.

The confining layers are composed of shales that form ubiquitous facies within the Smith Ranch Permit area. These confining layers were most likely deposited laterally away from the major braided channel systems as distal overbank facies. Figure 2-8 presents the overlying M Sand aquifer thickness. Figures 2-9, 2-10 and 2-11 present the L Shale, K Sand and J Shale isopach maps respectively for MU9. The thickness of the underlying aquifer, I Sand, is presented in Figure 2-12. Appendix A presents the geologic logs for the MU9 wells.

2.1 OVERLYING UNITS: L SHALE CONFINING UNIT AND M SAND

The L Shale is the overlying confining unit that separates the production sand (K Sand) from the overlying aquifer (M Sand). The M Sand thickness is typically 30 to 40 feet thick in this area. The M Sand thickness is presented on Figure 2-8. The M Sand is the production unit approximately two and one-half miles to the northeast in MU 4. The M Sand varies in thickness from less than 20 feet to greater than 60 feet within the MU9 ring. In general, the L Shale confining unit is continuous across the mine unit (see Figure 2-9). However, where the lower portion of the M Sand is present, the L Shale thins (slightly greater than 10 feet) (Figure 2-2; Cross section A-A') in the northeast end of the well patterns. The L Shale also thins to less than 20 feet at the southwest end of the MU9 wellfield (see Figure 2-7, cross section 4-4').

2.2 UNDERLYING UNITS: J SHALE CONFINING UNIT AND I SAND

The J Shale is the underlying confining unit that separates the K production sand from the underlying I Sand aquifer. Figure 2-11 gives the thickness of the J Shale. The I Sand is not a production unit near MU9. At some locations the upper I Sand exits resulting in a decrease in J Shale thickness between the K production sand and the underlying aquifer. The J Shale confining unit is continuous across the mine unit, but thins to 20 feet or larger in the 9MU14 area (see Figure 2-3; Cross section B-B').

2.3 PRODUCTION ZONE: K SAND

Commercial uranium deposits in the vicinity of MU9 occur in the K Sand, and consist of stacked, braided, fluvial sandstone units. The K Sand is irregular as indicated by variable sand thickness, grain size, and shale content that is characteristic of many production host sand units in the Southern Powder River Basin. The K Sand is composed of an upper and lower unit on the MU9 cross section. The top of the K Sand in MU9 is encountered at depths ranging from 800 to 940 feet below ground surface (bgs). The K Sand thickness within MU9 ranges from 75 to 135 (Figure 2-10) with an average thickness of 110 feet. The net sand thickness at well 9PW-2A and 9PW-1 are 82 and 90 feet respectively.

Groundwater investigations previously have been performed in the K Sand at Smith Ranch for the Southwest Regional Pump Test. The results from these tests indicate that the K Sand in the Upper Fort Union Formation is relatively homogenous and isotropic relative to the Southwest Pump Test results and the results from the two MU9 multi-well tests. The results from the Southwest Regional pump tests are summarized below.

SUMMARY OF RESULTS FROM THE K SAND SOUTHWEST REGIONAL PUMP TESTS				
Test	SWPW-2		SWPW-1	
Transmissivity (T; ft ² /d)	120		180	
Hyd. Cond. (k; ft/day)	1.33		2.00	
Net Sand Thickness (h; ft)	90		90	
Storativity (S)	9.1E-5		7.6E-5	

2.4 POTENTIOMETRIC SURFACE OF THE K SAND

Figure 2-13 is a potentiometric surface map of the K Sand Production Zone within the MU9 area based on water level just prior to the start of the two pump tests. The water level elevations were very similar in the overlapping wells allowing the water-level elevation prior to the two pump tests to be used to develop one piezometric map. The gradient in the well field area of MU9 is to the east-northeast at 0.0009 ft/ft.

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-2, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION A-A"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-2**

D-03

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-3, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION B-B"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-3**

D-04

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-4, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION 1-1"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-4**

D-05

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-5, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION 2-2"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-5**

D-06

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-6, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION 3-3"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-6**

D-07

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-7, "MU 9
PUMP TEST GEOLOGIC CROSS
SECTION 4-4"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-7**

D-08

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 2-13, "INITIAL
POTENTIOMETRIC SURFACE MAP: K
SAND; FT-MSL"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 2-13**

D-09

3.0 MONITOR WELL SPACING AND COMPLETION

3.1 WELL SPACING

The MU9 wells are located in Sections 7, 8, 17 and 18, Township 35 North, Range 74 West within the existing permit boundary except for the portion in Section 7 (Figure 1-2). Specific data related to well location, construction, completion interval and hydrology are provided on Table 3-1. Appendix B gives the completion reports for the MU9 wells. The hydrologic testing for MU9 was performed with two multi-well pump tests.

The MU9 monitoring wells were located in accordance with PRI's WDEQ/LQD Permit 633 and NRC License SAU-1548. The monitor well spacing for MU9 is based on the previous Smith Ranch standard of 500 feet from the outer limits of the wellfield pattern area and 500 feet between wells. The perimeter ore zone monitor wells (referred to as M wells) were located in a uniform pattern around the wellfield. The distance generally used at Smith Ranch/Highland is between 300 and 800 feet. The distance between the monitor wells and the production patterns typically is 250 to 600 feet. These wells were installed to determine baseline ground water quality and hydrologic characteristics of the Production Zone. A total of 51 perimeter ore zone monitor wells were installed. Wells M-916, M-917, M-941, M-942, 9MP-9 and 9MP-10 were monitored during both of the MU9 pump tests to prove continuity between the two multi-well pump tests in the K Sand.

Interior monitoring wells in the K Sand Production Zone (9MP Wells) were installed consistent with previous Smith Ranch/Highland operations (e.g., wells per three acres of pattern area). A total of fourteen 9MP wells were installed. All 9MP wells were used in one of these two pump tests.

Monitor wells were installed within the Overlying (9MO) and Underlying aquifers (9MU) (M and I Sands, respectively) at a density of one type of each well per three acres of pattern area. A total of 14 sets of MU and MO wells were installed. The spacing between Overlying and Underlying monitor wells in the same zone generally were less than 1,000 feet apart.

3.2 WELL INSTALLATION AND COMPLETION

To conduct the pump test in MU9, PRI installed two pumping wells (9PW-2A and 9PW-1) in the K Sand using 6-inch casing. To be consistent with other mine unit tests, and because economic ore may be present in all the K Sand subunits, the pumping wells were completed across the entire K Sand thickness; the sand intervals were underreamed to 10.5 inches.

The monitoring wells were drilled and completed consistent with PRI's WDEQ/LQD permits. Drilling and completion information is included in Appendix B.

The monitoring wells were constructed with a 4.5-inch PVC casing with the monitoring zones being underreamed to 10.5 inches. The M and MP wells were screened across the portion of the K Sand that will be mined in a particular area of MU9 (Table 3-1). The wells were developed using standard water well construction techniques, such as pumping, surging and/or air lifting. Completion reports for each well are provided in Appendix B.

3.3 ABANDONMENT OF EXISTING WELLS

No historic wells that require abandonment were identified in MU9. Should such wells be identified in the future, abandonment would be performed in accordance with WS-35-11-404 and Chapter VIII of the LQD Rules and Regulations.

TABLE 3-1.
 MU-9 Monitor Well Information
 Power Resources, Inc.

Well	Alias	Coordinates			Township & Range	Surface Elevation (ft; AMSL)	Casing Stickup (ft)	TOC Elev. (ft; AMSL)	Hole Depth (ft; bgs)	Casing Depth (ft; bgs)	Top (ft; bgs)	Bottom (ft; bgs)	Thickness (ft)	Screen Interval (sand ID)	Casing O.D. (in.)	9PW-2A TEST Static Depth to Water (ft; TOC)	9PW-2A TEST Static Water Elevation (ft; AMSL)	9PW-1 TEST Static Depth to Water (ft; TOC)	9PW-1 TEST Static Water Elevation (ft; AMSL)	Well	
		North	East	Section																	
M-901		855801	337907	7	3574	5558.9	1.1	5560.0	840.00	780.00	780.00	810.00	30.00	K5, 6	4.5	315.30	5244.74		5243.62	M-901	
M-902		855970	338376	8	3574	5553.3	0.6	5553.9	840.00	770.00	770.00	810.00	40.00	K5, 6, 7	4.5	310.30	5243.62		5243.45	M-902	
M-903		856014	338882	8	3574	5579.0	0.9	5579.9	880.00	810.00	815.00	860.00	45.00	K5, 6, 7	4.5	336.48	5243.45		5243.14	M-903	
M-904		856083	339377	8	3574	5552.9	1.2	5554.1	850.00	810.00	810.00	840.00	30.00	K5, 6, 7	4.5	311.00	5243.14		5242.15	M-904	
M-905A		856103	338899	8	3574	5538.4	1.0	5539.4	840.00	800.00	800.00	830.00	30.00	K5, 6, 7	4.5	297.25	5242.15		5241.57	M-905A	
M-906		856180	340373	8	3574	5551.3	1.1	5552.4	870.00	800.00	800.00	850.00	50.00	K6, 7, 8, 9	4.5	287.80	5241.57		5241.07	M-906	
M-907		856347	340845	8	3574	5528.1	0.7	5528.8	850.00	800.00	800.00	840.00	30.00	K7, 8, 9	4.5	267.80	5241.07		5241.07	M-907	
M-908		856074	341261	8	3574	5508.6	1.2	5509.6	840.00	810.00	810.00	840.00	30.00	K7, 8, 9	4.5	268.73	5241.07		5241.07	M-908	
M-909A		855578	341326	8	3574	5546.6	1.3	5547.9	880.00	820.00	820.00	870.00	50.00	K6, 7, 8	4.5	306.60	5241.07		5241.21	M-909A	
M-910		855130	341094	17	3574	5539.8	1.5	5541.3	860.00	820.00	810.00	860.00	50.00	K6, 7, 8	4.5	299.10	5242.21		5242.21	M-910	
M-911		854661	340978	17	3574	5585.9	0.8	5586.7	900.00	860.00	840.00	900.00	60.00	K6, 7, 8	4.5	345.92	5240.81		5240.81	M-911	
M-912		854301	340601	17	3574	5601.7	0.4	5602.1	920.00	852.00	860.00	900.00	40.00	K6, 7, 8	4.5	381.55	5240.52		5240.52	M-912	
M-913		854118	340138	17	3574	5646.8	1.4	5648.2	940.00	885.00	855.00	920.00	35.00	K6, 7, 8	4.5	405.20	5242.96		5242.96	M-913	
M-914		853955	339650	17	3574	5647.7	1.1	5648.8	940.00	870.00	870.00	935.00	65.00	K6, 7, 8	4.5	406.45	5242.39		5242.39	M-914	
M-915		853489	339432	17	3574	5662.1	1.3	5663.4	970.00	905.00	910.00	960.00	50.00	K6, 7	4.5	440.45	5242.97		5242.97	M-915	
M-916		853235	339001	17	3574	5687.6	0.9	5688.5	960.00	900.00	900.00	950.00	50.00	K6, 7, 8	4.5	445.90	5242.65	445.55	5243.00	M-916	
M-917		852994	338555	17	3574	5712.4	1.0	5713.4	970.00	900.00	900.00	955.00	55.00	K6, 7, 8	4.5	470.40	5243.03	471.10	5243.33	M-917	
M-918		852635	338206	18	3574	5745.2	0.7	5745.9	980.00	945.00	945.00	975.00	30.00	K6, 7	4.5	503.44	5242.47	503.44	5242.47	M-918	
M-919		852291	337840	18	3574	5747.1	1.4	5748.5	970.00	920.00	920.00	965.00	45.00	K6, 7	4.5	504.56	5243.95	504.56	5243.95	M-919	
M-920		852076	337410	18	3574	5736.1	1.4	5737.5	950.00	895.00	895.00	935.00	40.00	K6, 7	4.5	492.69	5244.82	492.69	5244.82	M-920	
M-921A		851831	336938	18	3574	5709.6	0.7	5710.3	900.00	831.00	850.00	895.00	45.00	K6, 7	4.5	465.52	5244.76	465.52	5244.76	M-921A	
M-922		851600	336513	18	3574	5710.8	1.4	5712.2	900.00	845.00	850.00	890.00	40.00	K6, 7	4.5	465.7	5244.99	465.7	5244.99	M-922	
M-923		851376	336061	18	3574	5714.5	1.0	5715.5	900.00	830.00	840.00	885.00	45.00	K6, 7	4.5	469.37	5246.09	469.37	5246.09	M-923	
M-924A		851077	335614	18	3574	5723.1	1.1	5724.2	900.00	830.00	850.00	885.00	35.00	K7	4.5	477.51	5246.68	477.51	5246.68	M-924A	
M-925A		850798	335242	18	3574	5724.0	2.9	5726.9	880.00	820.00	820.00	880.00	60.00	K6, 7	4.5	475.72	5251.18	475.72	5251.18	M-925A	
M-926		850501	334840	18	3574	5738.7	1.0	5739.7	900.00	820.00	820.00	900.00	80.00	K6, 7	4.5	492.13	5247.56	492.13	5247.56	M-926	
M-927A		850062	334599	18	3574	5752.9	0.9	5753.8	900.00	820.00	820.00	890.00	70.00	K6, 7	4.5	506.35	5247.45	506.35	5247.45	M-927A	
M-928		849864	334139	18	3574	5764.4	1.8	5766.2	910.00	816.00	820.00	890.00	70.00	K6, 7	4.5	517.83	5248.34	517.83	5248.34	M-928	
M-929		850013	333660	18	3574	5753.1	0.8	5753.9	900.00	815.00	820.00	880.00	60.00	K6, 7	4.5	505.25	5248.69	505.25	5248.69	M-929	
M-930		850403	333372	18	3574	5728.5	1.3	5729.8	880.00	790.00	790.00	850.00	60.00	K6, 7	4.5	480.7	5249.10	480.7	5249.10	M-930	
M-931		850877	333451	18	3574	5767.1	1.1	5768.2	960.00	820.00	830.00	895.00	65.00	K6, 7	4.5	519.13	5249.04	519.13	5249.04	M-931	
M-932	SWMP-1A	851435	333789	18	3574	5866.3	0.8	5867.1	1050.00	940.00	940.00	1050.00	110.00	K6, 7	4.5		619.1	5248.03	619.1	5248.03	M-932
M-933A		851554	334163	18	3574	5845.4	3.3	5845.4	1040.00	930.00	930.00	980.00	50.00	K6, 7	4.5	593.27	5252.13	593.27	5252.13	M-933A	
M-934		851734	334635	18	3574	5807.0	0.9	5807.9	1030.00	925.00	925.00	960.00	35.00	K6, 7	4.5	560.48	5247.42	560.48	5247.42	M-934	
M-935		852041	335030	18	3574	5796.9	0.3	5797.2	1040.00	920.00	920.00	975.00	55.00	K6, 7	4.5	549.99	5247.20	549.99	5247.20	M-935	
M-936		852262	335474	18	3574	5743.4	1.5	5744.9	930.00	870.00	870.00	920.00	50.00	K5, 6, 7	4.5	498.8	5246.11	498.8	5246.11	M-936	
M-937		852651	335817	18	3574	5703.8	1.0	5704.8	880.00	860.00	860.00	880.00	20.00	K5, 6	4.5	458.59	5246.23	458.59	5246.23	M-937	
M-938		852827	336289	18	3574	5676.6	0.8	5677.4	890.00	830.00	830.00	870.00	40.00	K6, 7, 8	4.5	432.02	5245.37	432.02	5245.37	M-938	
M-939		853067	336728	18	3574	5658.1	1.7	5658.8	880.00	810.00	810.00	865.00	55.00	K6, 7, 8	4.5	413.34	5246.41	413.34	5246.41	M-939	
M-940		853364	337132	18	3574	5649.8	1.0	5650.8	830.00	815.00	815.00	860.00	45.00	K6, 7	4.5	406.85	5243.94	406.85	5243.94	M-940	
M-941		853776	337420	18	3574	5633.4	1.0	5634.4	880.00	830.00	830.00	865.00	35.00	K5, 7	4.5	389.70	5244.65	389.70	5244.65	M-941	
M-942		854134	337764	18	3574	5640.3	0.9	5641.2	880.00	855.00	855.00	875.00	20.00	K5, 6	4.5	397.20	5243.98	397.20	5243.98	M-942	
M-943		854389	338206	18	3574	5656.3	1.1	5657.4	910.00	870.00	870.00	910.00	40.00	K5, 6, 7	4.5	413.90	5243.48	413.90	5243.48	M-943	
M-944		854577	338668	17	3574	5681.8	1.0	5682.8	910.00	880.00	870.00	900.00	30.00	K5, 6, 7	4.5	409.44	5243.39	409.44	5243.39	M-944	
M-945		854812	338910	17	3574	5623.2	0.8	5624.0	900.00	850.00	850.00	900.00	50.00	K6, 7, 8	4.5	381.00	5243.02	381.00	5243.02	M-945	
M-946		854776	338414	17	3574	5636.4	1.9	5638.3	900.00	830.00	830.00	900.00	50.00	K6, 7, 8	4.5	393.90	5244.44	393.90	5244.44	M-946	
M-947		854742	337912	18	3574	5618.0	0.9	5619.9	880.00	820.00	820.00	865.00	45.00	K5, 6, 7	4.5	375.60	5244.27	375.60	5244.27	M-947	
M-948		855035	337588	18	3574	5578.5	0.8	5579.3	860.00	770.00	770.00	825.00	55.00	K6, 7	4.5	334.55	5244.79	334.55	5244.79	M-948	
M-949		855467	337538	7	3574	5584.1	0.0	5584.1	850.00	810.00	810.00	840.00	30.00	K5, 6	4.5	339.90	5244.20	339.90	5244.20	M-949	
M-950		855316	338927	8	3574	5595.3	1.1	5596.4	880.00	820.00	820.00	870.00	50.00	K6, 7, 8	4.5	353.10	5243.34	353.10	5243.34	M-950	
M-951		855810	339003	8	3574	5602.4	1.2	5603.6	860.00	830.00	830.00	875.00	45.00	K6, 7, 8	4.5	360.00	5243.57	360.00	5243.57	M-951	
9MP-1A		855412	338430	8	3574	5614.0	0.8	5614.8	900.00	850.00	850.00	880.00	30.00	K5, 6	4.5	371.00	5243.80		5243.80	9MP-1A	
9MP-2		855513	339340	8	3574	5575.4	1.4	5576.8	870.00	830.00	830.00	860.00	30.00	K5, 6, 7, 8	4.5	332.50	5244.28		5244.28	9MP-2	
9MP-3A		855480	340093	8	3574	5603.1	0.0	5603.1	920.00	844.00	844.00	860.00	890.00	14.00	K6, 7, 8	4.5	362.00	5241.11		5241.11	9MP-3A
9MP-4		855662	340773	8	3574	5562.4	1.4	5563.8	900.00	890.00	890.00	870.00	20.00	K6, 7, 8	4.5	321.95	5241.61		5241.61	9MP-4	
9MP-5		855263	340390	8	3574	5592.1	1.1	5593.2	880.00	800.00	800.00	870.00	70.00	K6, 7, 8	4.5	341.46	5241.76		5241.76	9MP-5	
9MP-6		854875	340245	17	3574	5571.0	0.8	5571.8	860.00												

TABLE 3-1.
MU-9 Monitor Well Information
Power Resources, Inc.

Well	Alias	Coordinates			Township & Range	Surface Elevation (ft; AMSL)	Casing Stickup (ft)	TOC Elev. (ft; AMSL)	Hole Depth (ft; bgs)	Casing Depth (ft; bgs)	Screen Interval			Screen Interval (sand ID)	Casing O.D. (in.)	9PW-2A TEST Static Depth to Water (ft; TOC)	9PW-2A TEST Static Water Elevation (ft; AMSL)	9PW-1 TEST Static Depth to Water (ft; TOC)	9PW-1 TEST Static Water Elevation (ft; AMSL)	Well
		North	East	Section							Top (ft; bgs)	Bottom (ft; bgs)	Thickness (ft)							
9MO-7		854704	339895	17	3574	5591.0	1.2	5592.2	1080.00	1050.00	1060.00	1080.00	20.00	M	4.5	352.82	5239.41			9MO-7
9MO-8		854361	339293	17	3574	5616.2	0.5	5615.7	1160.00	1075.00	1075.00	1140.00	65.00	M	4.5	377.25	5239.43			9MO-8
9MO-9A		853763	338735	17	3574	5657.3	1.7	5659.0	1100.00	1045.00	1045.00	1065.00	20.00	M	4.5	416.90	5242.14			9MO-9A
9MO-10		853433	338088	18	3574	5708.6	0.9	5709.5	1120.00	1040.00	1040.00	1080.00	40.00	M	4.5			468.88	5240.64	9MO-10
9MO-11A		852929	337539	18	3574	5715.1	1.0	5716.1	1100.00	1020.00	1020.00	1040.00	20.00	M	4.5			476.02	5240.12	9MO-11A
9MO-12		852380	336790	18	3574	5704.7	0.5	5705.2	1100.00	1020.00	1020.00	1050.00	30.00	M	4.5			436.49	5268.69	9MO-12
9MO-13		851846	335704	18	3574	5749.6	0.9	5750.5	1100.00	1070.00	1070.00	1100.00	30.00	M	4.5			509.33	5241.17	9MO-13
9MO-14		851037	334668	18	3574	5754.7	0.0	5754.7	1020.00	980.00	980.00	1020.00	40.00	M	4.5			517.81	5236.89	9MO-14
9MU-1A		855406	338485	8	3574	5614.2	0.8	5615.0	810.00	800.00	750.00	790.00	40.00	I	4.5	327.45	5287.54			9MU-1A
9MU-2		855550	339359	8	3574	5575.3	1.3	5576.6	800.00	730.00	730.00	770.00	40.00	I	4.5	429.09	5147.51			9MU-2
9MU-3		855476	340150	8	3574	5604.2	1.0	5605.2	800.00	770.00	770.00	800.00	30.00	I	4.5	364.70	5240.49			9MU-3
9MU-4		855720	340821	8	3574	5559.8	1.5	5561.3	780.00	730.00	730.00	750.00	20.00	I	4.5	319.05	5242.25			9MU-4
9MU-5A		855283	340434	8	3574	5577.8	1.0	5578.8	800.00	770.00	770.00	805.00	35.00	I	4.5	431.80	5147.00			9MU-5A
9MU-6A		854965	340286	17	3574	5580.2	0.8	5581.0	770.00	740.00	740.00	770.00	30.00	I	4.5	340.85	5240.15			9MU-6A
9MU-7A		854640	339907	17	3574	5595.7	1.0	5596.7	800.00	750.00	750.00	780.00	30.00	I	4.5	450.45	5146.26			9MU-7A
9MU-8		854348	339252	17	3574	5620.0	0.5	5620.5	800.00	770.00	770.00	800.00	30.00	I	4.5	433.33	5187.18			9MU-8
9MU-9B		853806	338723	17	3574	5655.8	0.8	5656.6	820.00	795.00	795.00	820.00	25.00	I	4.5	368.75	5287.85			9MU-9B
9MU-10		853410	338069	18	3574	5708.6	1.0	5709.6	880.00	810.00	810.00	850.00	40.00	I	4.5			423.51	5286.12	9MU-10
9MU-11		852960	337550	18	3574	5705.3	0.4	5705.7	840.00	810.00	810.00	840.00	30.00	I	4.5			473.46	5232.20	9MU-11
9MU-12		852383	336816	18	3574	5705.6	0.9	5706.5	1100.00	775.00	780.00	810.00	30.00	I	4.5			417.08	5289.47	9MU-12
9MU-13		851799	335708	18	3574	5753.2	1.0	5754.2	840.00	800.00	800.00	830.00	30.00	I	4.5			458.65	5295.59	9MU-13
9MU-14		851048	334669	18	3574	5755.9	1.0	5756.9	810.00	770.00	770.00	800.00	30.00	I	4.5			458.02	5298.88	9MU-14
9PW-1		851720	336625	18	3574	5705.1	0.7	5705.8	960.00	840.00	840.00	890.00	50.00	K7.8	4.5			462.08	5243.72	9PW-1
9PW-2A		854742	339920	17	3574	5587.5	0.4	5587.9	960.00	940.00	810.00	875.00	65.00	K7	4.5	343.45	5244.45			9PW-2A

4.0 PUMP TEST DESIGN AND WATER LEVEL DATA FOR 9PW-2A TEST

4.1 TEST DESIGN

The MU9 9PW-2A pump test was conducted with the following objectives:

- Demonstrate hydraulic communication between the Production Zone and the surrounding monitor well ring (M wells);
- Determine the hydrologic characteristics of the Production Zone aquifer;
- Evaluate the presence or absence of hydrologic boundaries within the Production Zone; and,
- Demonstrate sufficient hydrologic isolation between the Production Zone and the Overlying and Underlying sands for the purposes of ISL mining.

The pump tests were designed to cause a minimum of 1 to 2 feet of water level drawdown in the K Sand at a radius of 2,000 feet from the pumping well.

Figure 4-1 presents the wellfield outline and the locations of the pumping and observation (monitoring) wells used during the 9PW-2A hydrologic test. The pumping well (9PW-2A) was screened across the entire thickness of the K Sand (Table 3-1). The pump was installed to a depth of 750 feet with a check valve.

The general testing procedures were as follows:

- ◆ Install automated monitoring equipment in the wells selected to be used in the test. Verify setting depths and head reading with manual water level measurements.
- ◆ Measure and record background water levels at least every 12 hours for a minimum of 48 hours prior to the start of the test.
- ◆ Pump the Well 9PW-2A at a constant rate (or as close as possible). Record water levels and barometric pressure throughout the background, pumping and recovery periods.

4.2 EQUIPMENT LAYOUT

Prior to the background monitoring period for the test, PRI installed a 30 gpm electric submersible pump with a check valve in the pumping well. Dual Halliburton MC-II meters were used to measure instantaneous flowrate and record total gallons pumped.

The monitoring equipment layout for the 9PW-2A test is shown on Figure 4-1. All the monitor wells for the test were equipped with automated water level recorders, either one In-situ TROLL data logger/transducer unit (pumping well), two In-situ Hermit data loggers with transducers, 9 Global Water transducer/data loggers or 40 Instrumentation Northwest transducer/data logger. Water levels were also measured by hand for correlation of the automated equipment. The pumping equipment performed as designed except for an electrical problem with the generator which caused it to stop running at 3:25 am on September 11. One of the transducers (well 9MP-6) stopped recording a correct water level when the water level dropped below the transducer during the test. For consistency, occasional erroneous data (e.g., inaccurate readings that resulted when the equipment tried to log data during a data download) were edited out of the database. Further, PRI personnel performed hand (e-line) measurements to check any equipment with potential accuracy problems.

PRI personnel installed the monitoring equipment prior to testing and provided day-to-day downloads. Prior to the test, HYDRO and PRI personnel selected the data logger and transducer layout. Thereafter, PRI collected data daily and transferred the data to HYDRO for analysis.

The monitor wells used for the test, distance from each monitor well to the pumping well, and the drawdown observed are presented in Table 4-1. The equipment layout, including distinction between equipment types and pressure ratings for each transducer, is listed on Table 4-2. Figure 4-1 also shows the transducers used for each well. Section 5 presents the K Sand drawdown plots while Appendix C presents a tabulation of water levels for all of the 9PW-2A pump test wells.

4.3 BACKGROUND MONITORING, TEST PROCEDURES AND DATA COLLECTION

A potentiometric map for the K Sand, based on water level prior to the start of both tests, is shown in Figure 2-13. Background monitoring data along with the pumping and recovery period data for the K Sand monitoring wells are shown on Figures 4-2 through 4-16. These plots present the depth to water versus time on a linear scale. A tabulation of the water level data is presented in Appendix C.

The pump test was performed by pumping 9PW-2A at an average rate of 29.0 gpm from 11:00 on September 10, 2007 to 3:25 on September 11 and from 9:05 on September 11 until 13:10 on September 13, 2007. The generator developed an electrical problem that caused the ceasing of pumping on September 11. The total pumping duration was 68.5 hours (4,110 minutes). The drawdown achieved in the pumping well was 45.4 feet; drawdown in the K Sand monitoring wells ranged from 2.8 to 20.5 feet (Table 4-1). Water levels were automatically measured and recorded every 15 minutes during the pumping and recovery periods. Pumping rate data for the test are shown on Table 4-3. Water level recovery was monitored for 5600 minutes. A list of K Sand monitoring wells, the distance of those wells from the pumping well, and the drawdown measured during the pumping period for all the wells are summarized in Table 4-1.

Table 4-1.
MONITORING WELL DISTANCE AND DRAWDOWN AT THE END OF THE 9PW-2A TEST

1st Start Date & Time	9/10/2007 11:00	2nd Start Date & Time	9/11/2007 9:05
1st End Date & Time	9/11/2007 3:25	2nd End Date & Time	9/13/2007 13:10
Duration	68.5		
Avg. Pumping Rate	29		
Pumping Well	9PW-2A	Distance from Pumping Well	Maximum Drawdown During Test
Monitoring Wells	38	(ft)	(ft)
	9PW-2A	0	45.4
Ore Zone Completions	9MP-1A	1634	5.4
	9MP-2	965	9.7
	9MP-3A	758	11.3
	9MP-4	1255	7.7
	9MP-5	701	11.9
	9MP-6	351	15e
	9MP-7A	111	20.5
	9MP-8	824	8.9
	9MP-9	1581	5.9
	9MP-10	2308	3.9
	M-901	2272	3.3
	M-902	1971	4.1
	M-903	1642	5.6
	M-904	1447	6.1
	M-905A	1361	7.7
	M-906	1508	6.7
	M-907	1853	5.1
	M-908	1890	3.8
	M-909A	1636	5.2
	M-910	1237	7.0
	M-911	1063	8.4
	M-912	811	9.9
	M-913	661	10.9
	M-914	832	8.9
	M-915	1345	4.5
	M-916	1765	5.1
	M-917	2218	3.9
	M-941	2680	2.8
	M-942	2240	3.9
	M-943	1750	5.3
	M-944	1263	6.9
	M-945	1012	8.5
	M-946	1506	6.3
	M-947	2008	4.1
	M-948	2350	3.1
	M-949	2487	2.9
	M-950	1148	7.8
	M-951	1408	6.8
Overlying Completions	9MO-1B	1535	*
	9MO-2	955	*
	9MO-3	762	*
	9MO-4	1297	*
	9MO-5	772	*
	9MO-6A	371	*
	9MO-7	52	*
	9MO-8	734	*
	9MO-9	1537	*
Underlying Completions	9MU-1A	1581	*
	9MU-2	984	*
	9MU-3	769	*
	9MU-4	1330	*
	9MU-5A	746	*
	9MU-6A	429	*
	9MU-7A	103	*
	9MU-8	776	*
	9MU-9B	1520	*

Note: * = No Drawdown Observed

e = estimated maximum drawdown because water level was below transducer

Table 4-2.

DATA LOGGER AND TRANSDUCER EQUIPMENT FOR MONITORING WELLS FOR THE 9PW-2A TEST

4-4

<u>Well ID.</u>	<u>Transducer Type</u>	<u>Transducer SN #</u>	<u>Transducer Range</u>	<u>Well ID.</u>	<u>Transducer Type</u>	<u>Transducer SN #</u>	<u>Transducer Range</u>
M-901	PT2X	2710035	30	9MP-1A	PT2X	2710029	30
M-902	PT2X	2713018	30	9MP-2	PT2X	2710007	30
M-903	PT2X	2710031	30	9MP-3A	Global Water	57681	15 ft
M-904	PT2X	2710027	30	9MP-4	PXD	9806	20
M-905A	PT2X	2710025	30	9MP-5	PXD	9032	20
M-906	PT2X	2710037	30	9MP-6	PT2X	2710023	30
M-907	Global Water	3815	15 ft	9MP-7A	PT2X	2713010	30
M-908	Global Water	49925	15 ft	9MP-8	PT2X	2710003	30
M-909A	PXD	9826	20	9MP-9	PT2X	2710012	30
M-910	Global Water	98-04-00007	15 ft	9MP-10	PT2X	2710005	30
M-911	PT2X	2711042	30	9MO-1B	PT2X	2710008	30
M-912	PT2X	2710038	30	9MO-2	PT2X	2710001	30
M-913	PT2X	2710011	30	9MO-3	PT2X	2710017	30
M-914	PT2X	2714000	30	9MO-4	PXD	1812	50
M-915	PT2X	2710030	30	9MO-5	PXD	9824	20
M-916	PT2X	2710036	30	9MO-6A	PT2X	2710034	30
M-917	PT2X	2710033	30	9MO-7	PT2X	2710004	30
M-941	PT2X	2710032	30	9MO-8	PT2X	2710015	30
M-942	PT2X	2710022	30	9MO-9	PT2X	2710002	30
M-943	PT2X	2710016	30	9MU-1A	Global Water	57679	15 ft
M-944	PT2X	2710040	30	9MU-2	PT2X	2710009	30
M-945	PT2X	2710014	30	9MU-3	Global Water	57680	15 ft
M-946	PT2X	2710018	30	9MU-4	PXD	5953	20
M-947	PT2X	2710021	30	9MU-5A	PXD	9813	20
M-948	PT2X	2710006	30	9MU-6A	Global Water	45069	15 ft
M-949	PT2X	2710019	30	9MU-7	PT2X	2714001	30
M-950	PT2X	2712009	30	9MU-8	Global Water	49923	15 ft
M-951	PT2X	2710013	30	9MU-9B	Global Water	45067	15 ft
				9PW-2A	Level Troll	105371	100

TABLE 4-3. FLOW RATE VS. TIME FOR PUMPING WELL 9PW-2A

**POWER RESOURCES, INC.
MINE UNIT 9 PUMP TEST (PHASE 1)
PUMPING RATE DATA**

<u>DATE</u>	<u>TIME</u>	<u>TOTALIZER #1</u>	<u>#1 GPM</u>	<u>TOTALIZER #2</u>	<u>#2 GPM</u>	<u>PSI</u>	
9/10/2007	1100						
			PUMP ON				
9/10/2007	1103	0	0	0	0	0	
9/10/2007	1105	53	28.29	54	28.635	0	
9/10/2007	1430	5925	28.704	5978	28.911	0	
9/10/2007	2030	16263	28.669	16381	28.918	0	
9/11/2007	230	26364	29.187	26532	29.01	0	
9/11/2007	325	PUMP OFF DUE TO GENERATOR PROBLEM					
9/11/2007	815	28281	0	28435	0	0	
9/11/2007	905	PUMP BACK ON					
9/11/2007	905	28455	29.049	28300	29.049	0	
9/11/2007	1417	37367	29.118	37466	29.049	0	
9/11/2007	2015	47511	29.325	47589	29.118	5	
9/12/2007	220	58203	29.118	58255	29.118	5	
9/12/2007	1000	71837	28.911	71887	29.044	5	
9/12/2007	1415	79044	29.601	79114	29.808	5	
9/12/2007	2145	92264	29.187	92342	29.256	5	
9/13/2007	330	102502	29.532	102578	29.325	5	
9/13/2007	838	111326	29.394	111389	29.394	5	
9/13/2007	1310		PUMP OFF				

On 9/11/07, the pump was found not running. The generator had a broken wire and was repaired and turned back on @ 0905. It looks like it went down ~0325.

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 4-1, "DATA
LOGGER AND TRANSDUCER
EQUIPMENT LAYOUT FOR THE 9PW-
2A TEST"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 4-1**

D-10

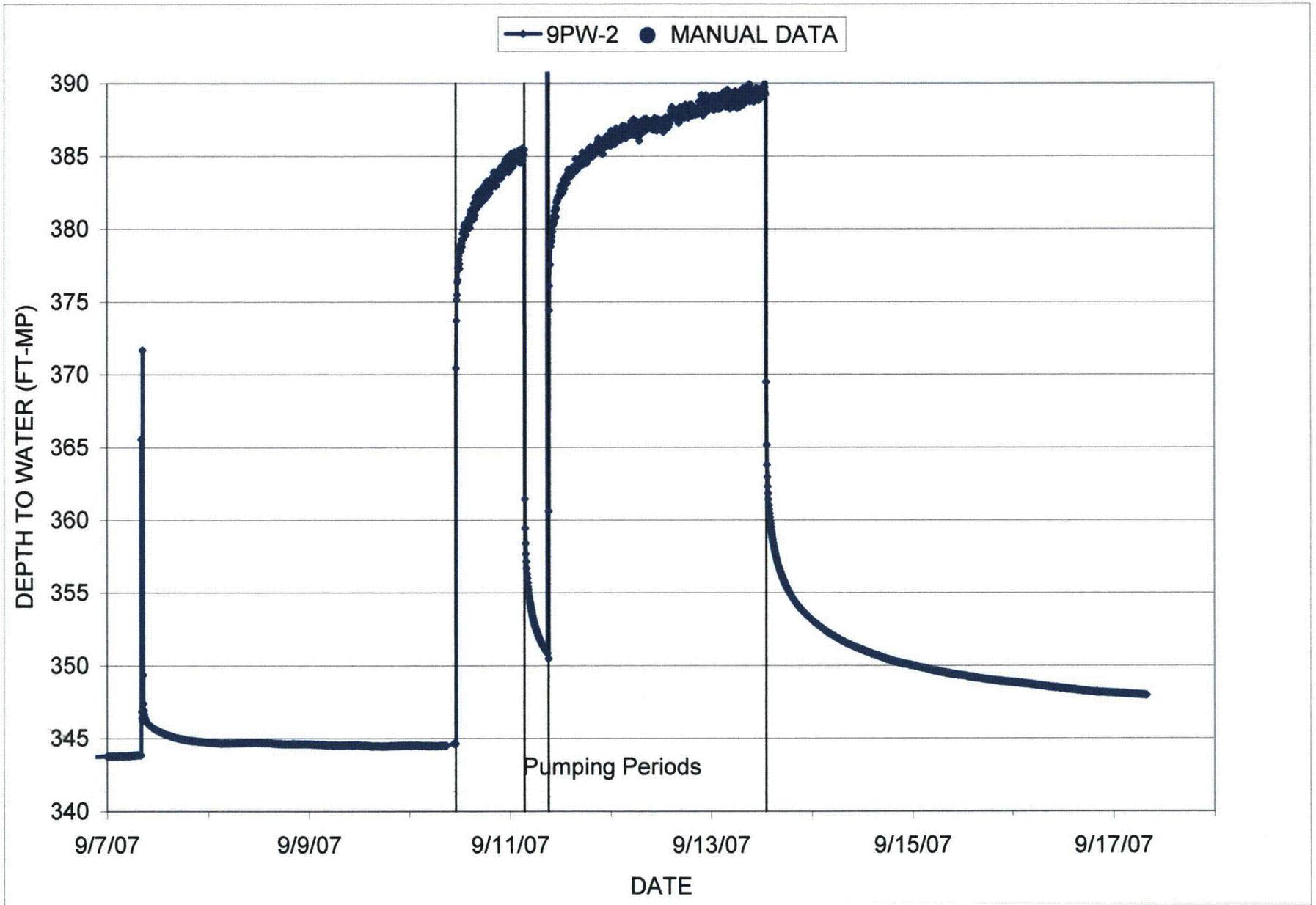


FIGURE 4-2. DEPTH TO WATER VERSUS TIME FOR PUMPING WELL 9PW-2A

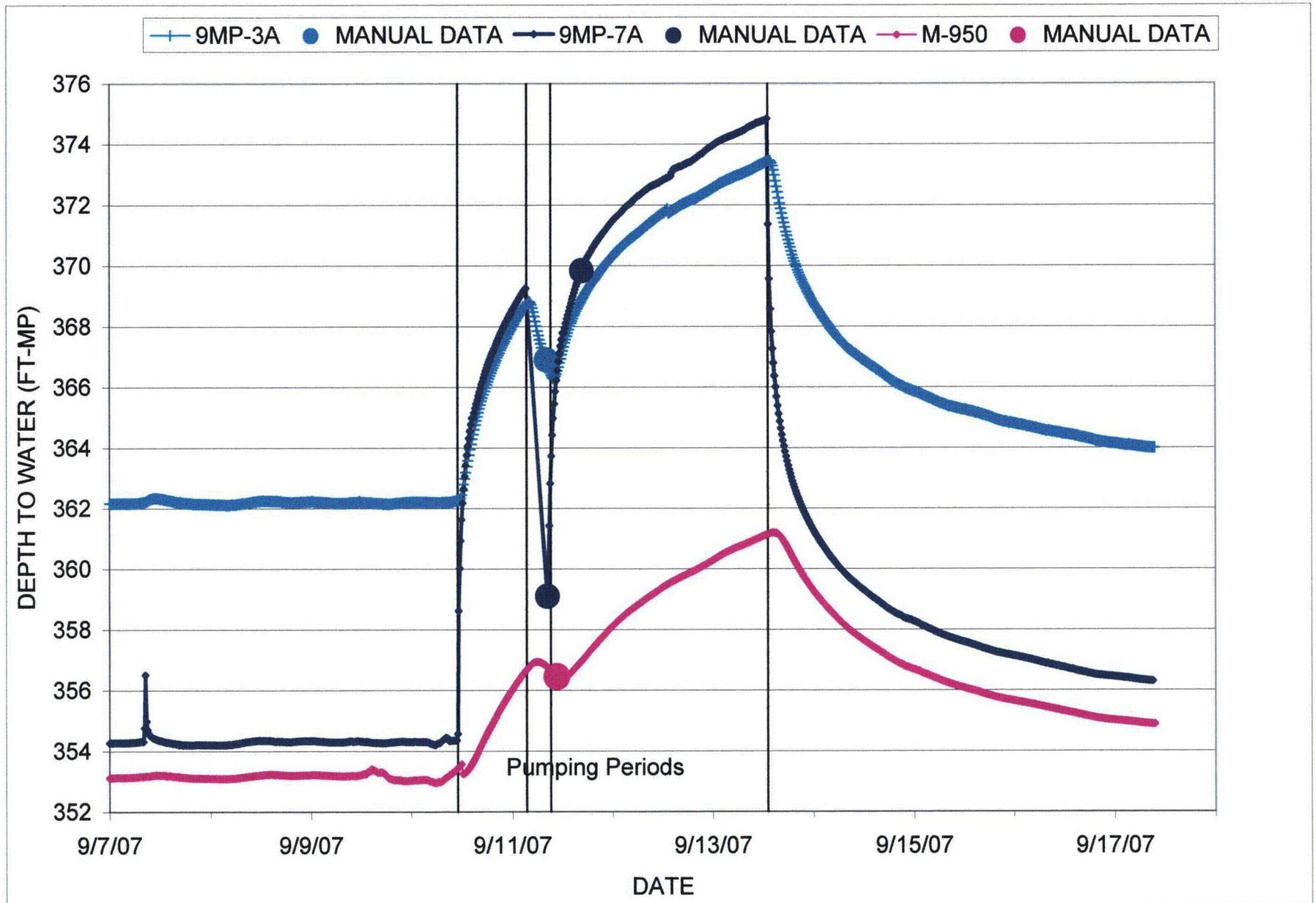


FIGURE 4-3. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-3A, 9MP-7A AND M-950

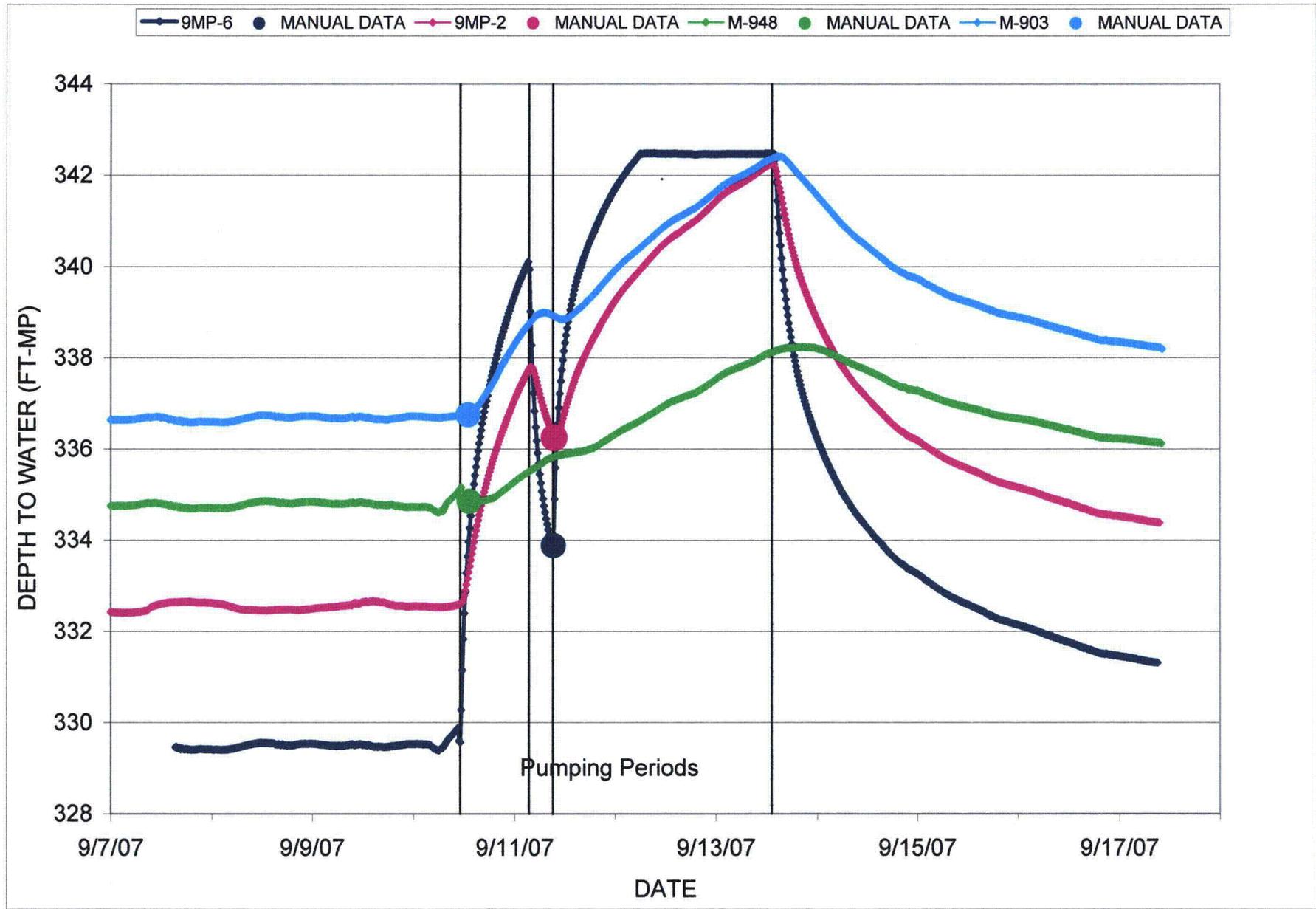


FIGURE 4-4. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-6, 9MP-2, M-948 AND M-903

4-10

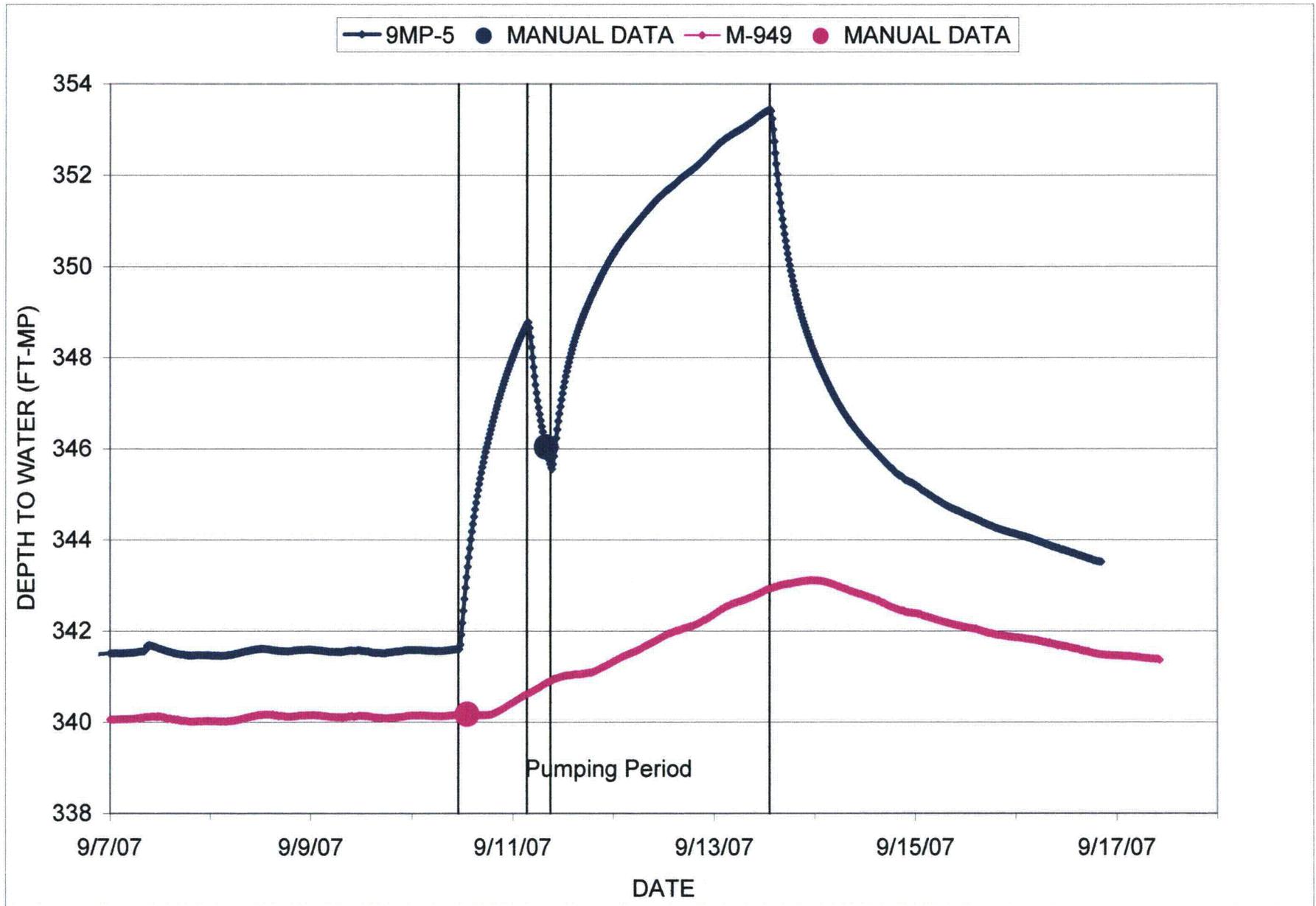


FIGURE 4-5. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-5 AND M-949

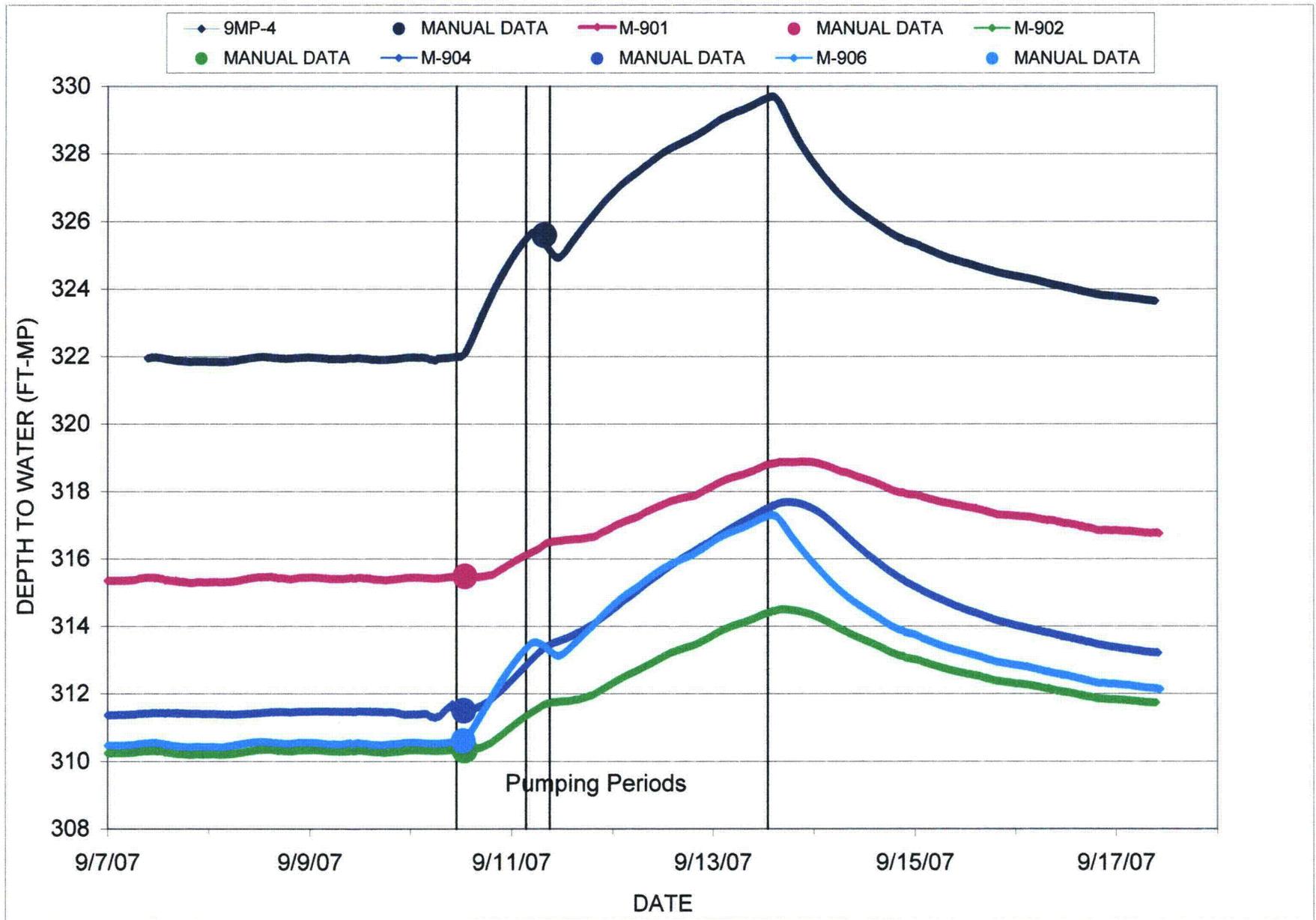


FIGURE 4-6. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-4, M-901, M-902, M-904 AND M-906

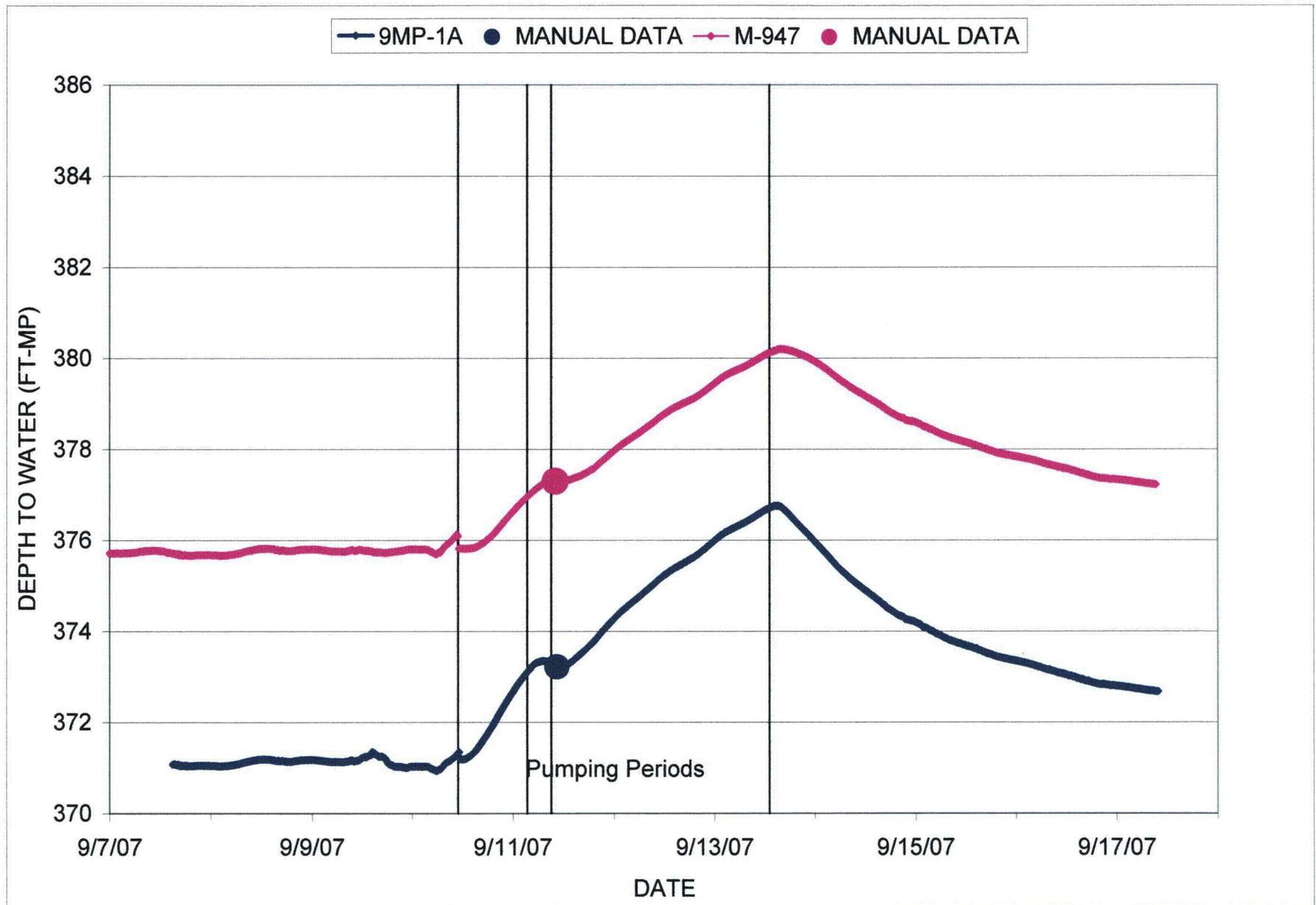


FIGURE 4-7. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-1A AND M-947

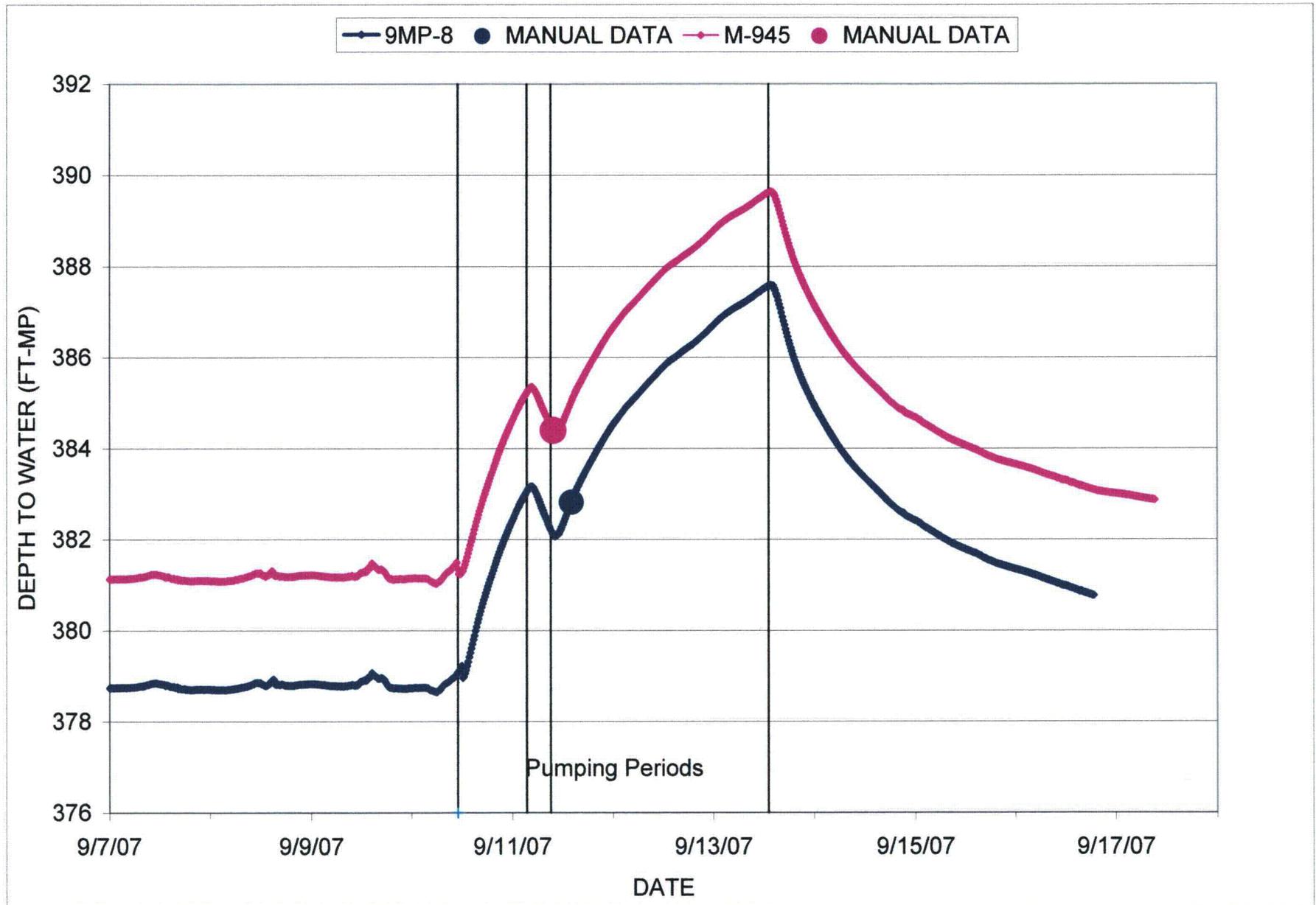


FIGURE 4-8. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-8 AND M-945

4-14

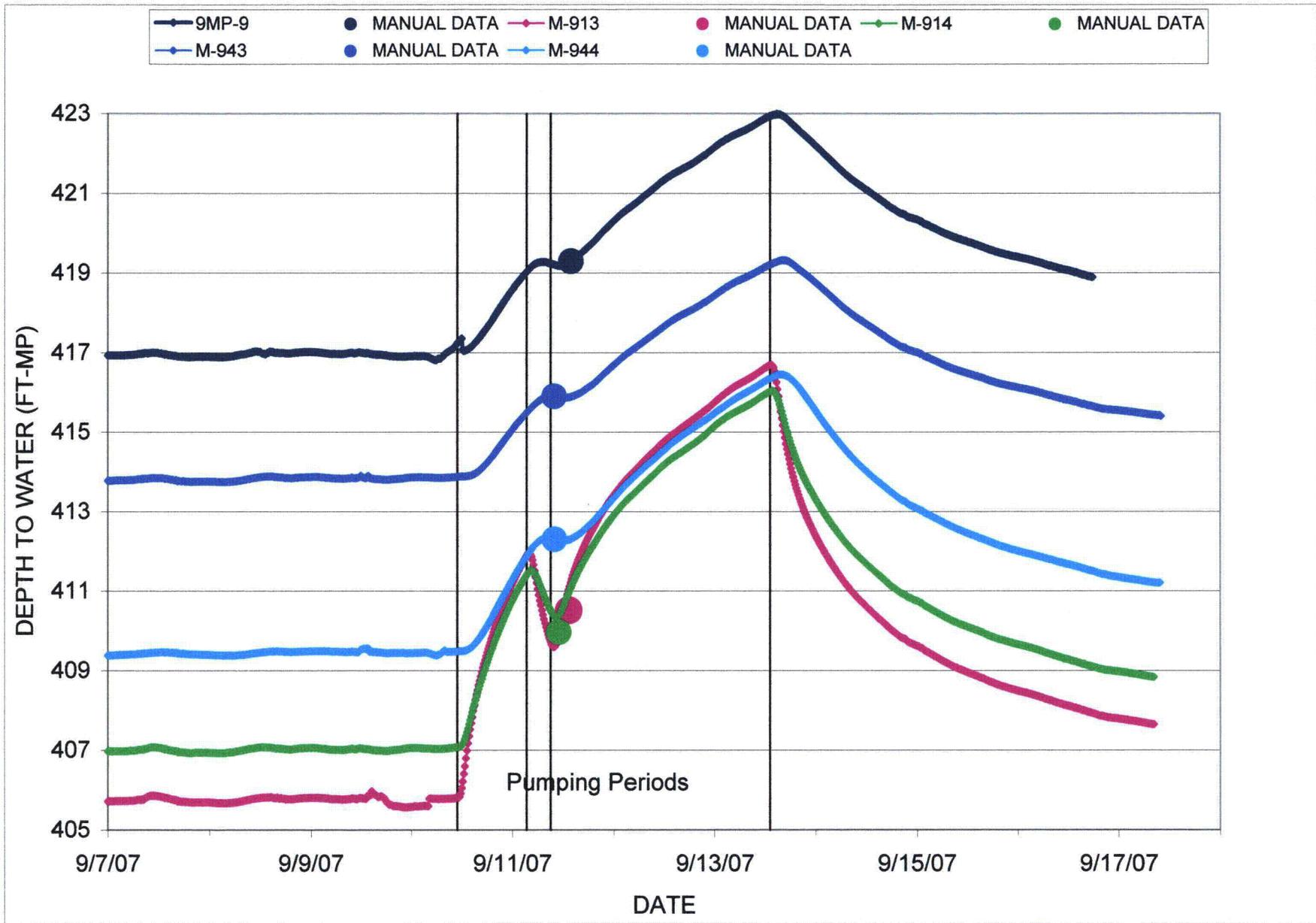


FIGURE 4-9. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-9, M-913, M-914, M-943 AND M-944

4-15

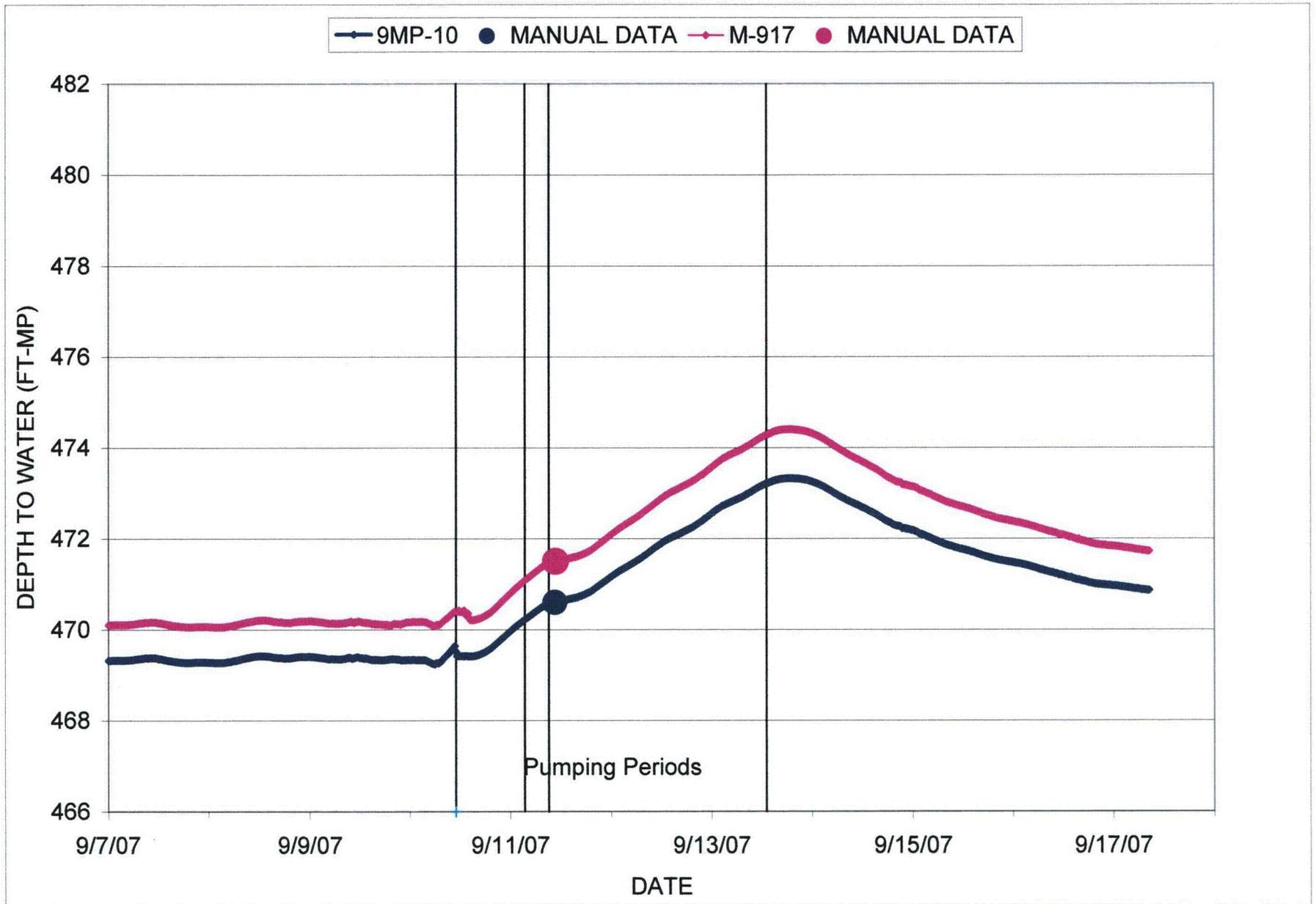


FIGURE 4-10. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-10 AND M-917

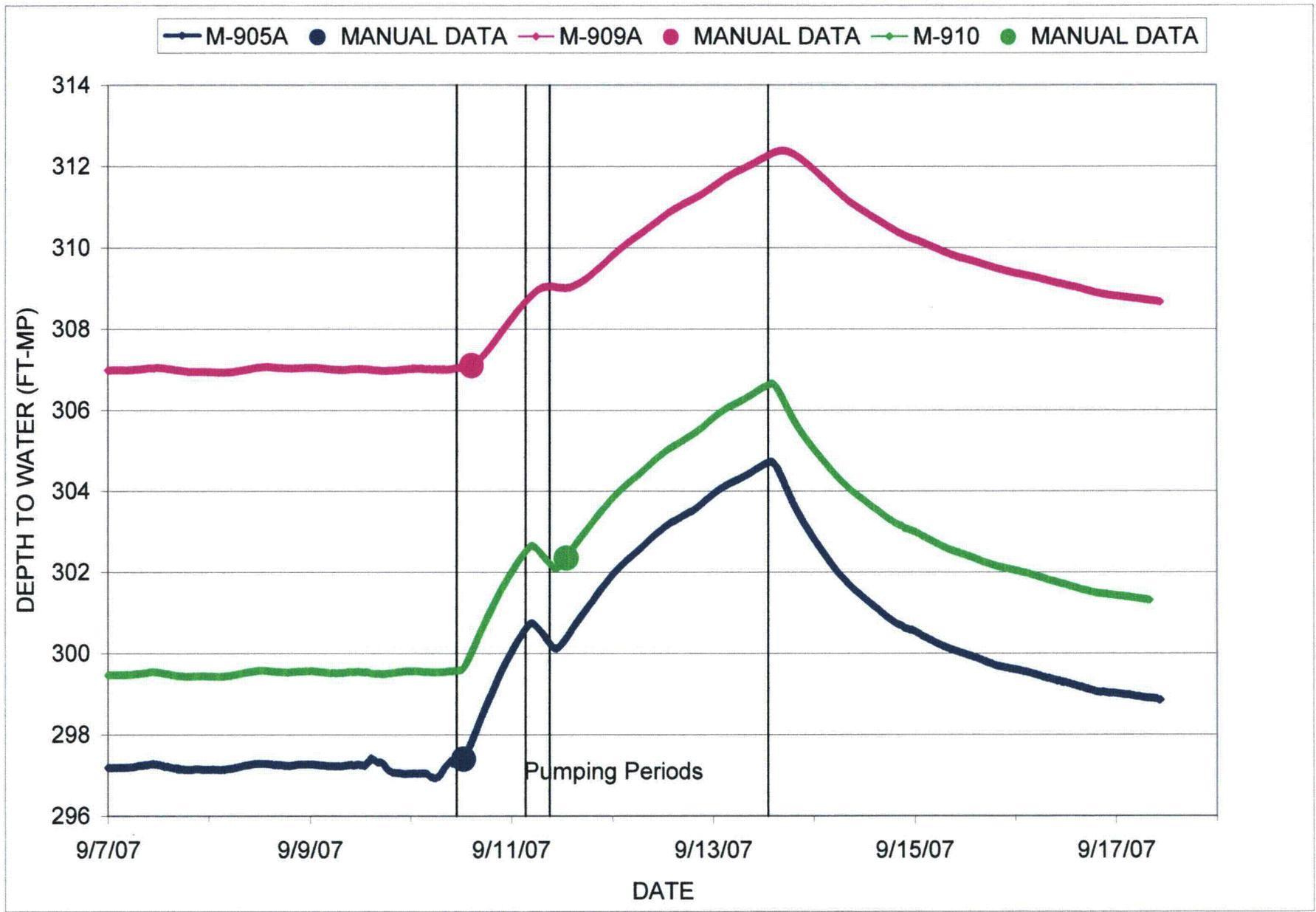


FIGURE 4-11. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-905A, M-909A AND M-910

4-17

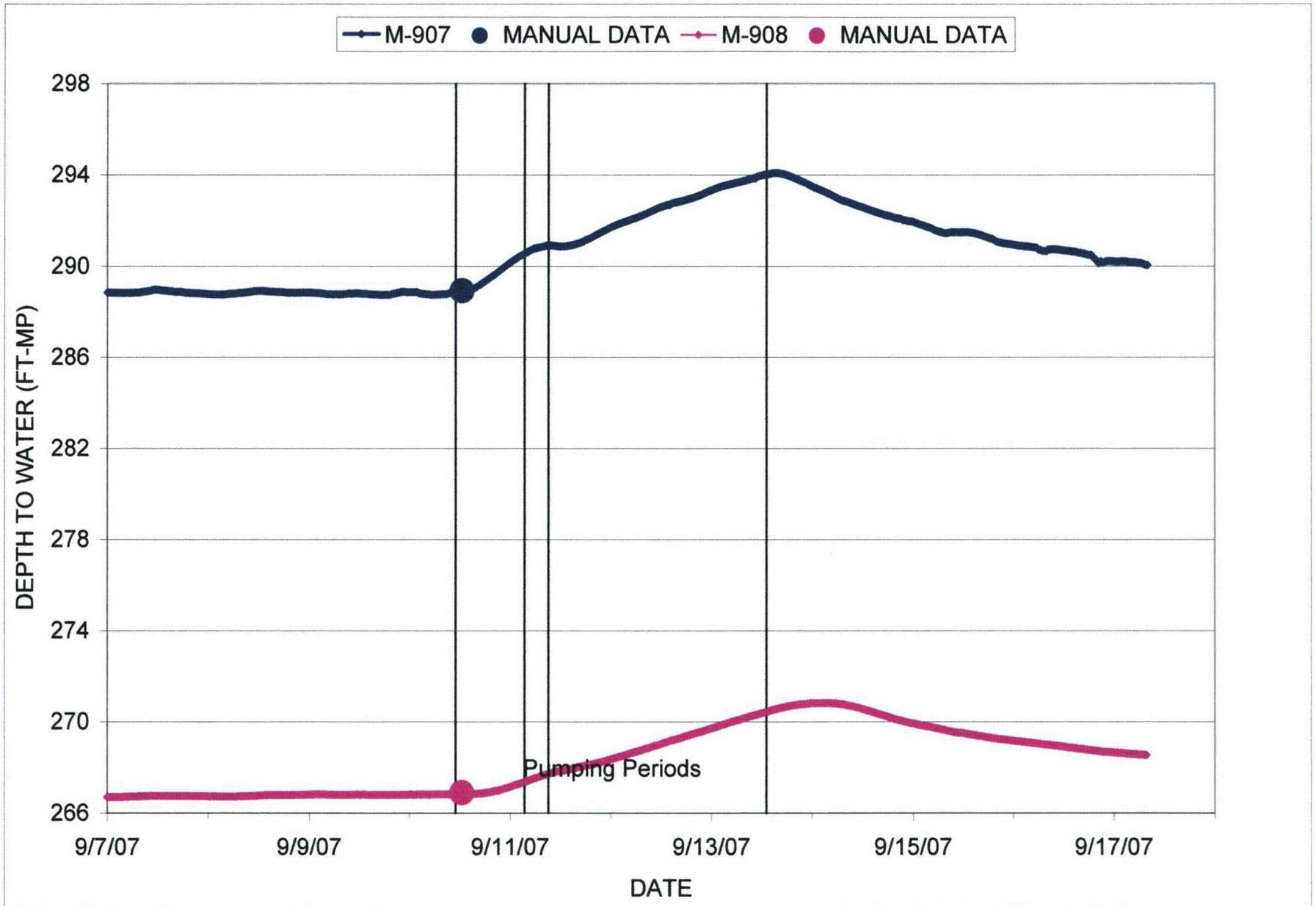


FIGURE 4-12. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-907 AND M-908

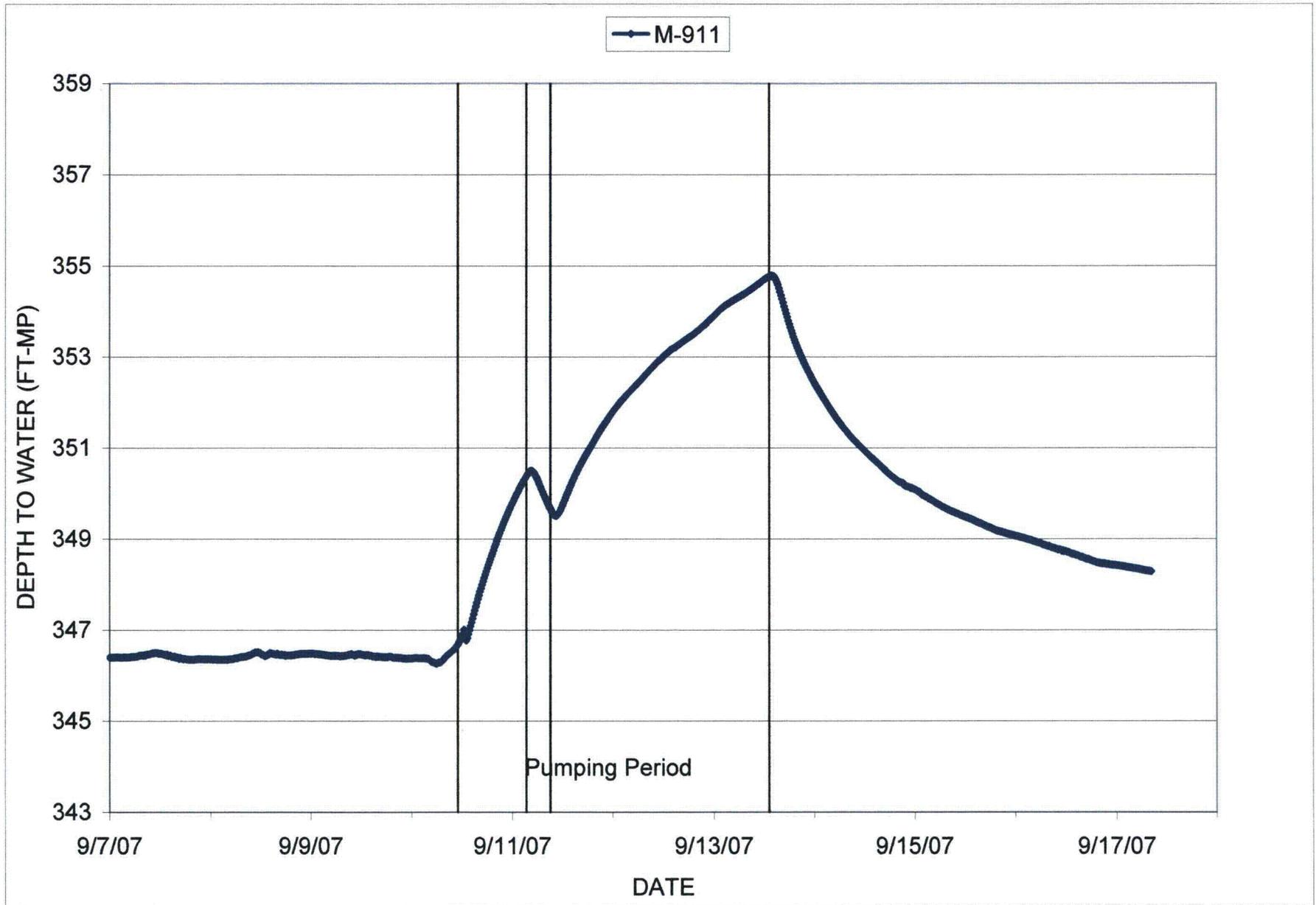


FIGURE 4-13. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-911

4-19

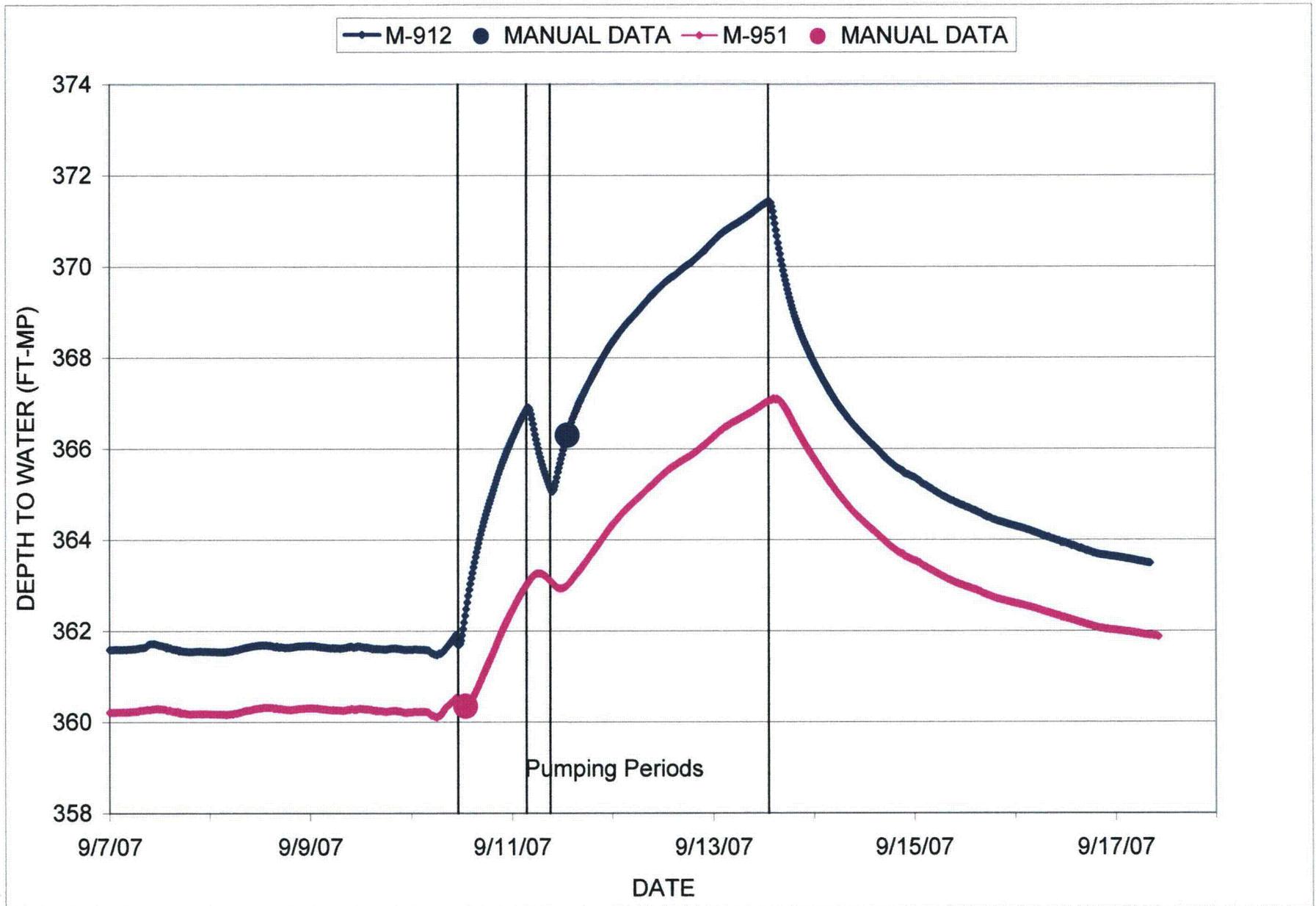


FIGURE 4-14. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-912 AND M-951

4-20

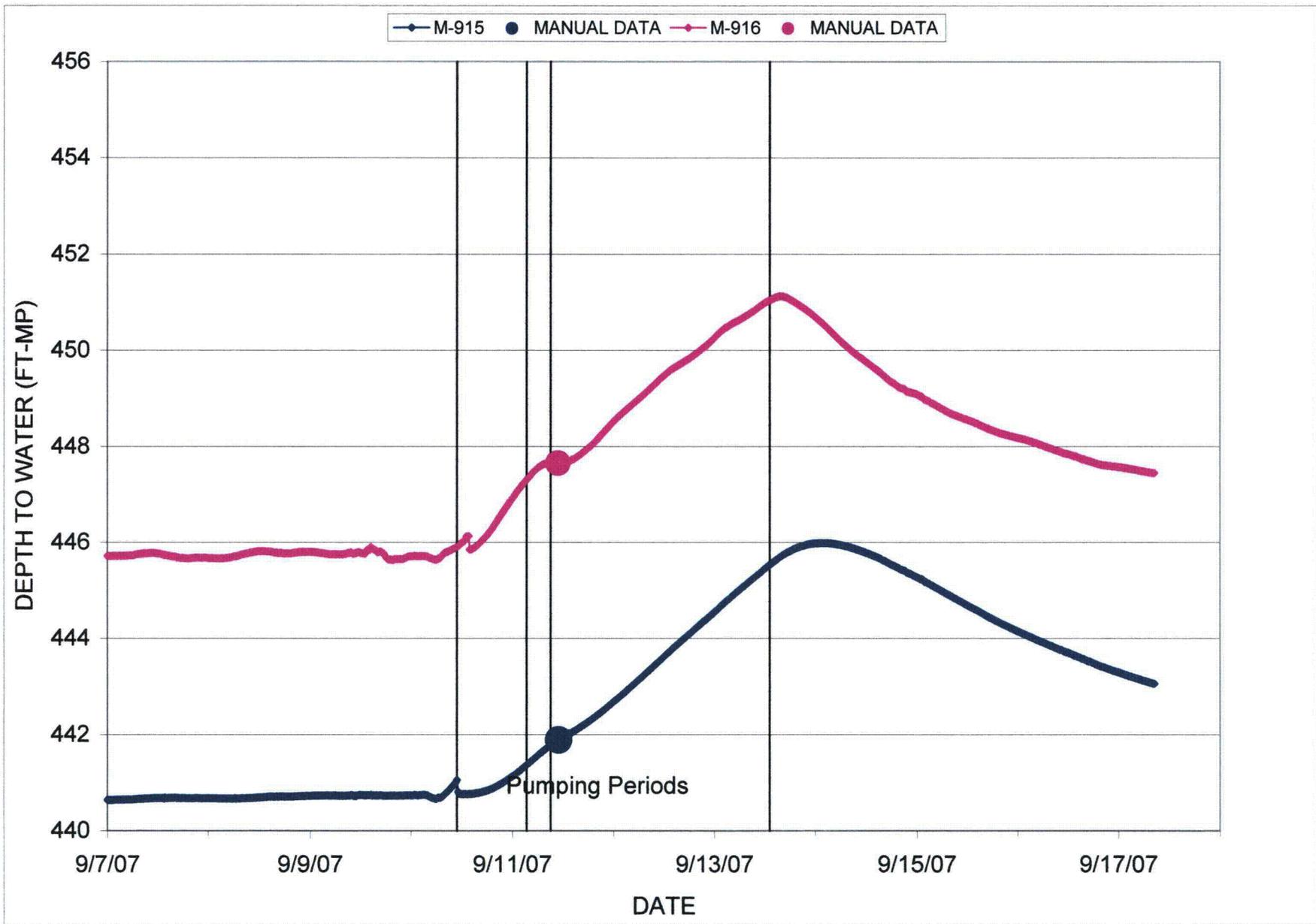


FIGURE 4-15. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-915 AND M-916

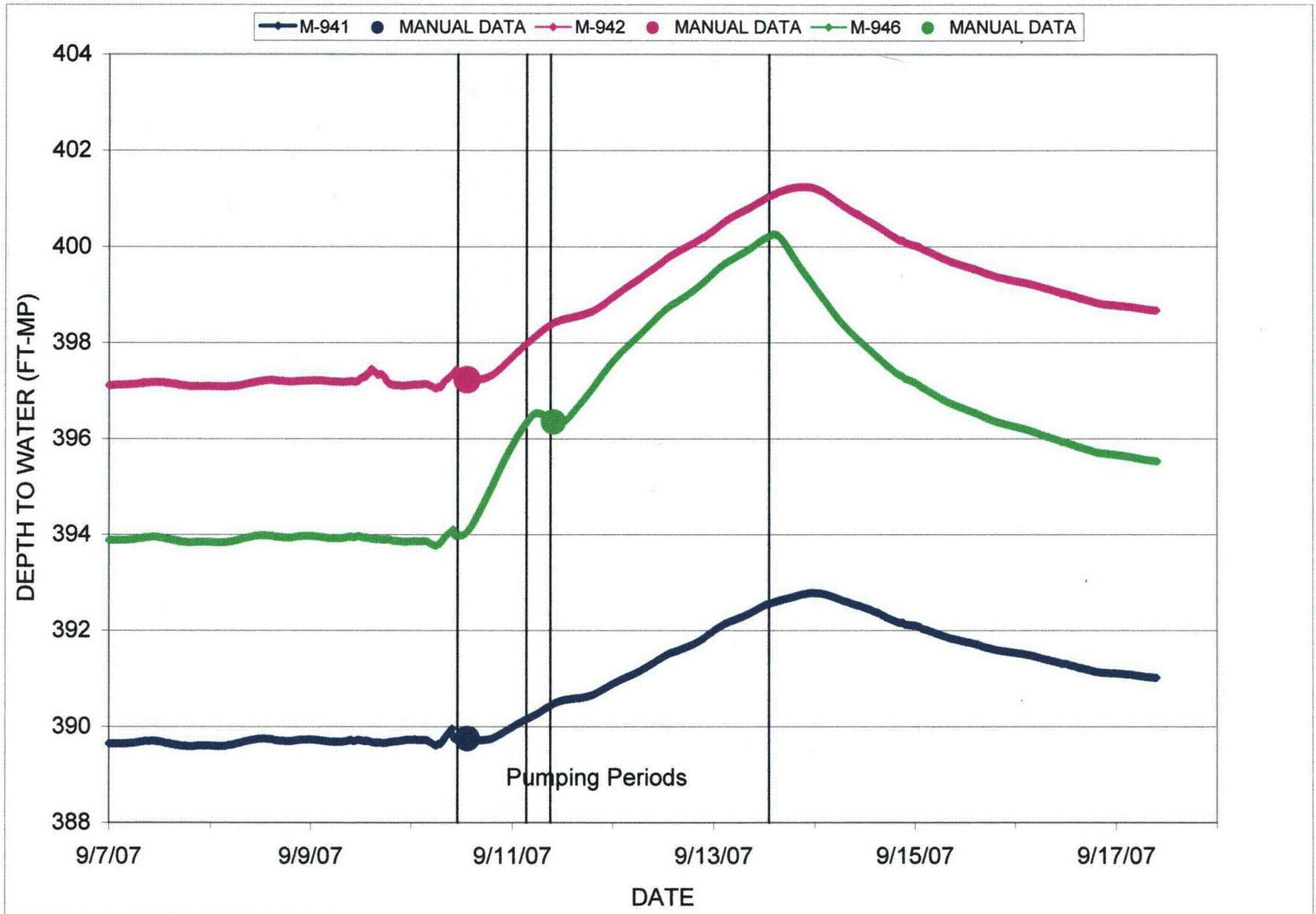


FIGURE 4-16. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-941, M-942 AND M-946

5.0 ANALYTICAL METHODS AND TEST RESULTS – PRODUCTION ZONE FOR 9PW-2A TEST

5.1 ANALYTICAL METHODS

Drawdown data collected from the monitor wells were graphically analyzed to determine transmissivity and storativity. The primary analysis method used was the Theis (1935) log-log method and the Cooper & Jacob (Jacob) (1946) straight-line method. Cooper & Jacob recommended the 'u' value to be <0.01 for usage of the straight line fit. Kruseman and de Rider (1991) suggest that a 'u' value of less than 0.1 is appropriate which can be seen from a plot of the Theis well function versus u on semi-log plot. With the use of the less than 0.1 criteria, the straight line method is appropriate for all of the K Sand wells except those that are greater than 1140 feet from the pumping well.

The test data were analyzed primarily using the Jacob method because this method is appropriate for the test. Ferris and others (1962) present the Theis and Jacob equation in the gallon per foot per day units used in these calculations. Appendix E presents the aquifer test theories with the adjustments needed to analyze the pump tests with an off period during the pumping phase of the test. The significant assumptions inherent in these two methods include:

- ▶ The aquifer is confined and has apparent infinite extent
- ▶ The aquifer is homogenous and isotropic, and of uniform thickness over the area influenced by pumping
- ▶ The piezometric surface is horizontal prior to pumping
- ▶ The well is pumped at a constant rate
- ▶ The pumping well is fully penetrated
- ▶ Well diameter is small, so well storage is negligible

These assumptions are reasonably satisfied. Obviously, the K Sand is not homogenous and isotropic; however, over the scale of the pump tests, it can be treated in this manner. Observation wells respond to the average conditions in the area and are reflective of large area for a long pumping period.

Leaky aquifer solutions such as Hantush (1960) were not applicable to the data from the K Sand. Likewise, because none of the monitor wells were completed within the confining units, a Neumann-Witherspoon (1972) analysis was not performed. Previous field and laboratory tests of the aquitards have shown that the Powder River Basin Shales are very adequate for ISR operation and do not need to be measured during the wellfield tests.

Water level stability data collected during the pre-test and post-test periods along with barometric pressure were used to assess the background trends. No significant recharge or trend corrections were warranted for any of the M or 9MP wells.

5.2 BACKGROUND TRENDS

Water level stability data were collected prior to the start of the test. Plots of the background data for the pumping M and 9MP wells are shown in Figures 4-3 through 4-16. Based on those data, water level trends prior to the start of the test did not warrant any pre-trend corrections. The barometric change during the pumping phase of the test was approximately 0.4 inches of Hg (see Section 6 plots for barometric pressure data) which did not require any adjustments in the K Sand water levels for barometric changes.

5.3 TEST RESULTS

5.3.1 DRAWDOWN

The drawdown achieved during the test is shown on Figure 5-1. Theis type curves and Jacob matches are presented in Figure 5-2 through 5-38 for the K Sand wells. The straight-line data after the pump was restarted can be analyzed by plotting a ratio of the times since pumping started. The first time (t_1) times the time since pumping started the second time (t_3) divided by the time since pumping stopped the first time (t_2) (see Appendix E for discussion of the multi-well straight-line equation). The u value for t_3 needs to be less than 0.1 for the straight-line method to be appropriate in this case. Based on the average aquifer properties and the amount of time pumped after the pump was restarted indicates that the distance from the pumping well has to be less than 1140 feet for the straight-line method to be appropriate in this case. The result from the straight-line method was not used in the calculation of the average aquifer properties for observation well distances greater than 1100 feet. The results in Table 5-1 therefore, were tagged and not used where the straight-line method does not meet this criteria. The drawdown data in Figure 5-4 shows that the drawdown became steady during the last portion of the test for well 9MP-6. This was due to the water level dropping below the transducer and therefore this portion of the drawdown data is not useful.

The log-log type curve matching for the 9PW-2A pump test had to be adjusted for the two start times due to the pump going off in this well. These log-log drawdowns were initially matched to the Theis type curve prior to the first stopping of the pump. This match point produced initial transmissivity and storage coefficient for the analysis. A refined transmissivity and storage coefficient was developed by using the entire portion of the drawdown curve. The initial transmissivity and storage coefficients and the time on, off and on of the pumping well were used with the multi-well equation (see Appendix E) to calculate the drawdown from the multi-pumping times. The transmissivity and storage coefficients were iterated during this matching to obtain the best match of the overall drawdown versus time for the entire test. This produced the refined transmissivity and refined storage coefficient which were used as the result for the log-log analysis for the 9PW-2A test.

The tabulation of the water level data for the test are included in Appendix C.

5.3.2 ANALYTICAL RESULTS

Transmissivity (T) results from the Jacob and Theis analysis ranged from 94 to 154 ft²/d, with an average T value of 121 ft²/d. The Jacob results were used to calculate average aquifer properties except for wells where the straight-line method was not appropriate. The Theis results were used for these wells in computing the average. The Theis results for wells M-915 and M-917 were also not used to compute the average transmissivity because these values were not considered representative of the aquifer. Based on the average thickness of the K Sand at pumping well 9PW-2A of 82 feet, the average hydraulic conductivity (K) is 1.47 ft/d (5.2E-4 cm/s) (Table 5-1). Assuming a water temperature of 50 degrees F, this equates to a permeability of approximately 700 millidarcies (md). Storativity (S) values ranged from 4.3E-5 to 2.2E-4. The average S value for the test was 7.7E-5.

Recovery analysis of the pumping well data (9PW-2A) results in a T value of 119 ft²/d.

5.4 DIRECTIONAL TRANSMISSIVITY

The K Sand monitoring wells all showed adequate drawdown to prove communication between the Production Zone and the monitoring wells. Therefore adequate communication exists between the monitoring wells and the Production zone. Drawdowns at the end of the 9PW-2A pump test are presented in Figure 5-1 and show a fairly uniform circular pattern. The directional transmissivities calculated from the Papadopulos (1965) method for the fluvial sands in the Powder River Basin vary greatly due to the combination of wells used in calculating the directional transmissivities. These fluvial channels were not formed in a consistent direction over any area such as MU9, therefore no calculations of the directional transmissivities were made from 9PW-2A pump test.

Table 5-1.
SUMMARY OF AQUIFER PROPERTIES FOR THE 9PW-2A TEST

Well	Distance from Pumping Well (ft)	THEIS			COOPER & JACOB		
		Transmissivity		Storage Coefficient	Transmissivity		Storage Coefficient
		(gpd/ft)	(ft ² /day)		(gpd/ft)	(ft ² /day)	
9PW-2A	-				950	127	
9MP-1A	1634	860	115	7.4E-05	@ 1080	144	@ 5.9E-05
9MP-2	965				890	119	6.0E-05
9MP-3A	758				830	111	7.3E-05
9MP-4	1255	990	132	6.2E-05	@ 950	127	@ 5.6E-05
9MP-5	701				850	114	6.9E-05
9MP-6	351				990	132	7.0E-05
9MP-7A	111	1090	146	9.4E-05	920	123	2.2E-04
9MP-8	824				1150	154	1.5E-04
9MP-9	1581	1000	134	6.4E-05	@ 930	124	@ 5.9E-05
9MP-10	2308	990	132	6.2E-05	@ 1220	163	@ 4.7E-05
M-901	2272	950	127	7.6E-05	@ 1220	163	@ 5.9E-05
M-902	1971	900	120	7.9E-05	@ 1140	152	@ 6.2E-05
M-903	1642	940	126	6.2E-05	@ 1430	191	@ 7.2E-05
M-904	1447	700	94	9.4E-05	@ 830	111	@ 7.2E-05
M-905A	1361	990	132	4.3E-05	@ 980	131	@ 4.6E-05
M-906	1508	1000	134	5.2E-05	@ 1010	135	@ 4.8E-05
M-907	1853	1050	140	5.8E-05	@ 1080	144	@ 4.9E-05
M-908	1890	820	110	1.1E-04	@ 1160	155	@ 7.9E-05
M-909A	1636	900	120	7.9E-05	@ 1010	135	@ 6.4E-05
M-910	1237	1040	139	6.8E-05	@ 950	127	@ 7.1E-05
M-911	1063				910	122	6.8E-05
M-912	811				850	114	8.4E-05
M-913	661				840	112	1.0E-04
M-914	832				840	112	1.1E-04
M-915	1345	#430	57	1.8E-04	@ 790	106	@ 1.3E-05
M-916	1765	840	112	7.3E-05	@ 1020	136	@ 5.7E-05
M-917	2218	#500	67	6.2E-05	@ 1050	140	@ 5.2E-05
M-941	2680	950	127	6.9E-05	@ 1390	186	@ 4.9E-05
M-942	2240	870	116	6.5E-05	@ 1110	148	@ 5.0E-05
M-943	1750	880	118	6.7E-05	@ 1050	140	@ 5.4E-05
M-944	1263	750	100	8.0E-05	@ 920	123	@ 7.3E-05
M-945	1012				950	127	7.0E-05
M-946	1506	1010	135	6.0E-05	@ 1030	138	@ 5.5E-05
M-947	2008	790	106	7.5E-05	@ 1130	151	@ 6.0E-05
M-948	2350	780	104	8.3E-05	@ 1370	183	@ 6.1E-05
M-949	2487	800	107	8.7E-05	@ 1560	209	@ 5.9E-05
M-950	1148	800	107	8.6E-05	@ 910	122	@ 6.9E-05
M-951	1408	840	112	6.7E-05	@ 970	130	@ 5.8E-05
AVERAGE:					903		7.7E-05

Note: @ = used Theis result to calculate average
= not considered representative and not used in average

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 5-1, "K SAND
MAXIMUM DRAWDOWN FOR THE MU
9PW-2A PUMP TEST, IN FEET"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 5-1**

D-11

9-9

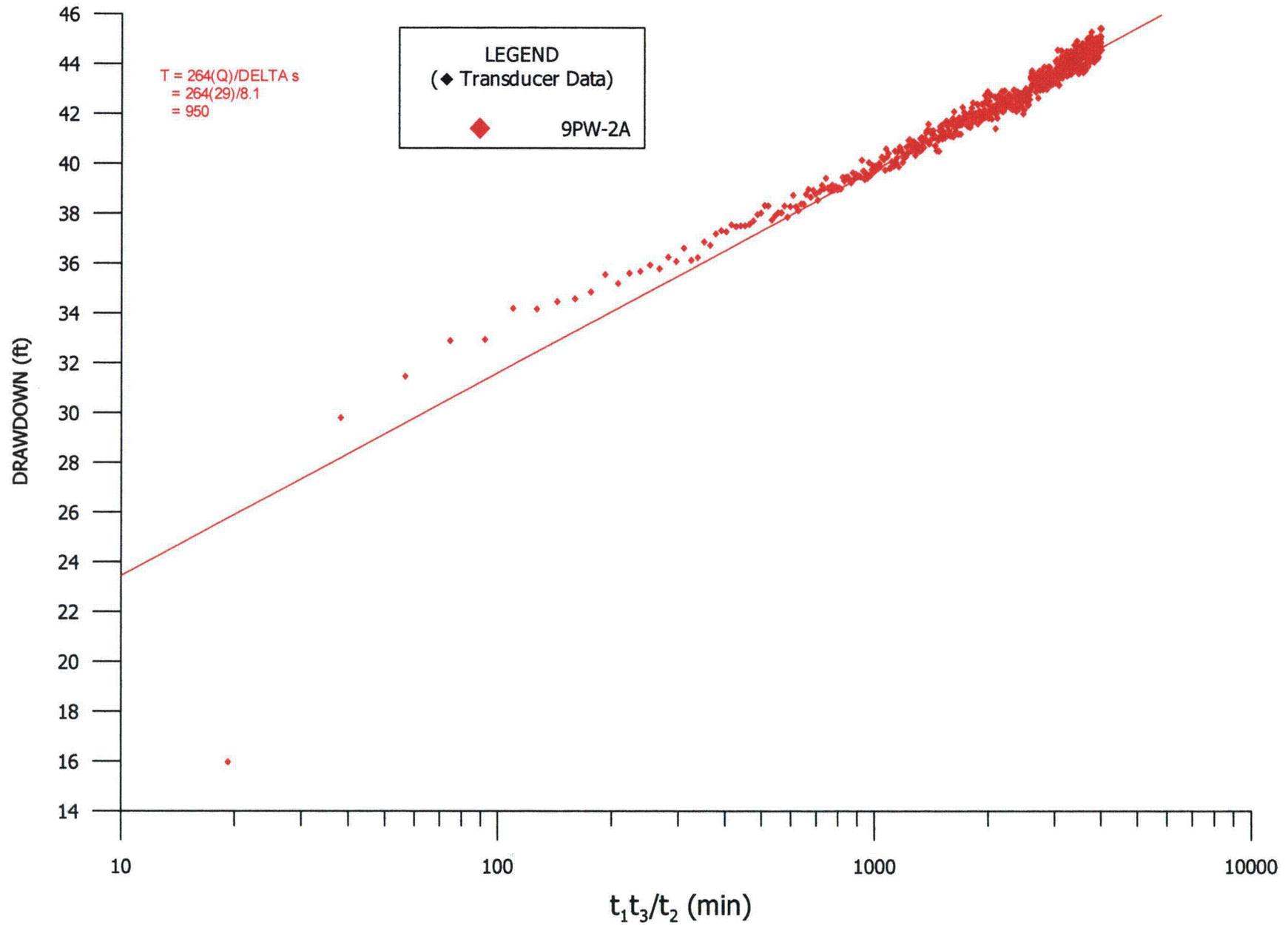


FIGURE 5-2. DRAWDOWN IN PUMPING WELL 9PW-2A, SEMI-LOG

5-7

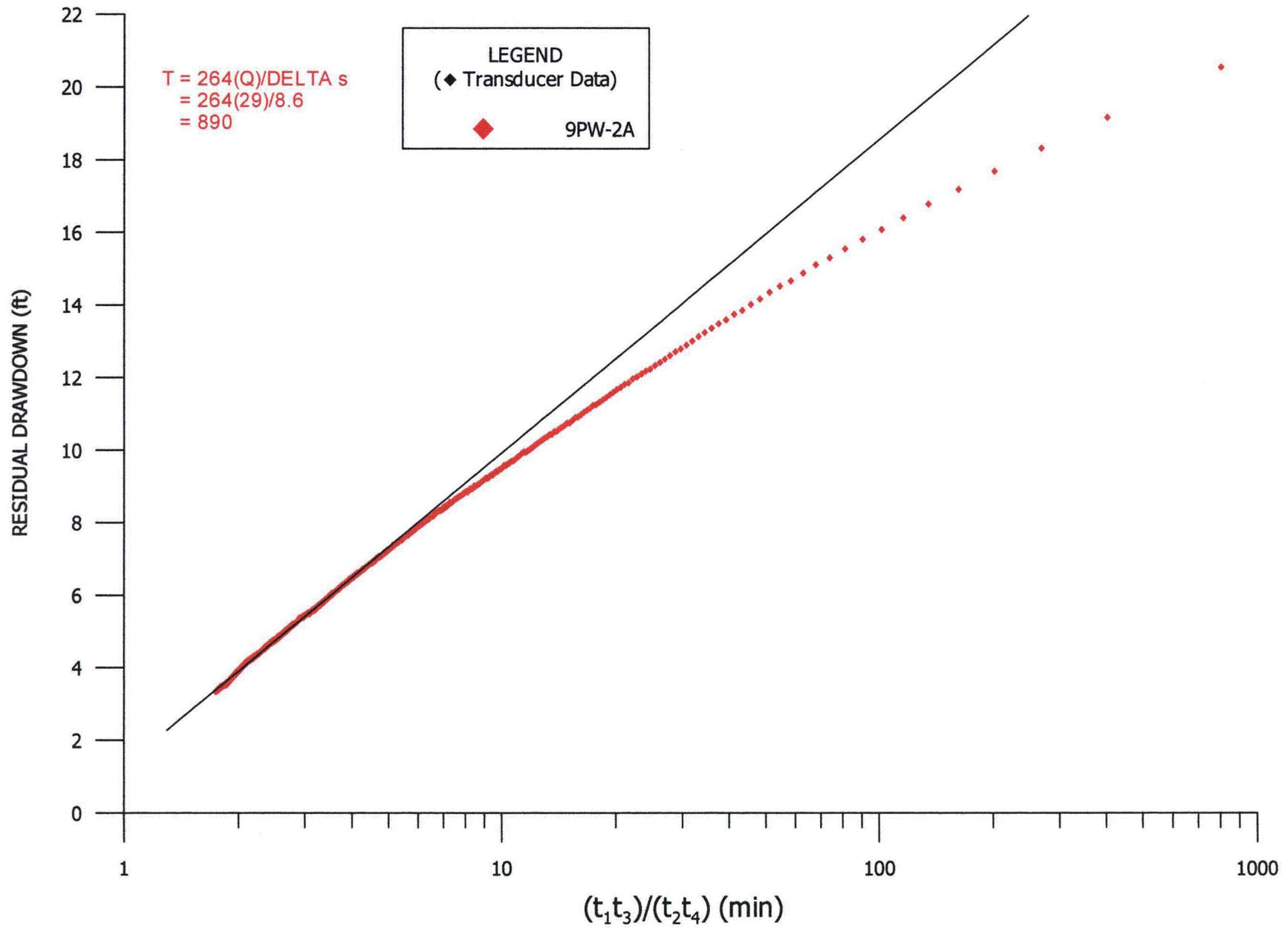


FIGURE 5-3. RECOVERY IN PUMPING WELL 9PW-2A

8-5

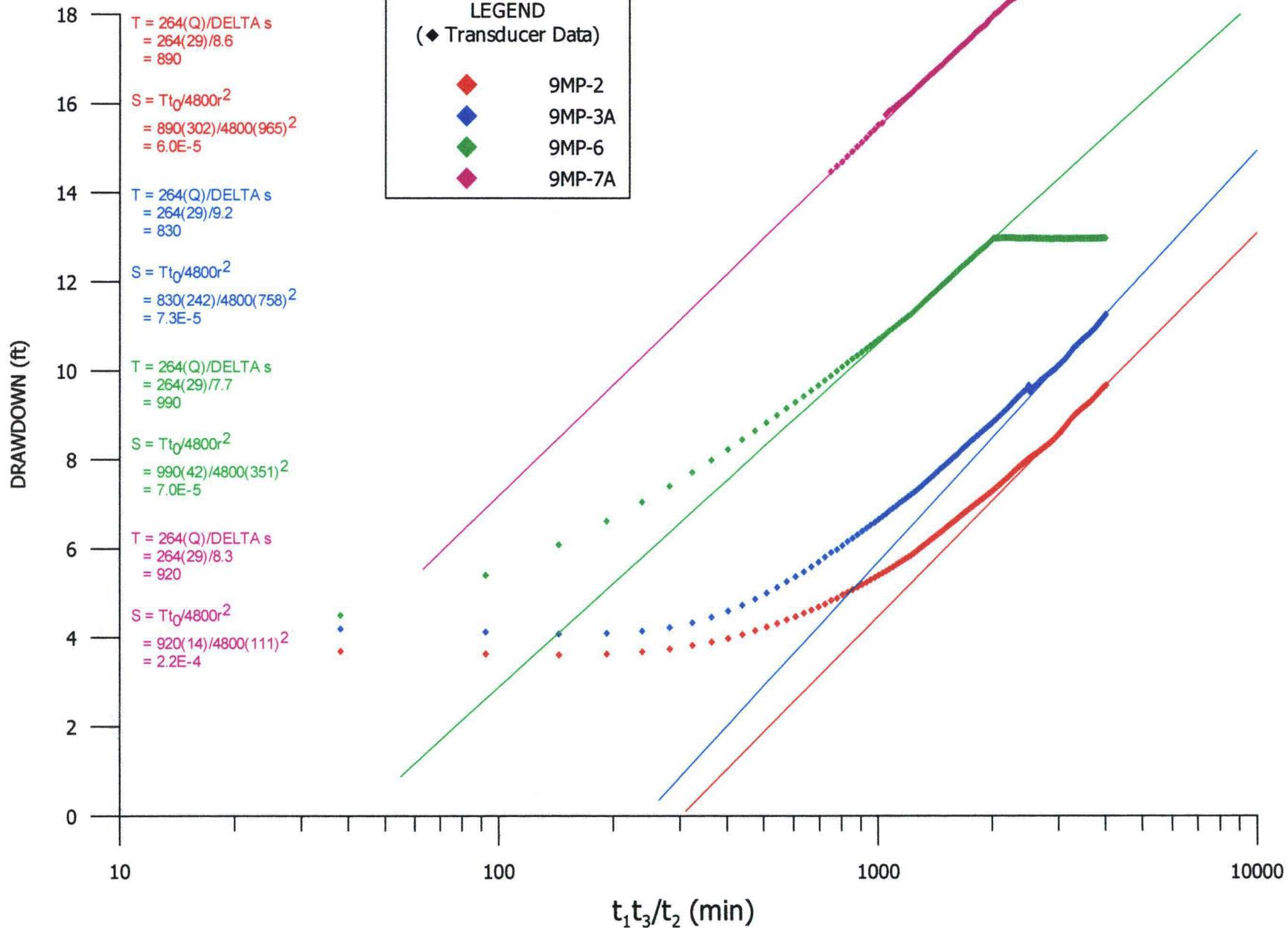
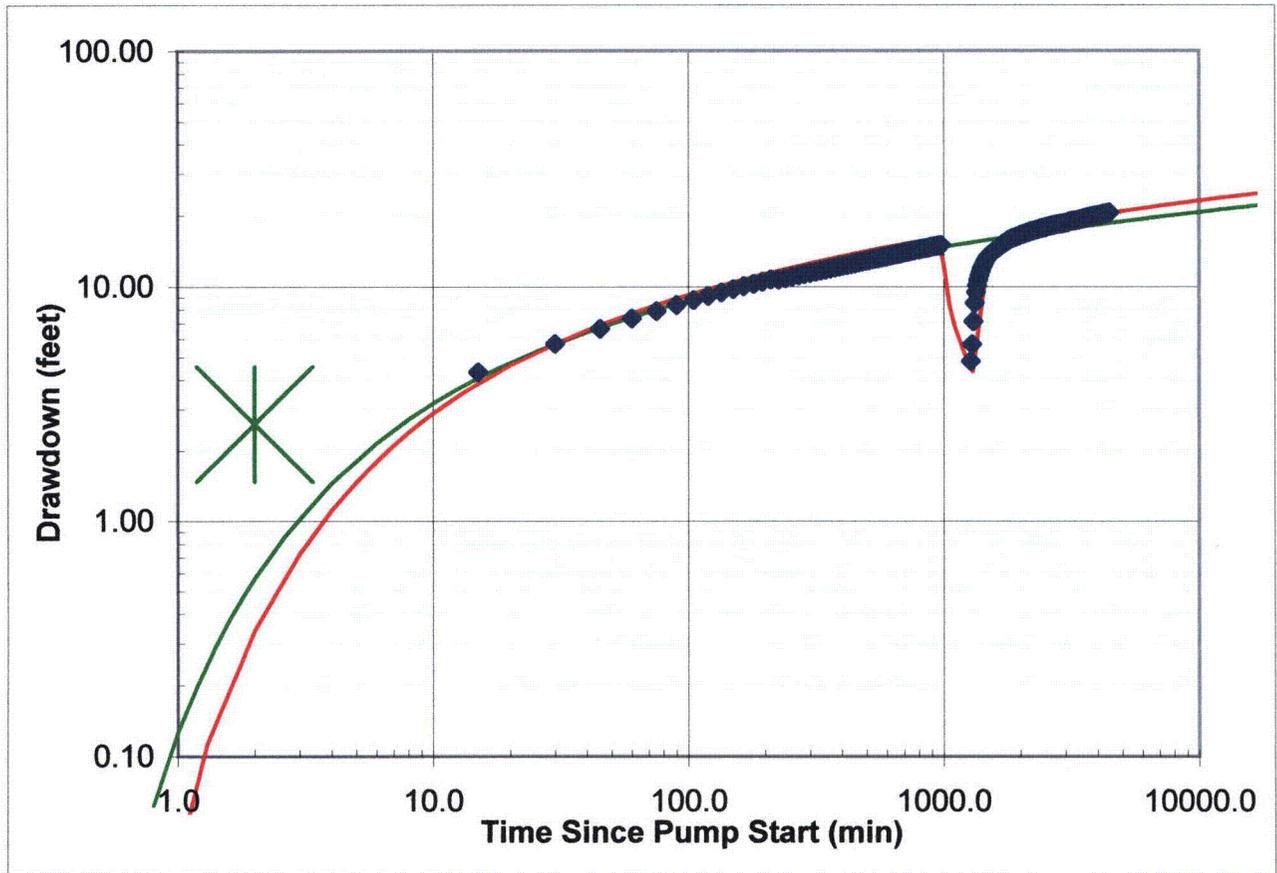


FIGURE 5-4. DRAWDOWN IN OBSERVATION WELLS 9MP-2, 9MP-3A, 9MP-6 AND 9MP-7A, SEMI-LOG



This Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	111
Drawdown Match Point (ft)	2.60
Time Match Point (min)	2.0
Calculated Transmissivity (gal/day/ft)	1280
Calculated Storage Coefficient (ft/ft)	7.7E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1090</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>9.4E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-5. DRAWDOWN IN OBSERVATION WELL 9MP-7A, LOG-LOG

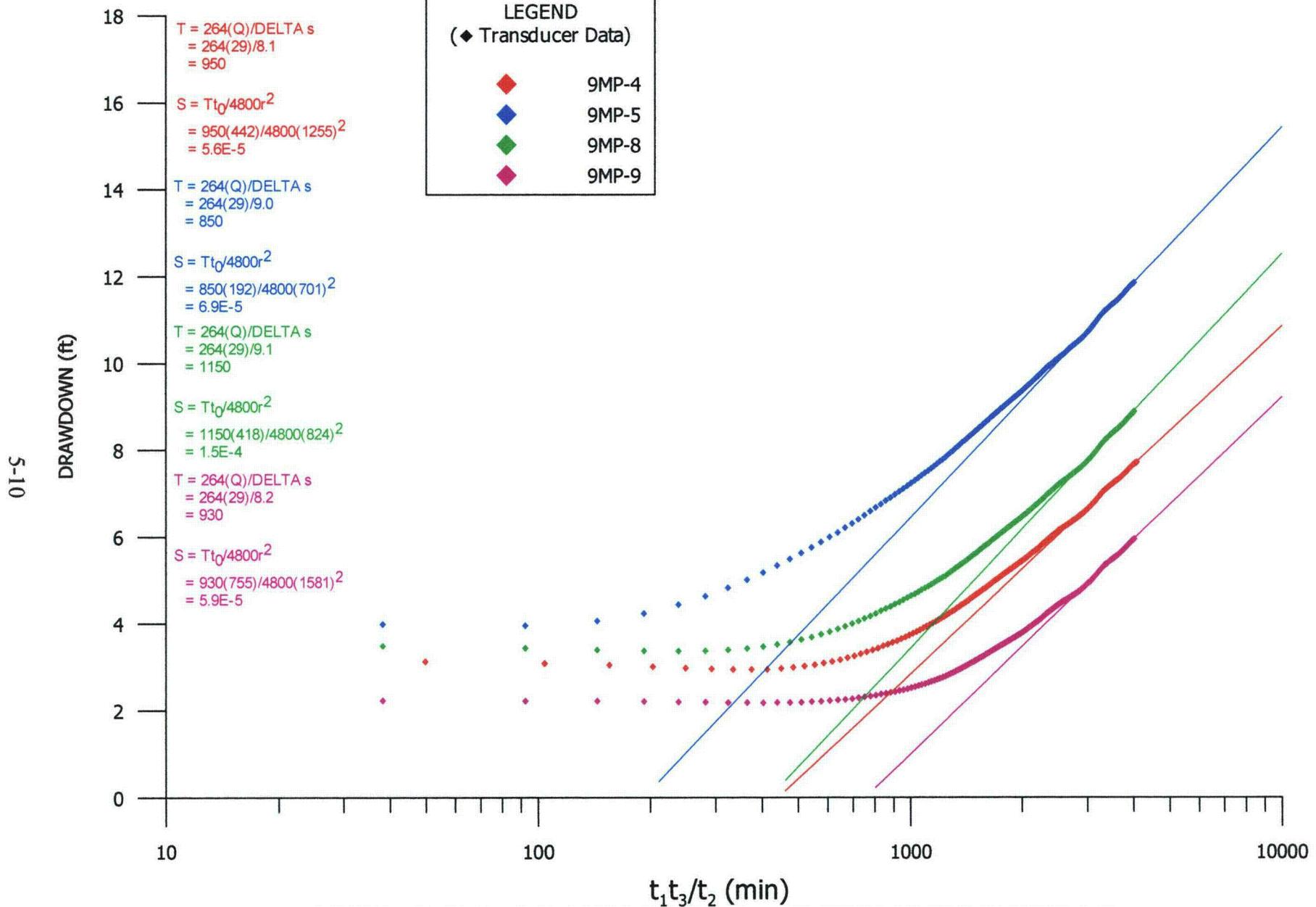
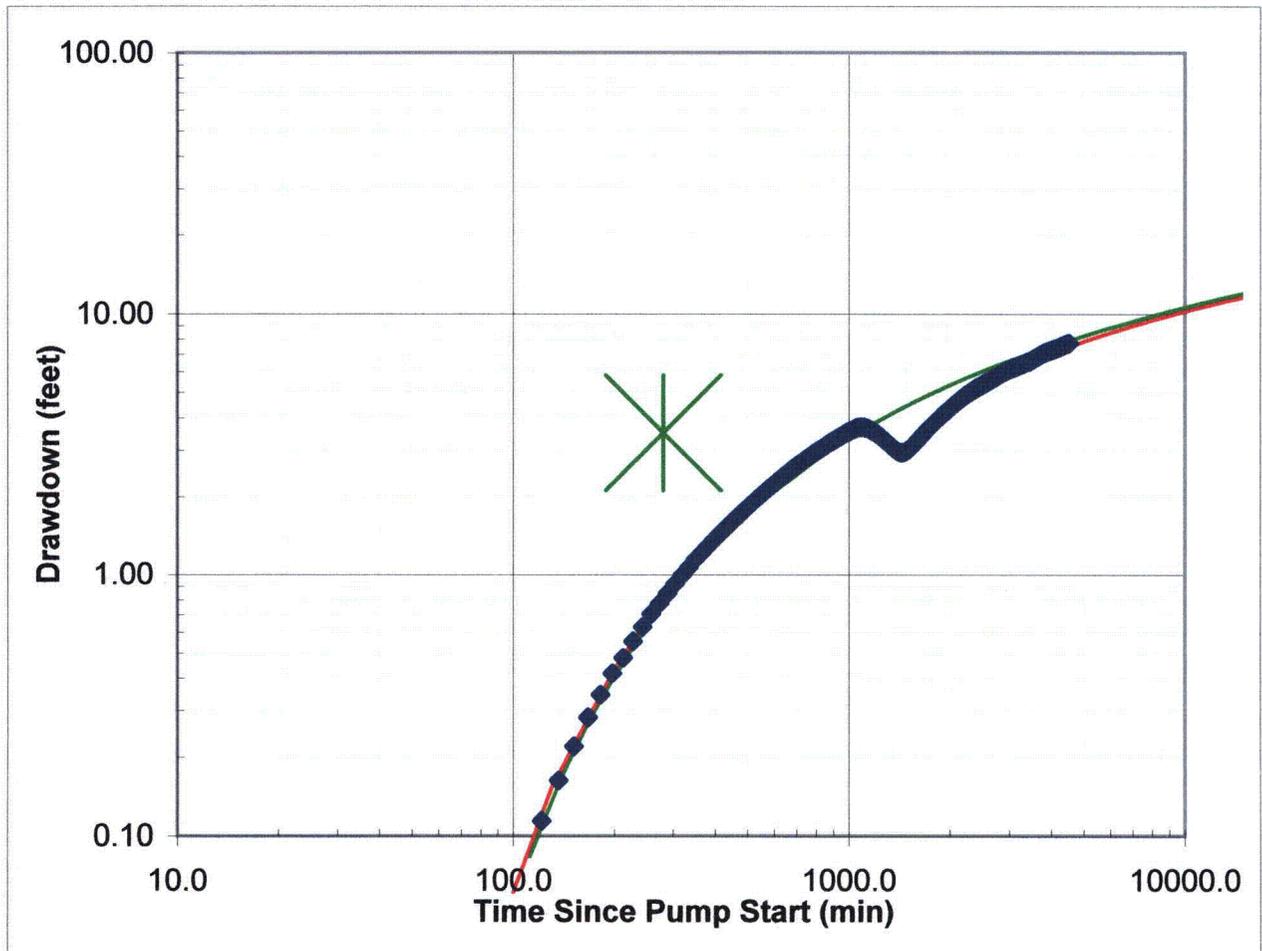


FIGURE 5-6. DRAWDOWN IN OBSERVATION WELLS 9MP-4, 9MP-5, 9MP-8 AND 9MP-9, SEMI-LOG



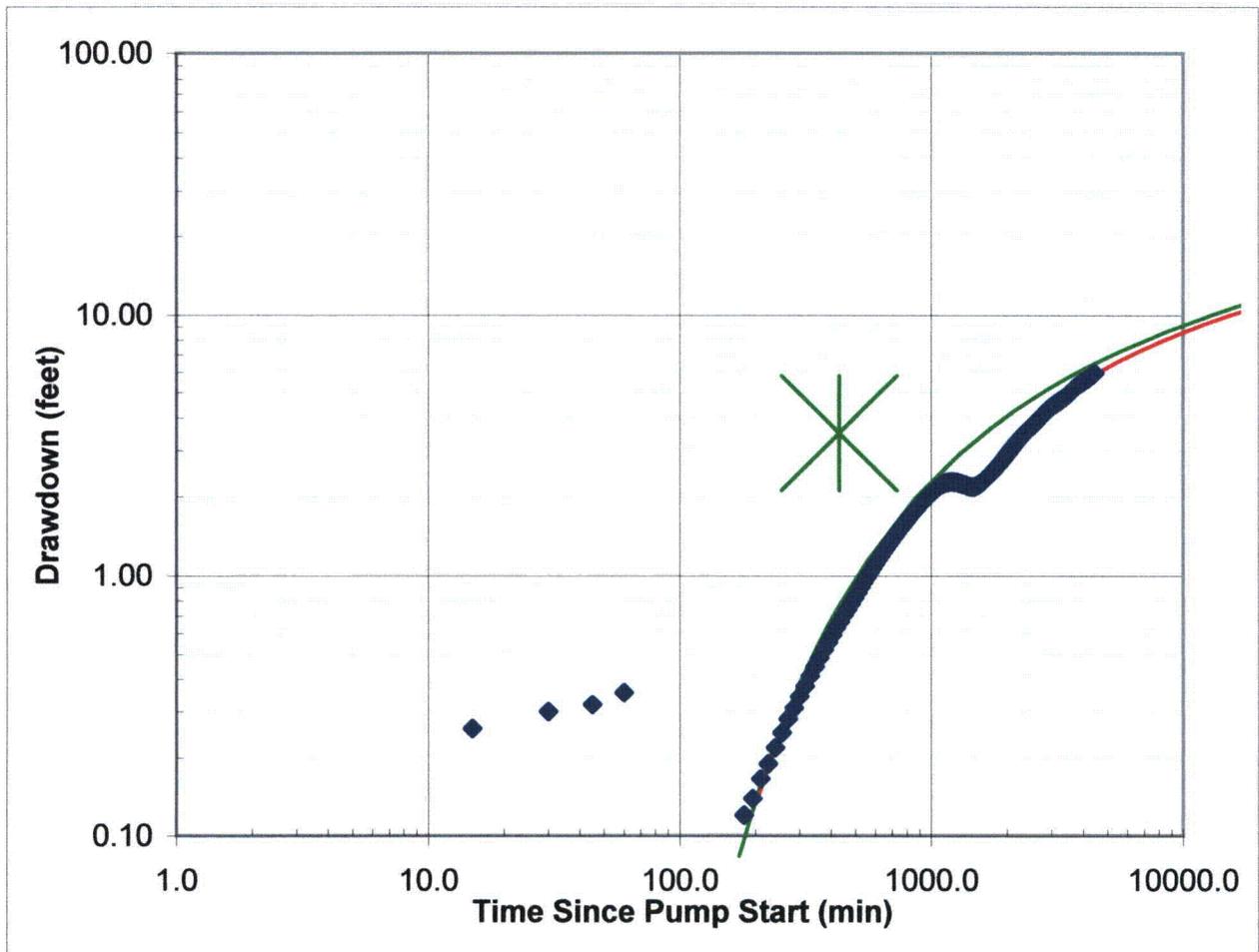
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1255
Drawdown Match Point (ft)	<u>3.50</u>
Time Match Point (min)	280.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	6.3E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>990</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.2E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-7. DRAWDOWN IN OBSERVATION WELL 9MP-4, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1581
Drawdown Match Point (ft)	3.50
Time Match Point (min)	430.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	6.1E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1000</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.4E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-8. DRAWDOWN IN OBSERVATION WELL 9MP-9, LOG-LOG

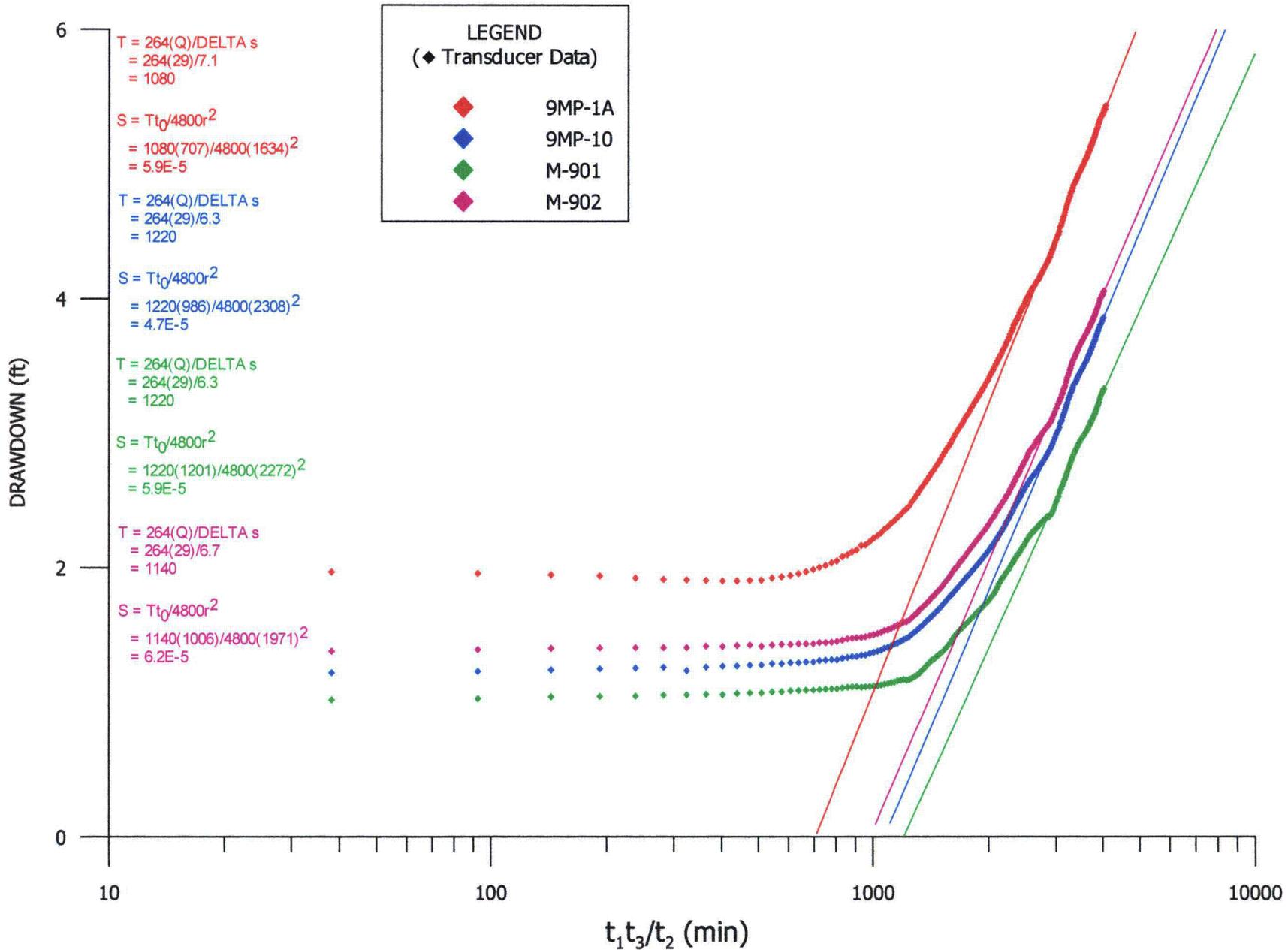
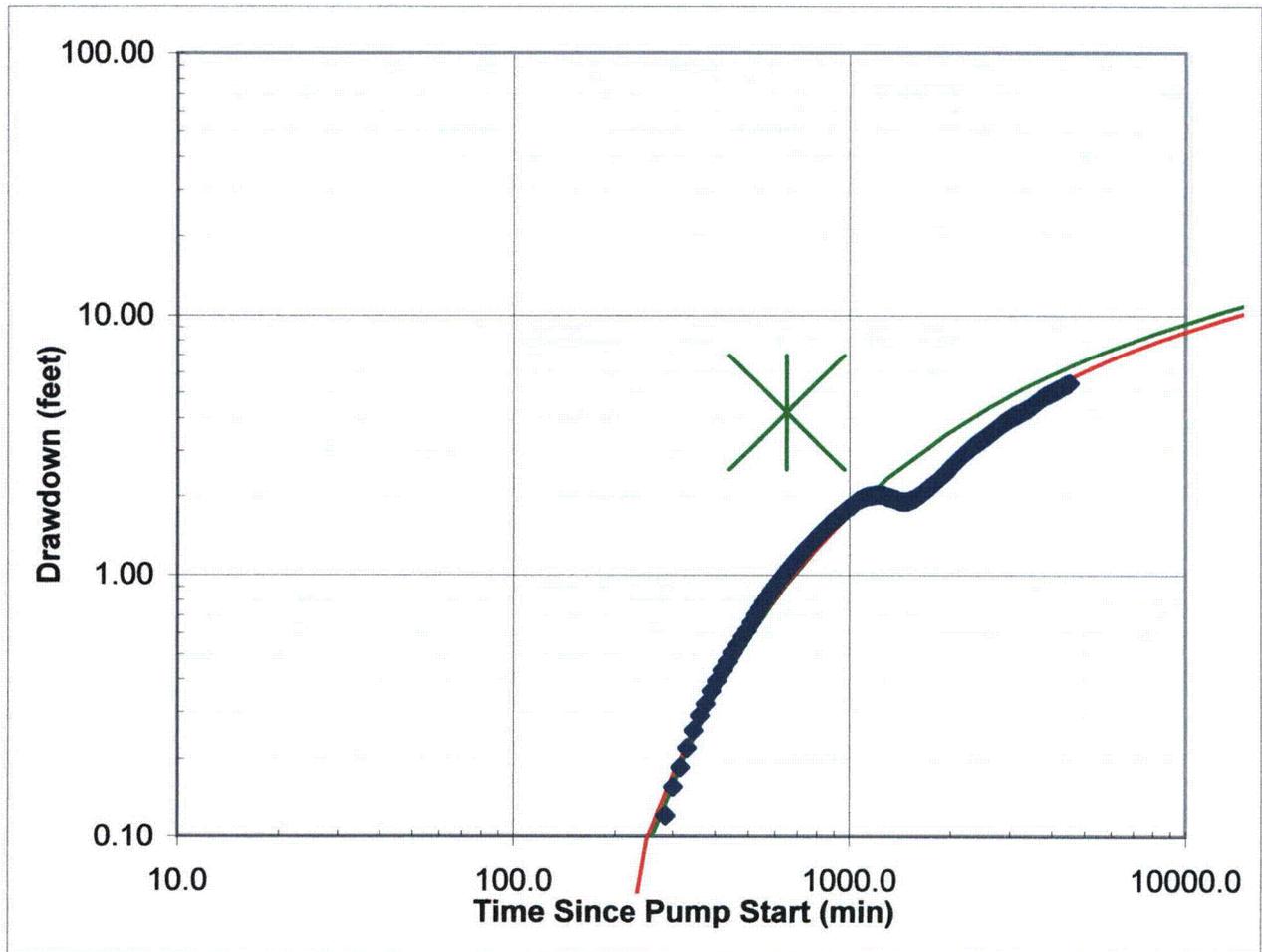


FIGURE 5-9. DRAWDOWN IN OBSERVATION WELLS 9MP-1A, 9MP-10, M-901 AND M-902, SEMI-LOG



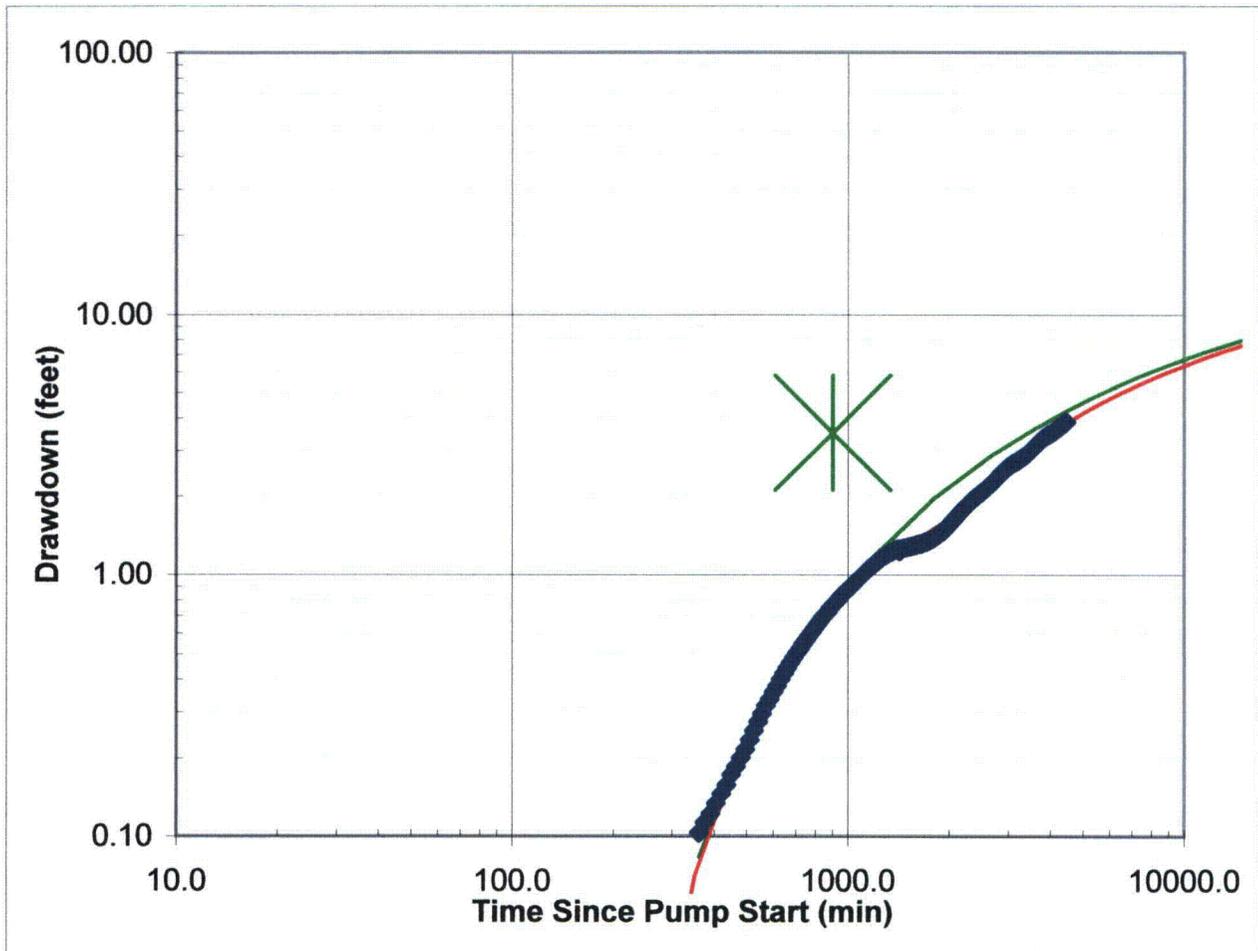
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1634
Drawdown Match Point (ft)	4.20
Time Match Point (min)	650.0
Calculated Transmissivity (gal/day/ft)	790
Calculated Storage Coefficient (ft/ft)	7.2E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>860</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>7.4E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-10. DRAWDOWN IN OBSERVATION WELL 9MP-1A, LOG-LOG



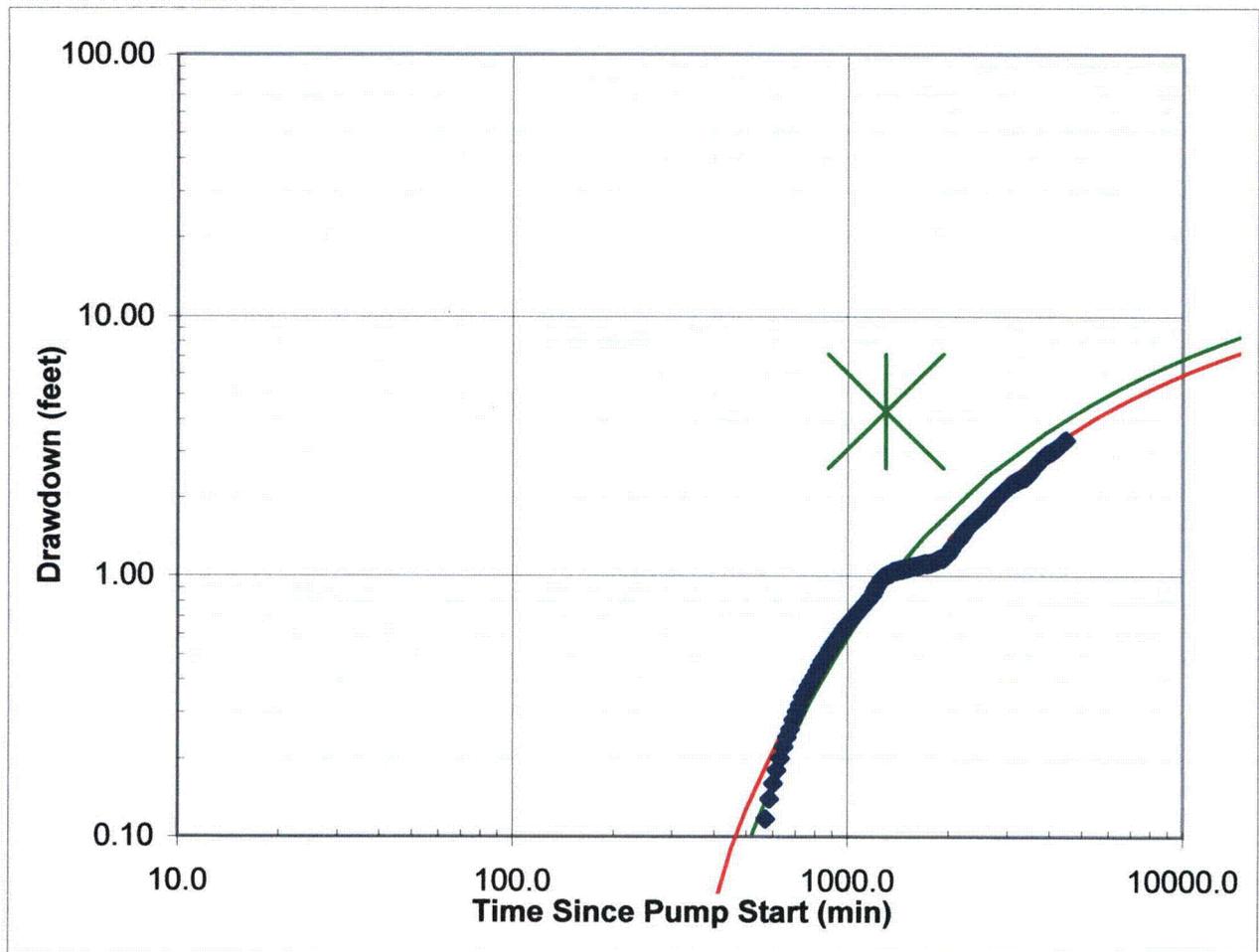
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2308
Drawdown Match Point (ft)	3.50
Time Match Point (min)	900.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	6.0E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>990</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.2E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-11. DRAWDOWN IN OBSERVATION WELL 9MP-10, LOG-LOG



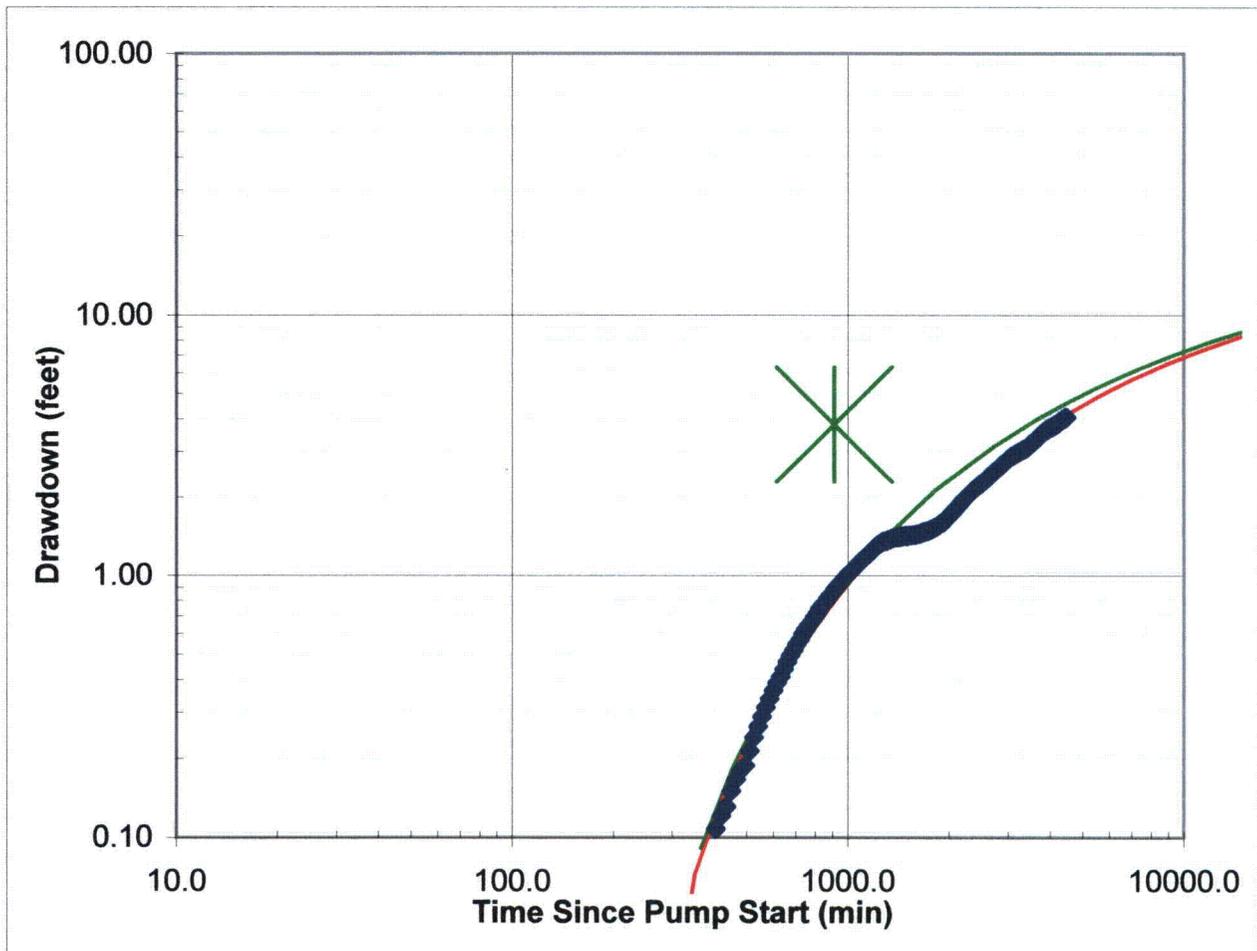
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2272
Drawdown Match Point (ft)	4.30
Time Match Point (min)	1300.0
Calculated Transmissivity (gal/day/ft)	770
Calculated Storage Coefficient (ft/ft)	7.2E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>950</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>7.6E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-12. DRAWDOWN IN OBSERVATION WELL M-901, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1971
Drawdown Match Point (ft)	3.80
Time Match Point (min)	910.0
Calculated Transmissivity (gal/day/ft)	870
Calculated Storage Coefficient (ft/ft)	7.6E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>900</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>7.9E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-13. DRAWDOWN IN OBSERVATION WELL M-902, LOG-LOG

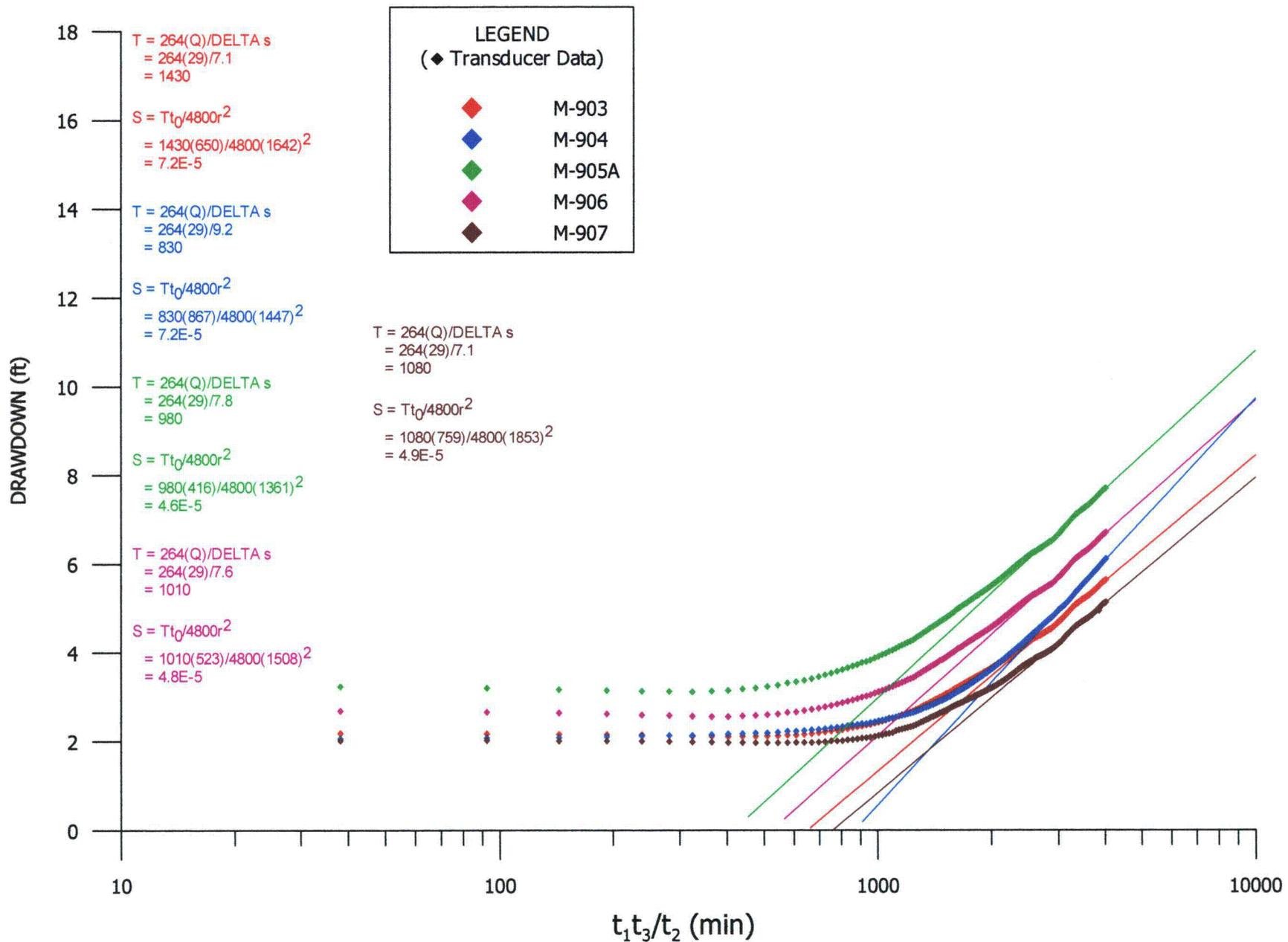
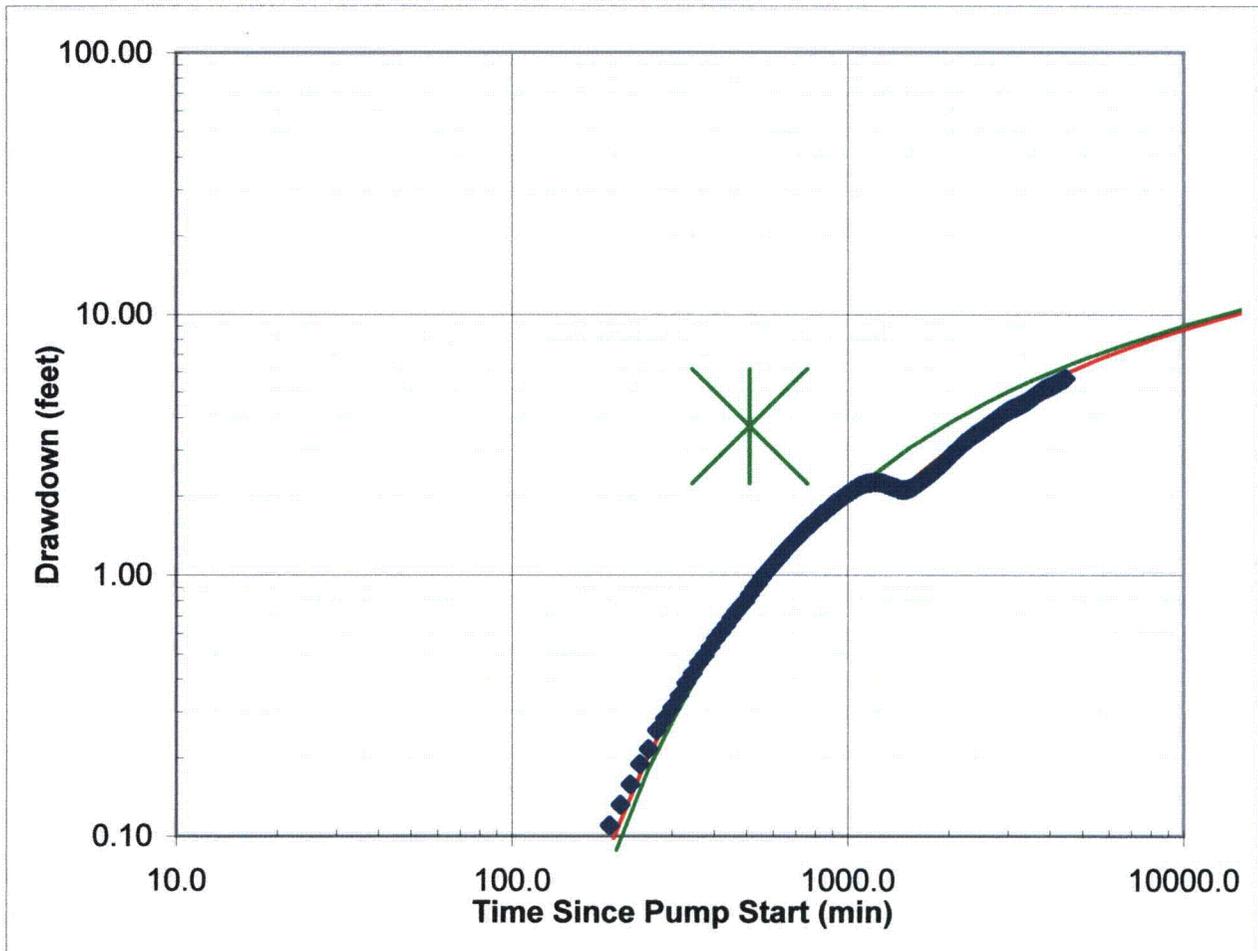


FIGURE 5-14. DRAWDOWN IN OBSERVATION WELLS M-903, M-904, M-905A, M-906 AND M-907, SEMI-LOG



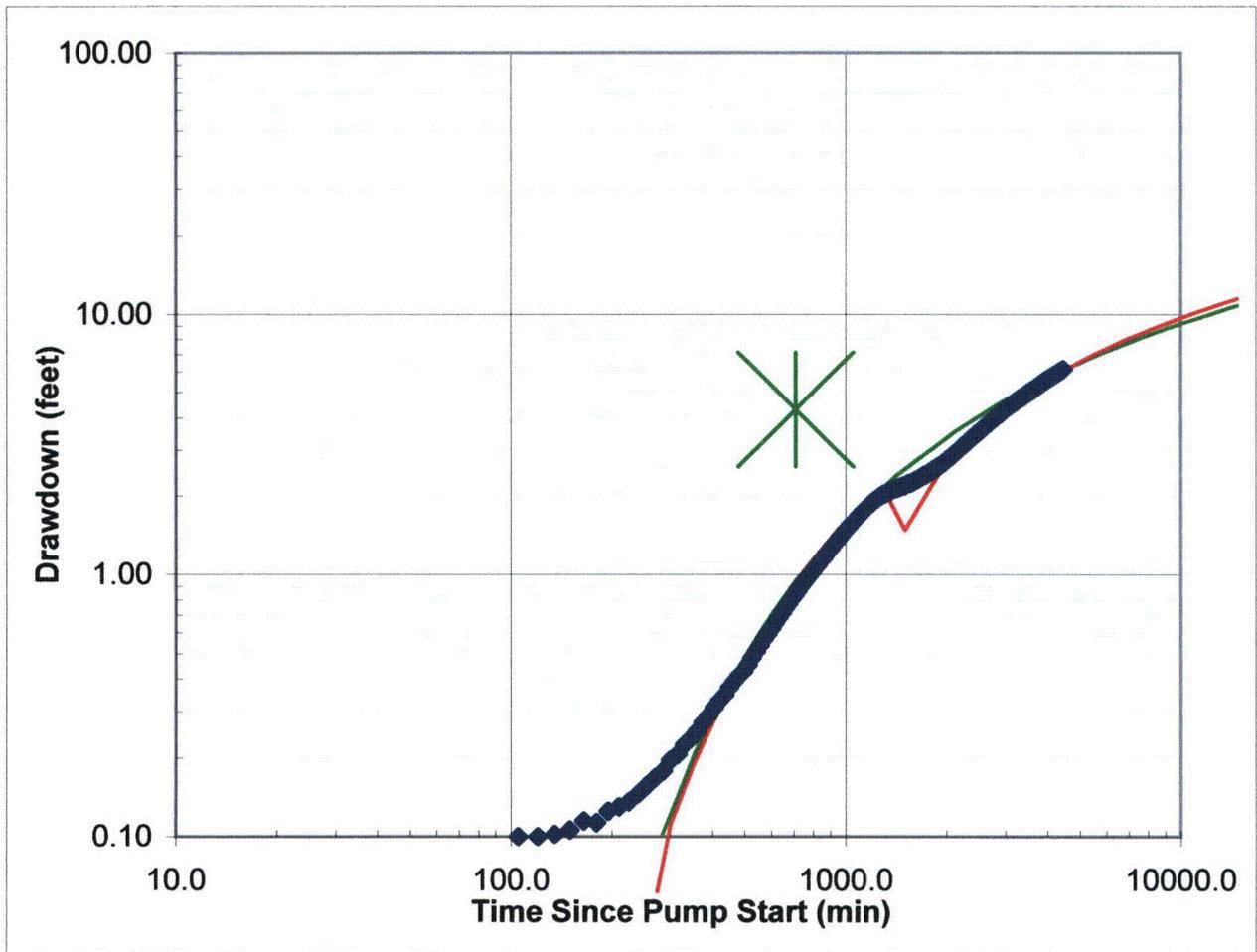
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1642
Drawdown Match Point (ft)	3.75
Time Match Point (min)	510.0
Calculated Transmissivity (gal/day/ft)	900
Calculated Storage Coefficient (ft/ft)	6.3E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>940</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.2E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-15. DRAWDOWN IN OBSERVATION WELL M-903, LOG-LOG



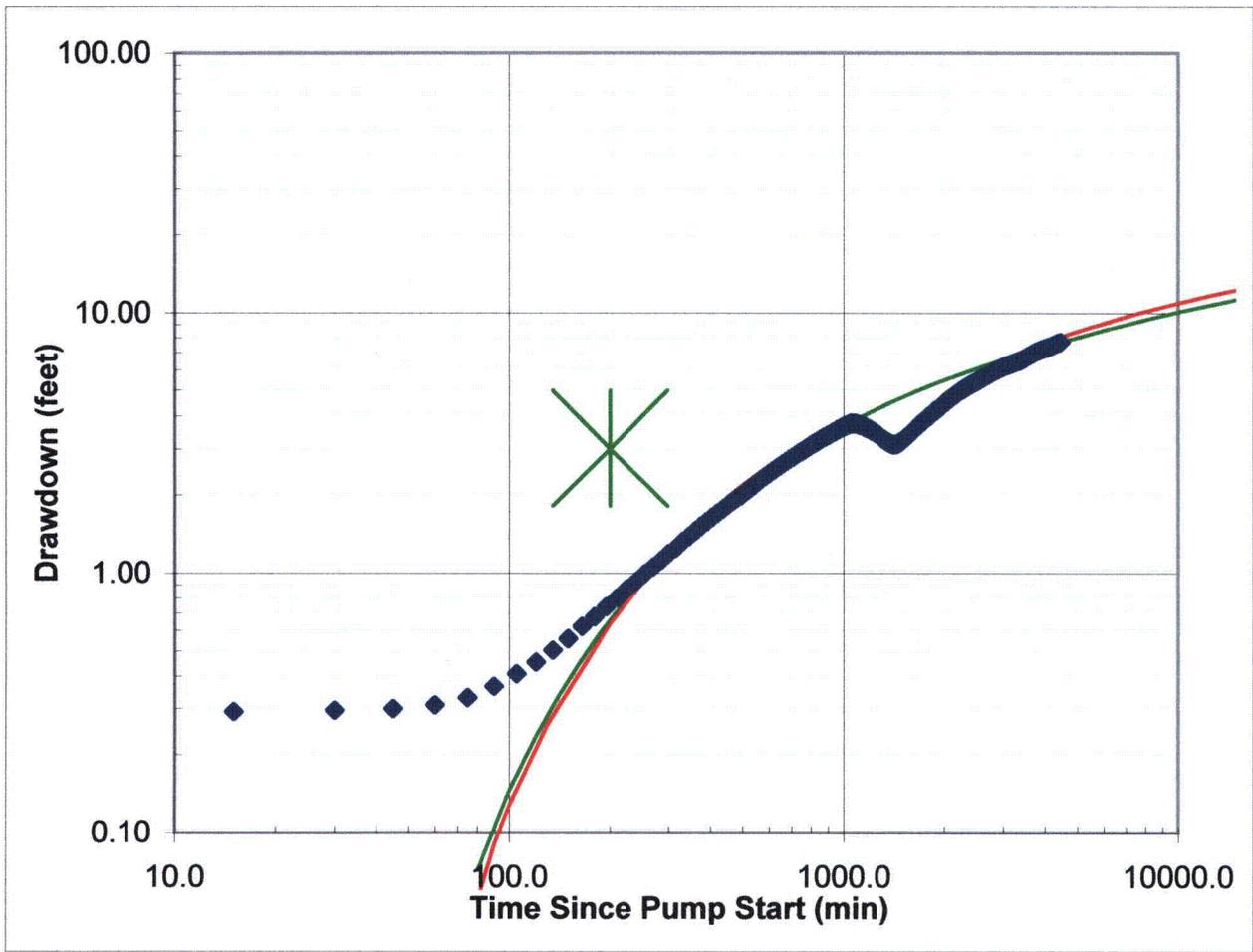
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1447
Drawdown Match Point (ft)	4.30
Time Match Point (min)	710.0
Calculated Transmissivity (gal/day/ft)	770
Calculated Storage Coefficient (ft/ft)	9.7E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>700</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>9.4E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-16. DRAWDOWN IN OBSERVATION WELL M-904, LOG-LOG



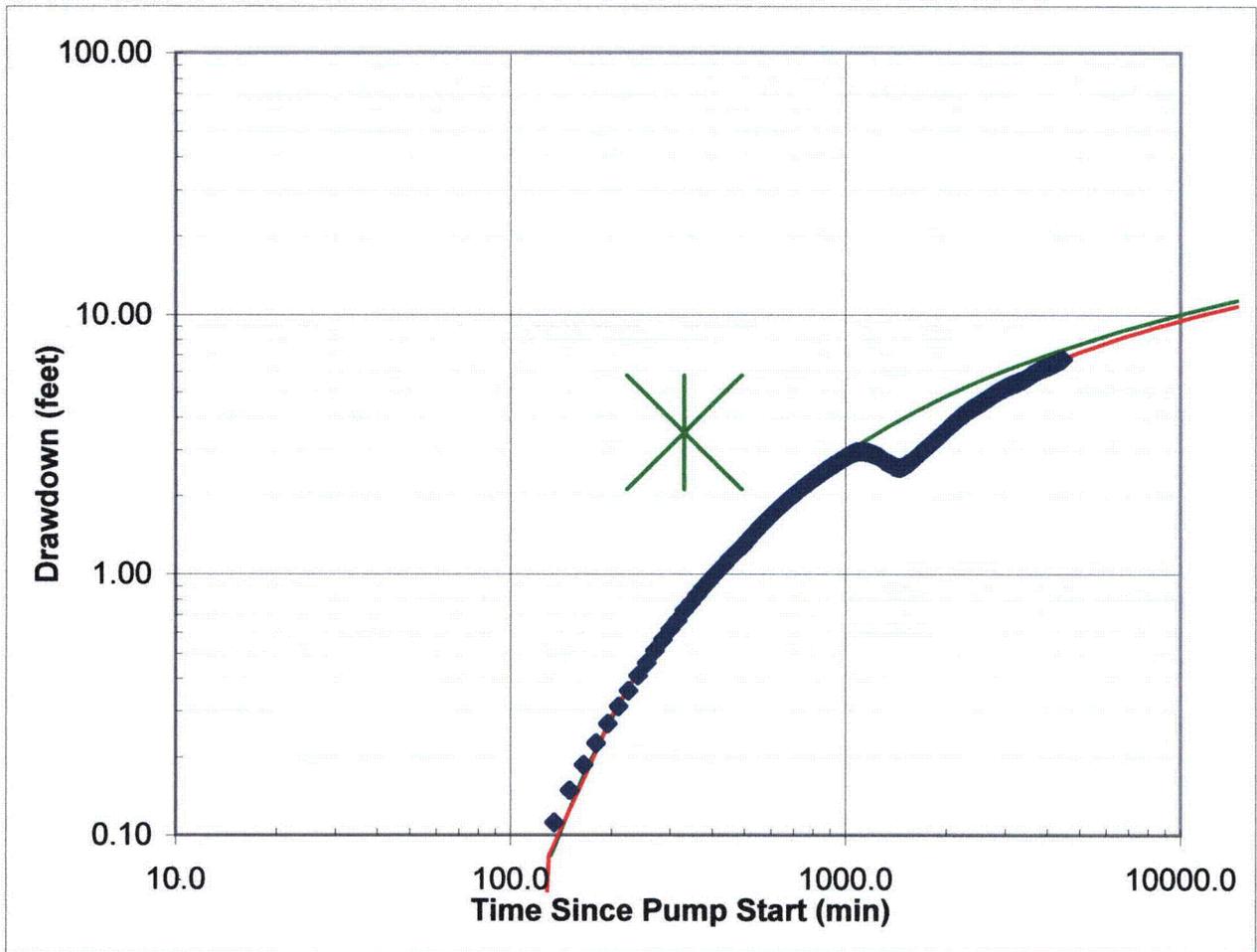
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1361
Drawdown Match Point (ft)	3.00
Time Match Point (min)	200.0
Calculated Transmissivity (gal/day/ft)	1110
Calculated Storage Coefficient (ft/ft)	4.4E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>990</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>4.3E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-17. DRAWDOWN IN OBSERVATION WELL M-905A, LOG-LOG



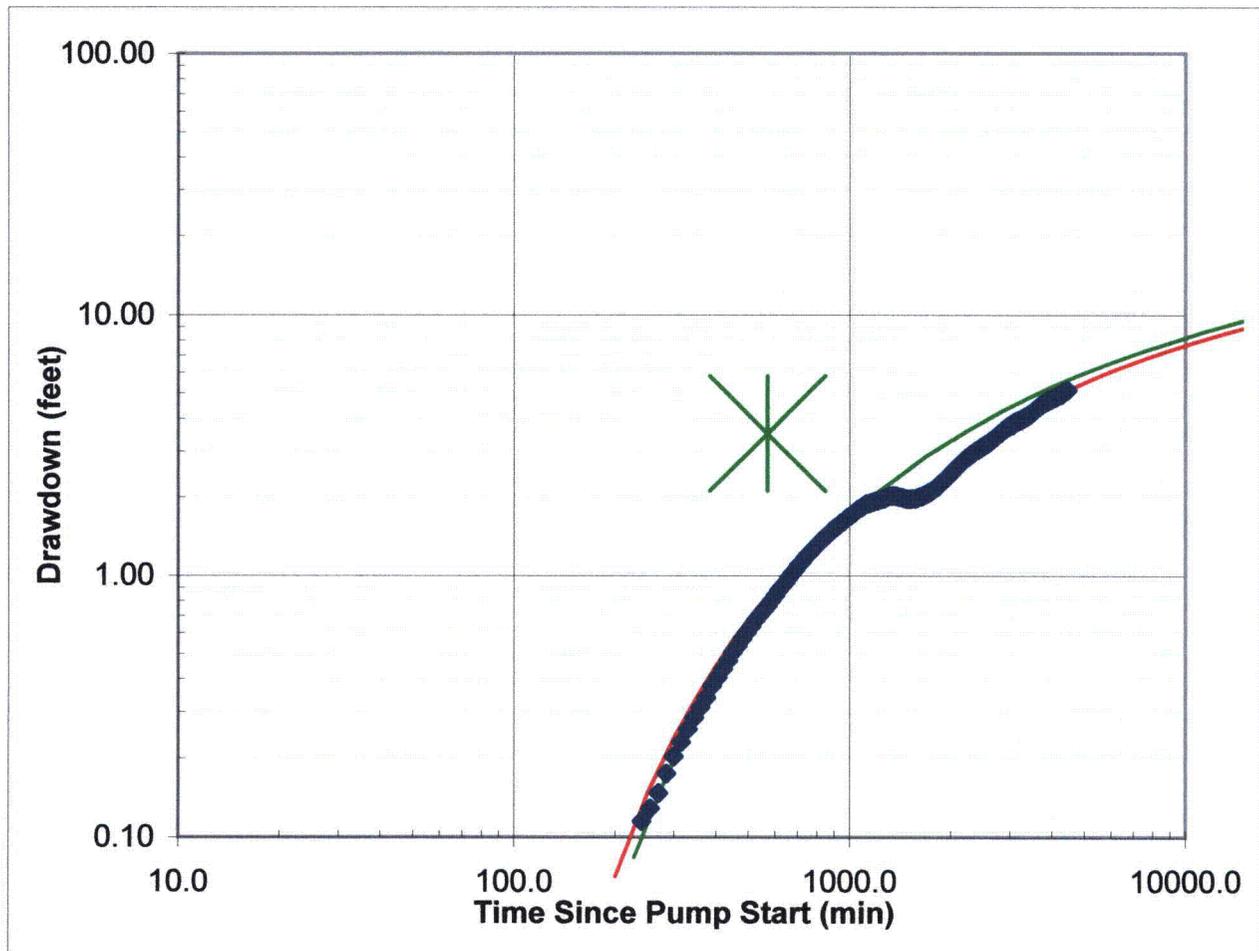
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1508
Drawdown Match Point (ft)	3.50
Time Match Point (min)	330.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	5.1E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1000</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>5.2E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-18. DRAWDOWN IN OBSERVATION WELL M-906, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1853
Drawdown Match Point (ft)	3.50
Time Match Point (min)	570.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	5.9E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1050</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>5.8E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-19. DRAWDOWN IN OBSERVATION WELL M-907, LOG-LOG

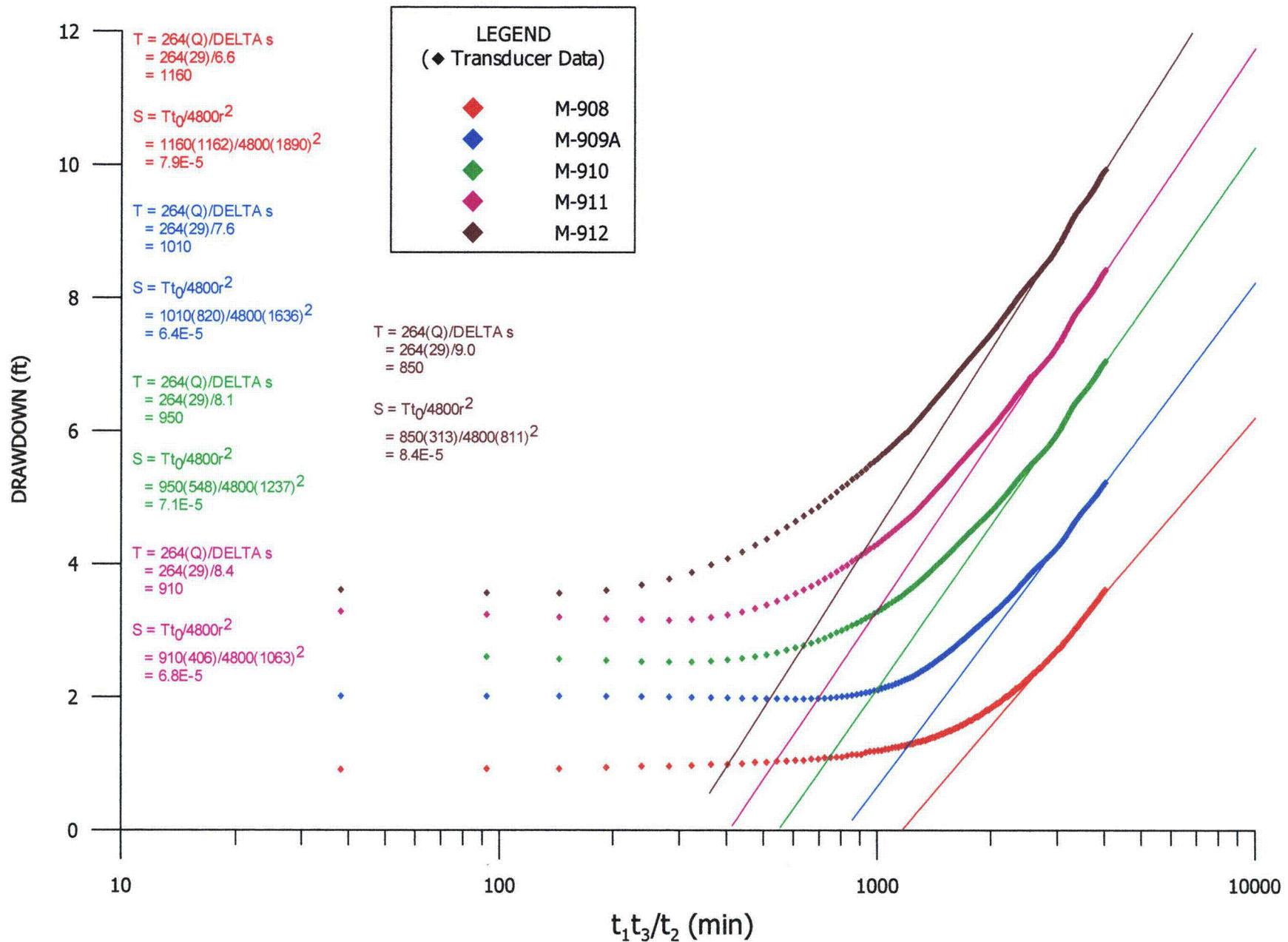
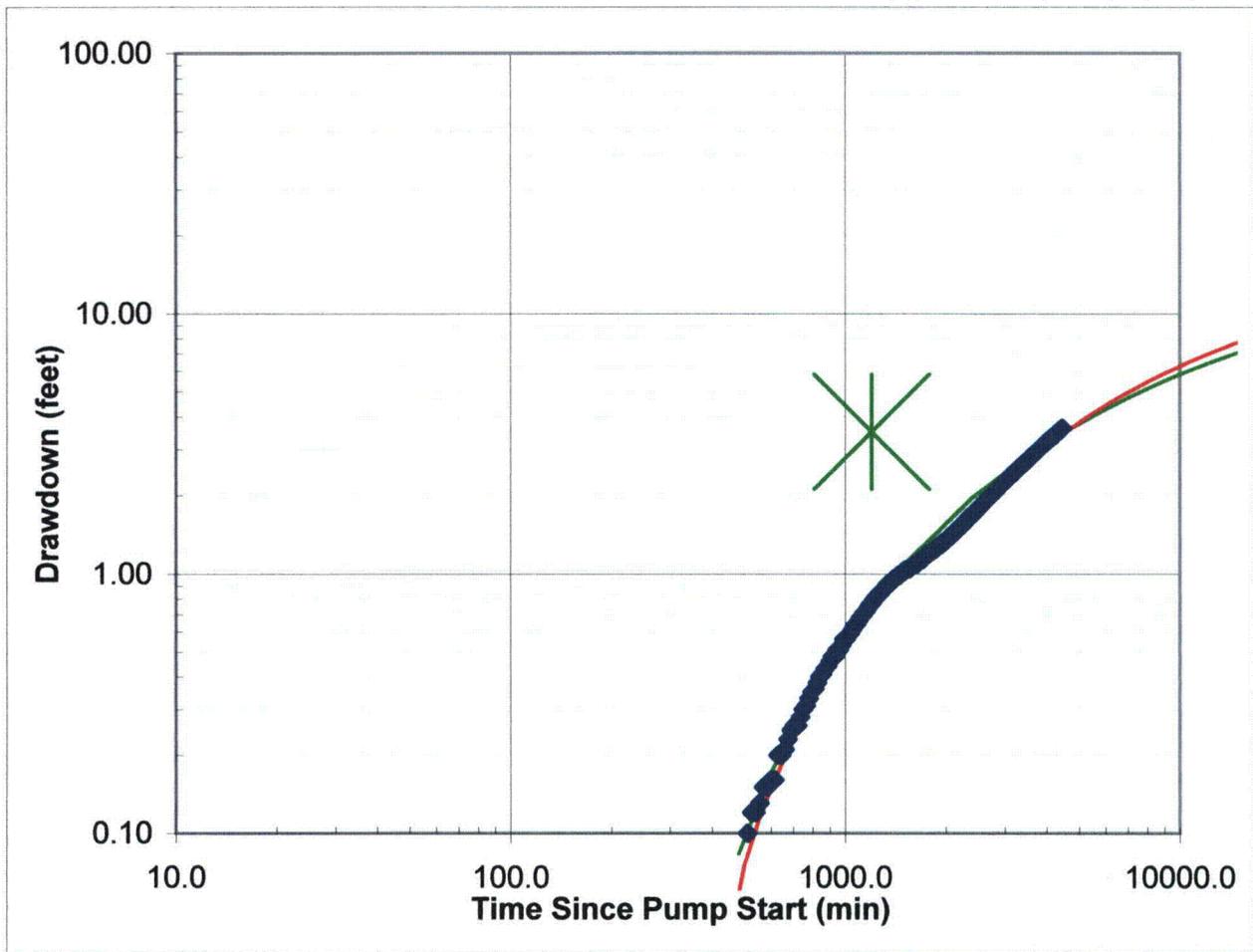


FIGURE 5-20. DRAWDOWN IN OBSERVATION WELLS M-908, M-909A, M-910, M-911 AND M-912, SEMI-LOG



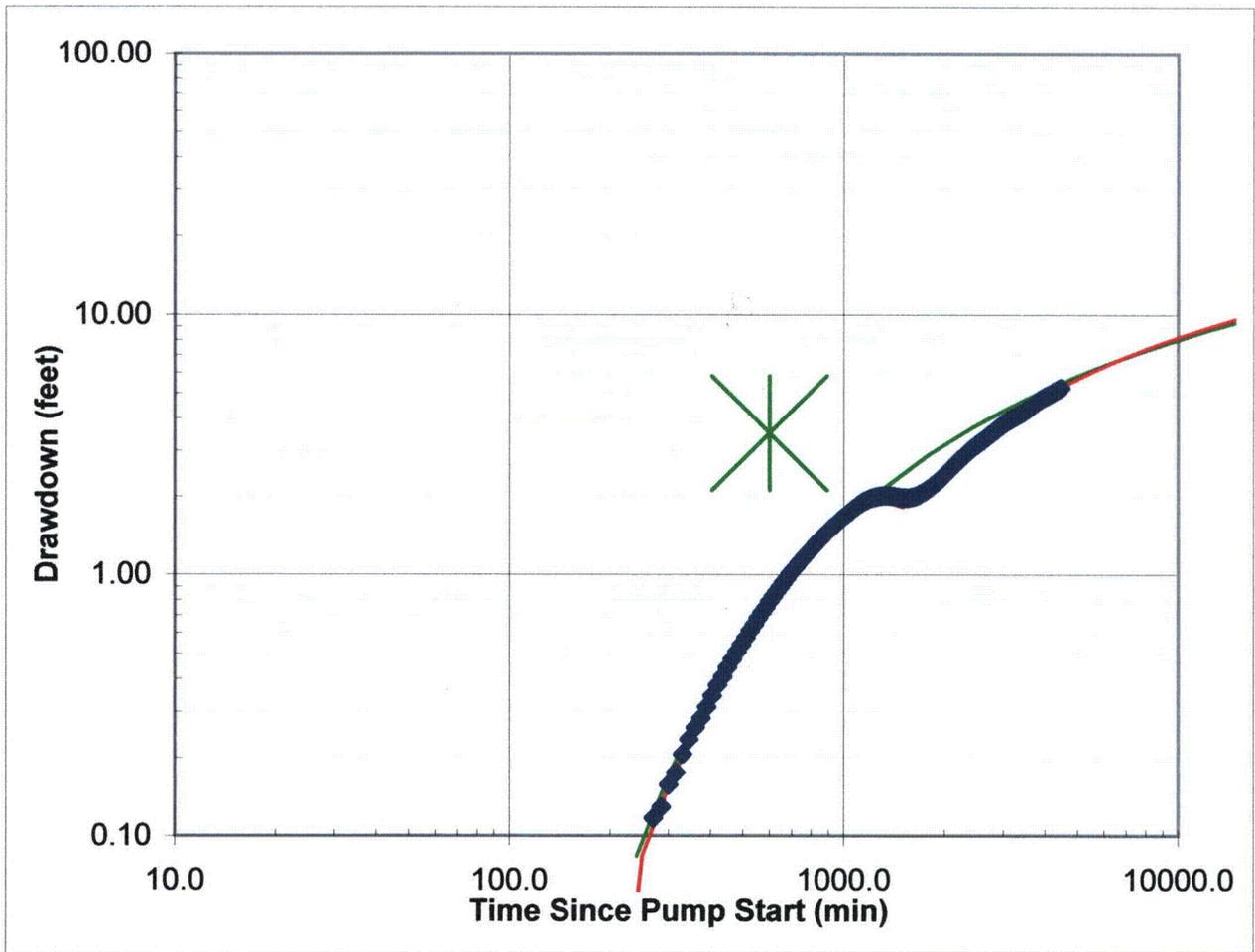
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1890
Drawdown Match Point (ft)	3.50
Time Match Point (min)	1200.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	1.2E-04
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>820</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>1.1E-04</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-21. DRAWDOWN IN OBSERVATION WELL M-908, LOG-LOG



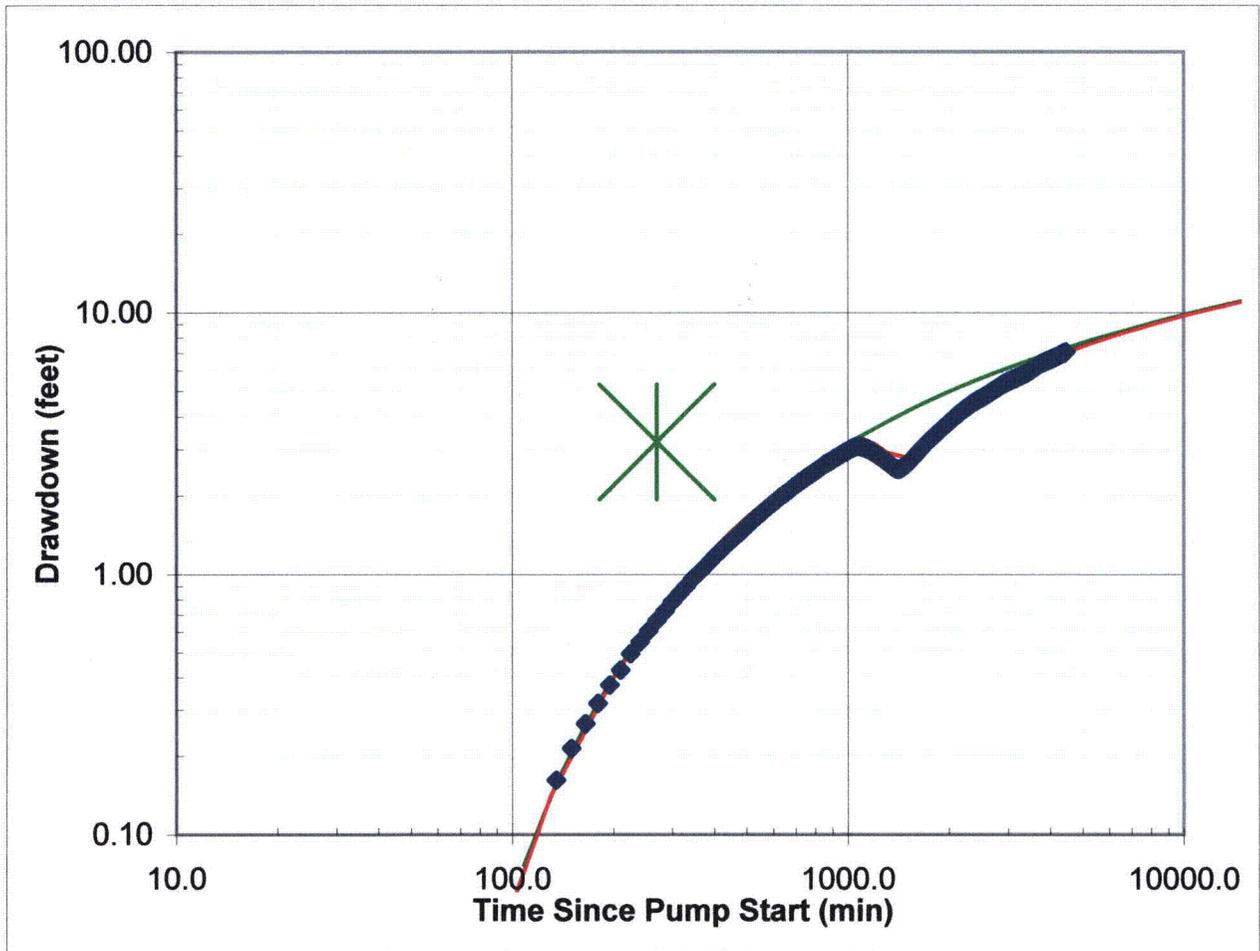
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1636
Drawdown Match Point (ft)	3.50
Time Match Point (min)	600.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	7.9E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>900</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>7.9E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-22. DRAWDOWN IN OBSERVATION WELL M-909A, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1237
Drawdown Match Point (ft)	3.20
Time Match Point (min)	270.0
Calculated Transmissivity (gal/day/ft)	1040
Calculated Storage Coefficient (ft/ft)	6.8E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1040</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.8E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-23. DRAWDOWN IN OBSERVATION WELL M-910, LOG-LOG

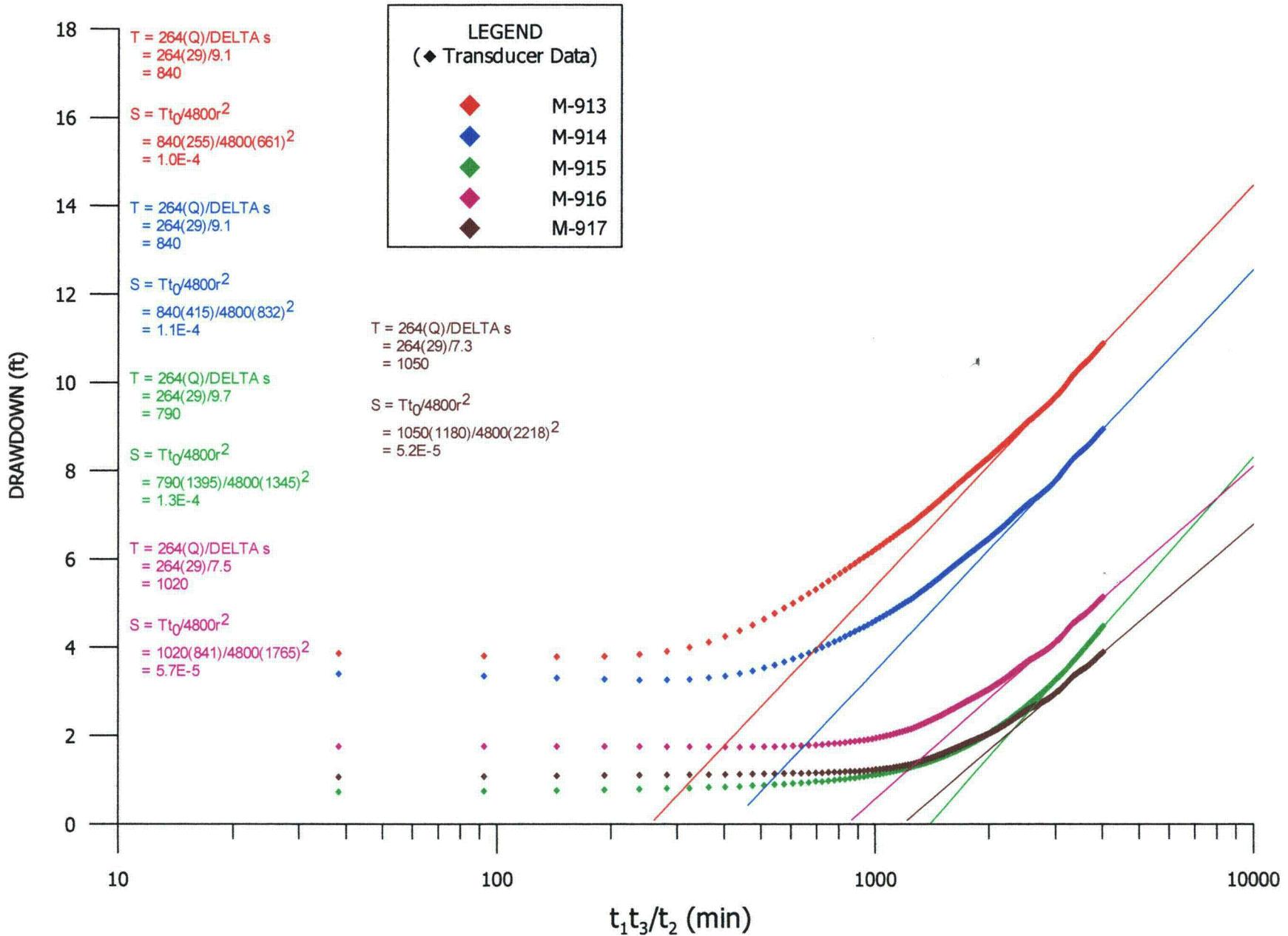
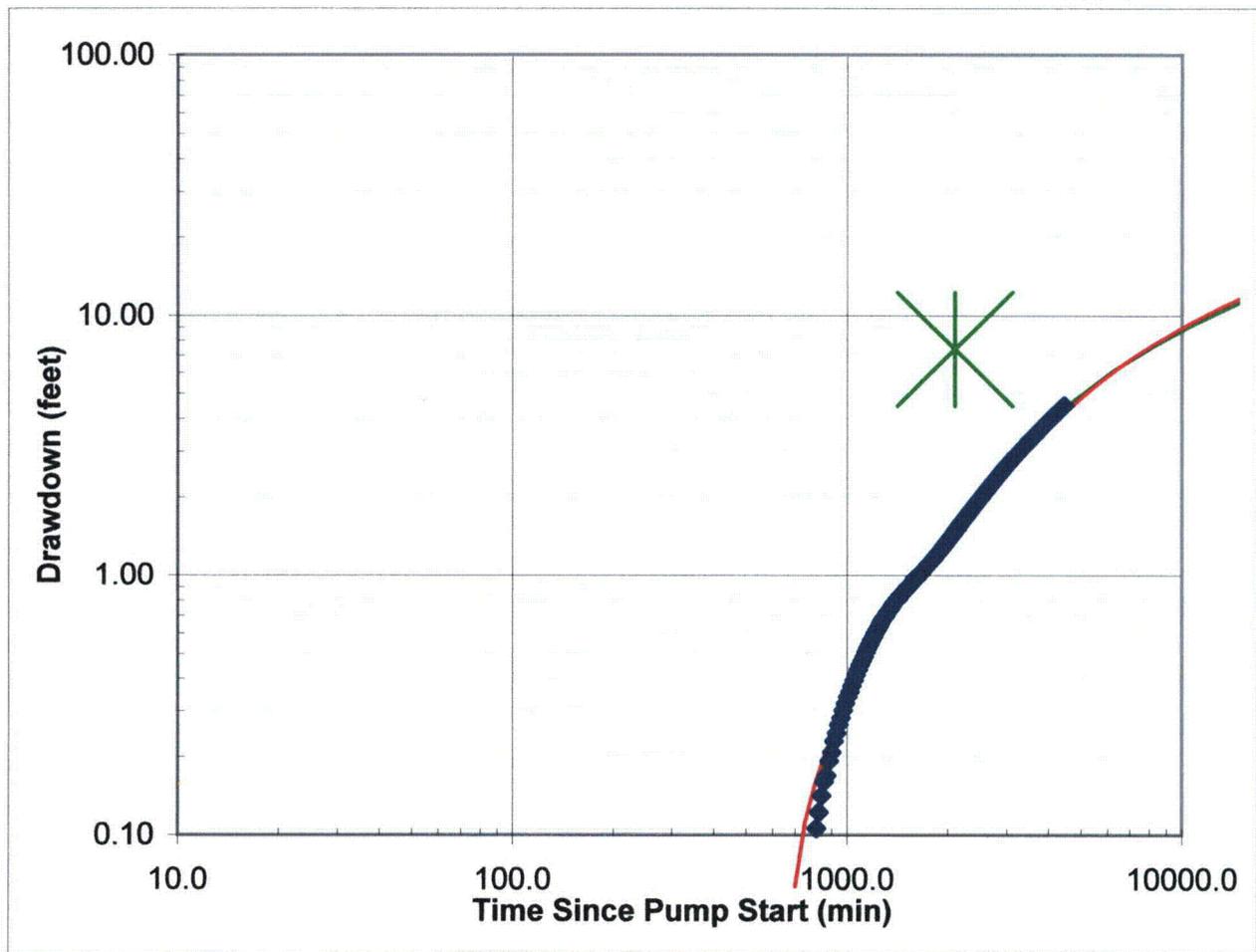


FIGURE 5-24. DRAWDOWN IN OBSERVATION WELLS M-913, M-914, M-915, M-916 AND M-917, SEMI-LOG



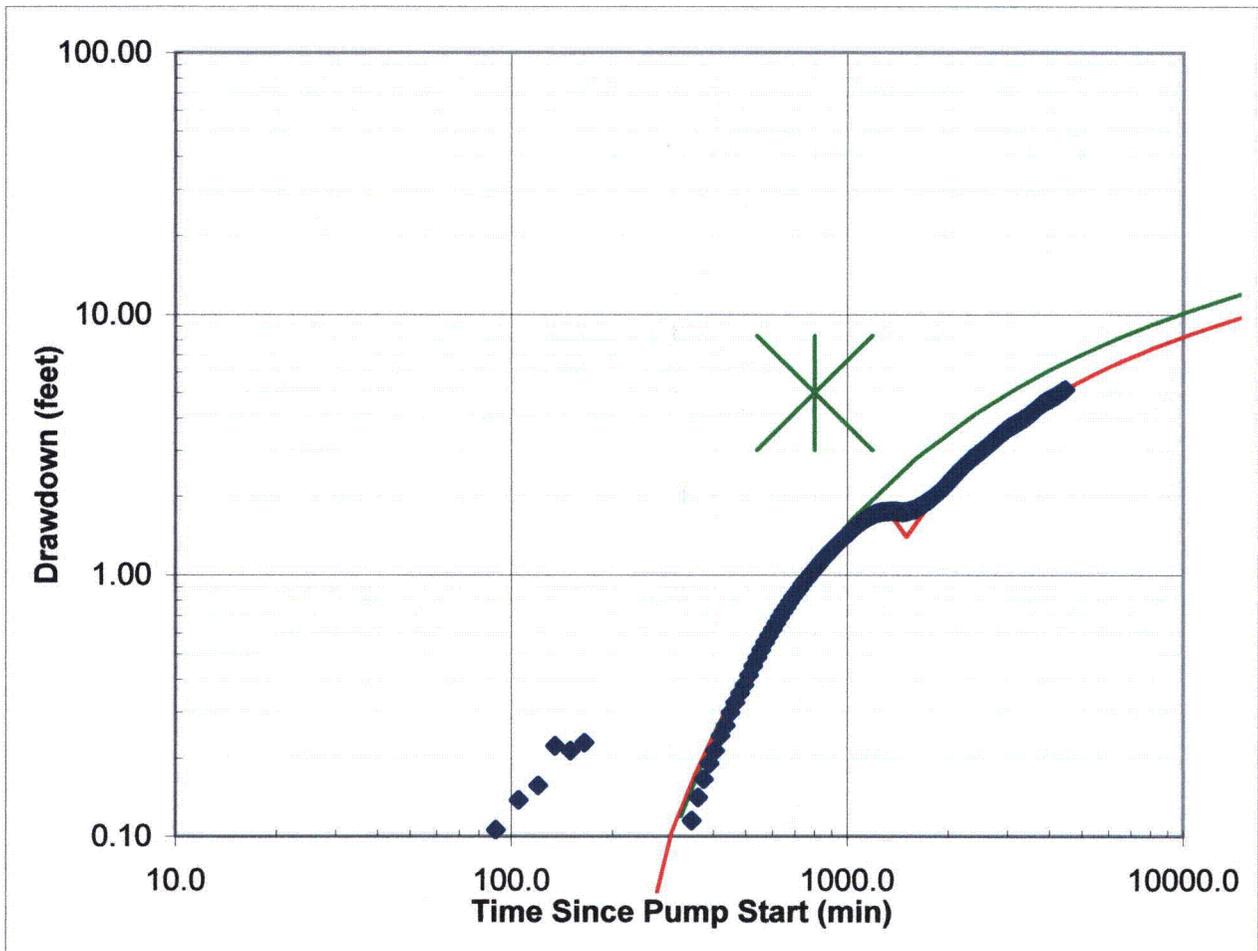
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1345
Drawdown Match Point (ft)	7.40
Time Match Point (min)	2100.0
Calculated Transmissivity (gal/day/ft)	450
Calculated Storage Coefficient (ft/ft)	1.9E-04
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>430</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>1.8E-04</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-25. DRAWDOWN IN OBSERVATION WELL M-915, LOG-LOG



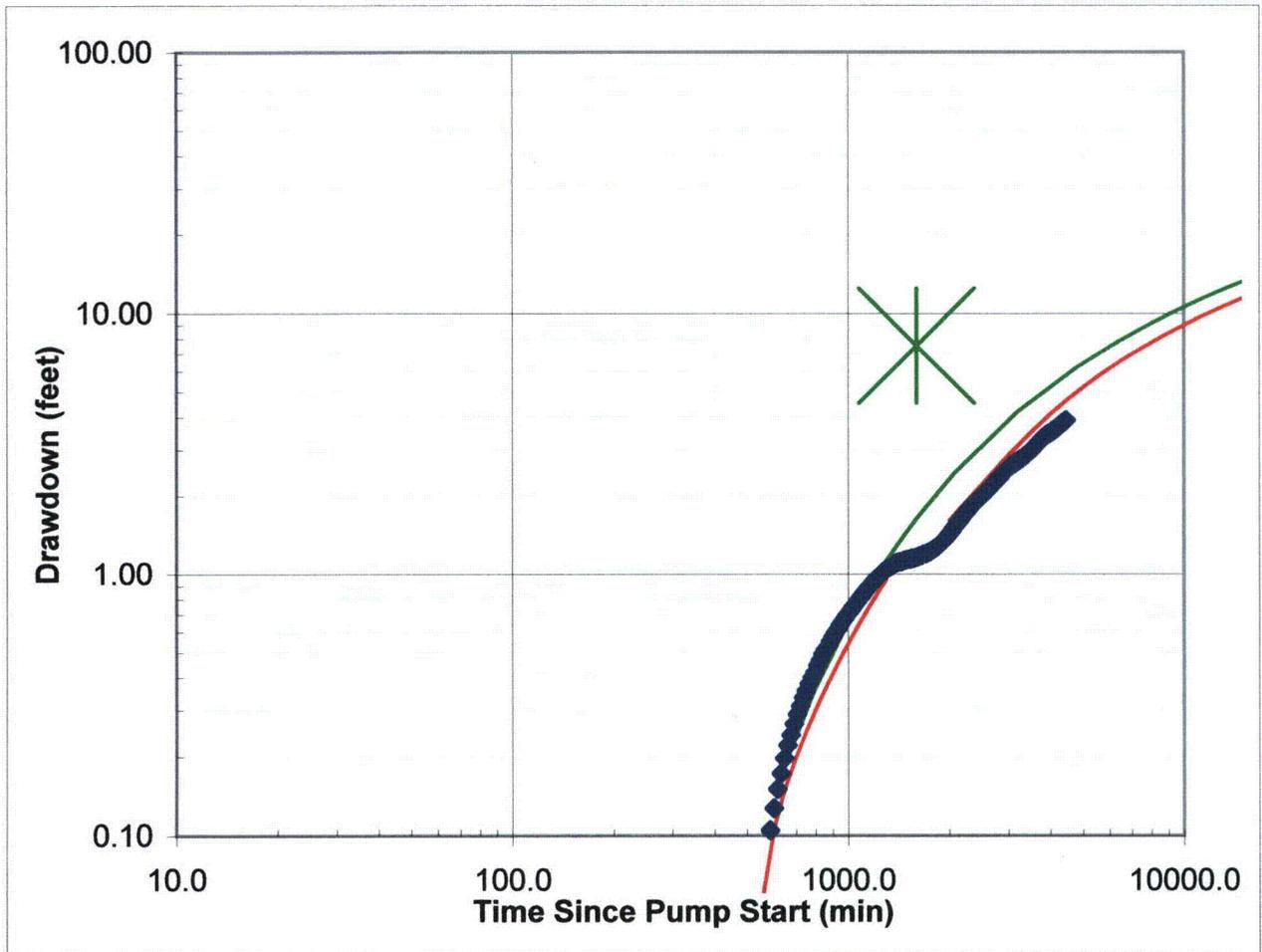
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1765
Drawdown Match Point (ft)	5.00
Time Match Point (min)	800.0
Calculated Transmissivity (gal/day/ft)	660
Calculated Storage Coefficient (ft/ft)	6.3E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>840</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>7.3E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-26. DRAWDOWN IN OBSERVATION WELL M-916, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2218
Drawdown Match Point (ft)	7.50
Time Match Point (min)	1600.0
Calculated Transmissivity (gal/day/ft)	440
Calculated Storage Coefficient (ft/ft)	5.4E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>500</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.2E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-27. DRAWDOWN IN OBSERVATION WELL M-917, LOG-LOG

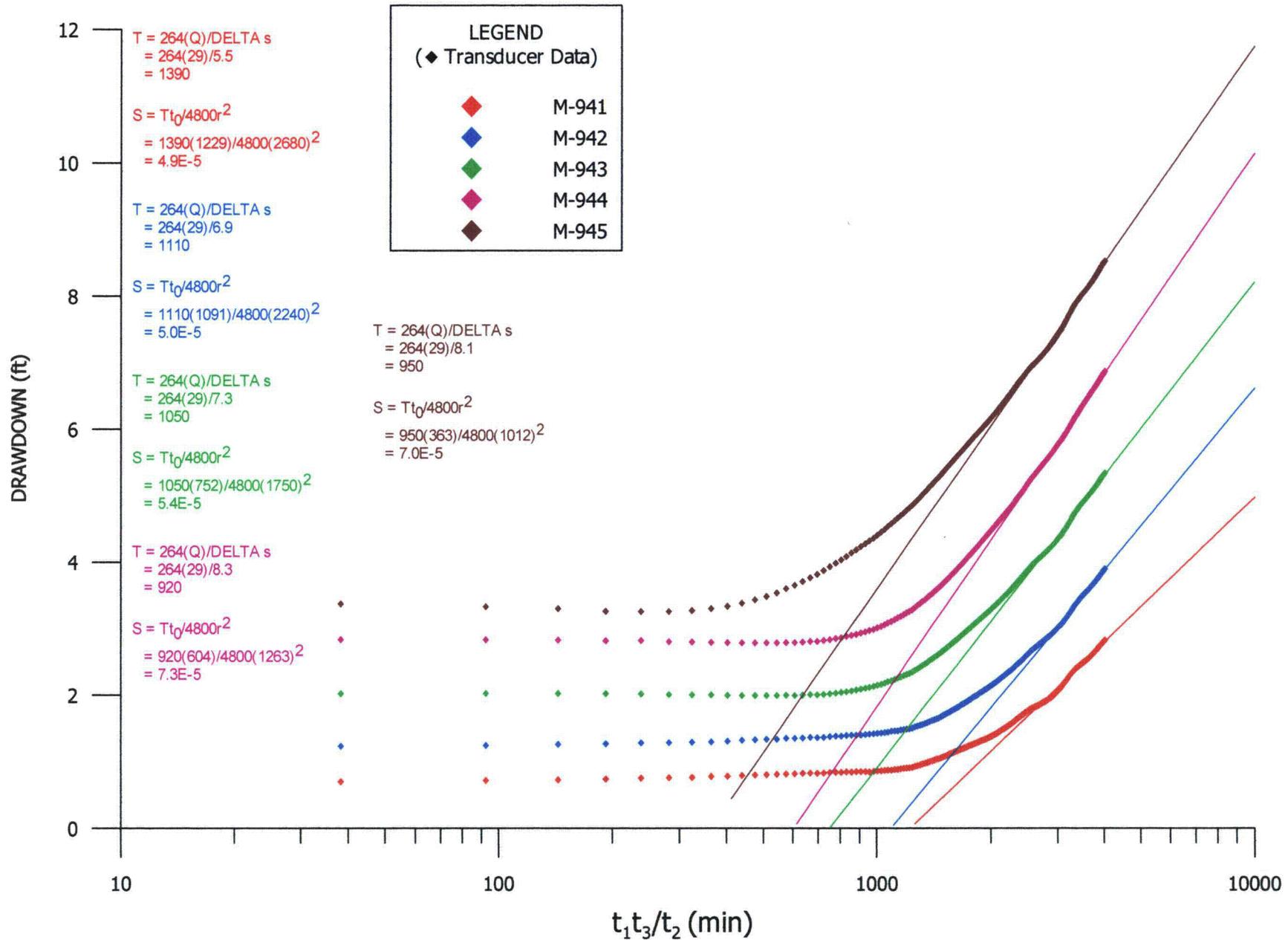
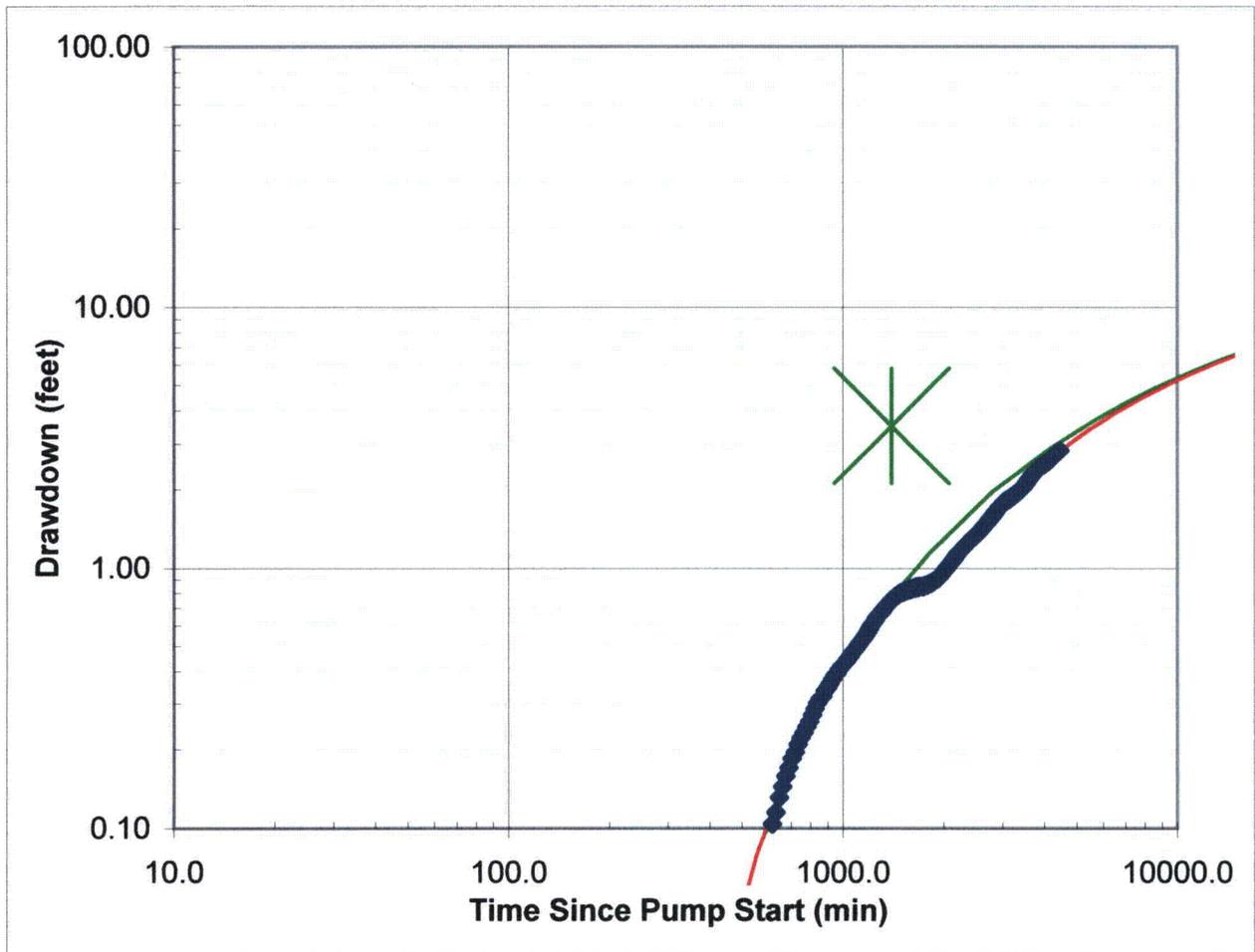


FIGURE 5-28. DRAWDOWN IN OBSERVATION WELLS M-941, M-942, M-943, M-944 AND M-945, SEMI-LOG



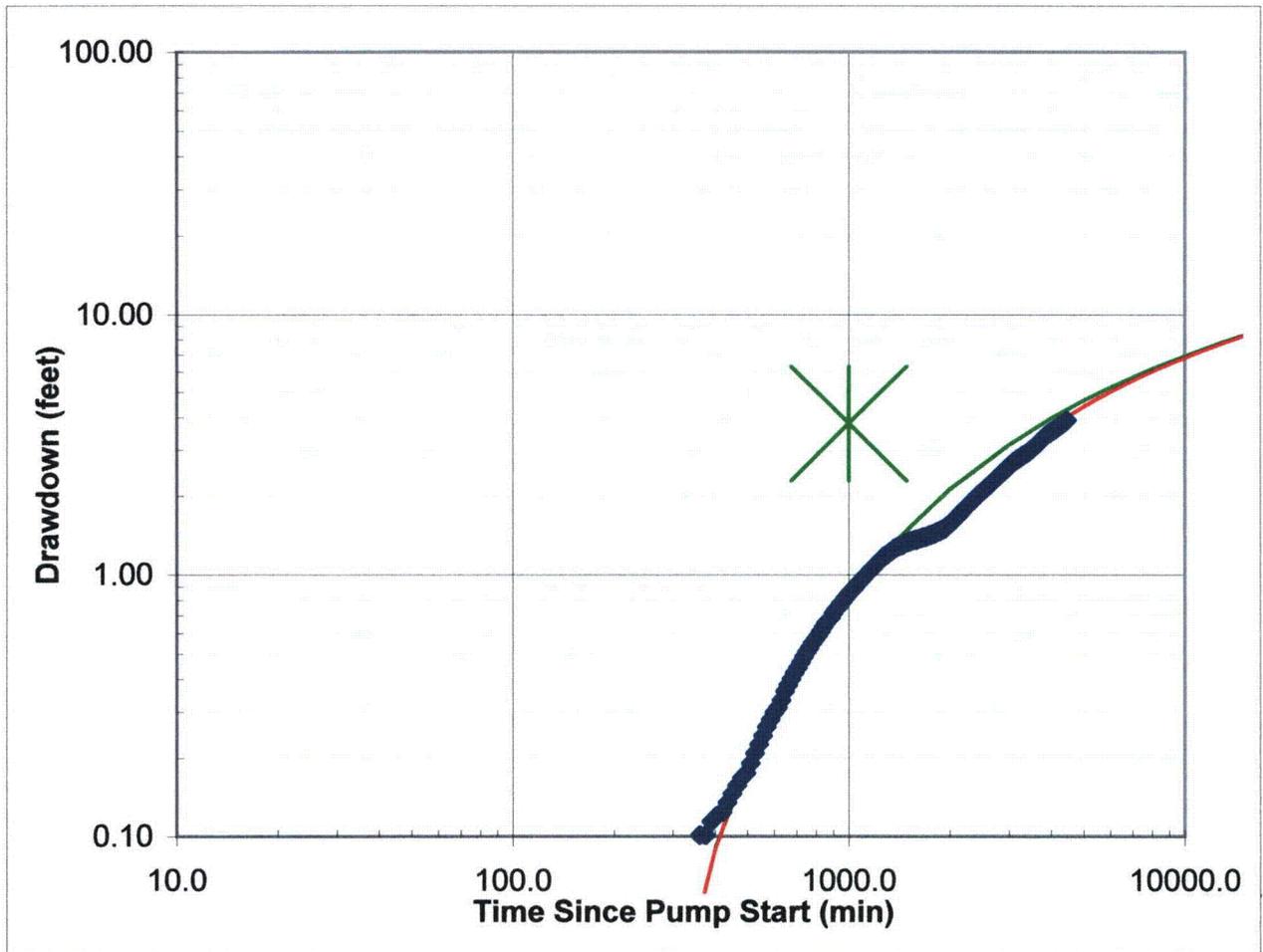
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2680
Drawdown Match Point (ft)	3.50
Time Match Point (min)	1400.0
Calculated Transmissivity (gal/day/ft)	950
Calculated Storage Coefficient (ft/ft)	6.9E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>950</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.9E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-29. DRAWDOWN IN OBSERVATION WELL M-941, LOG-LOG



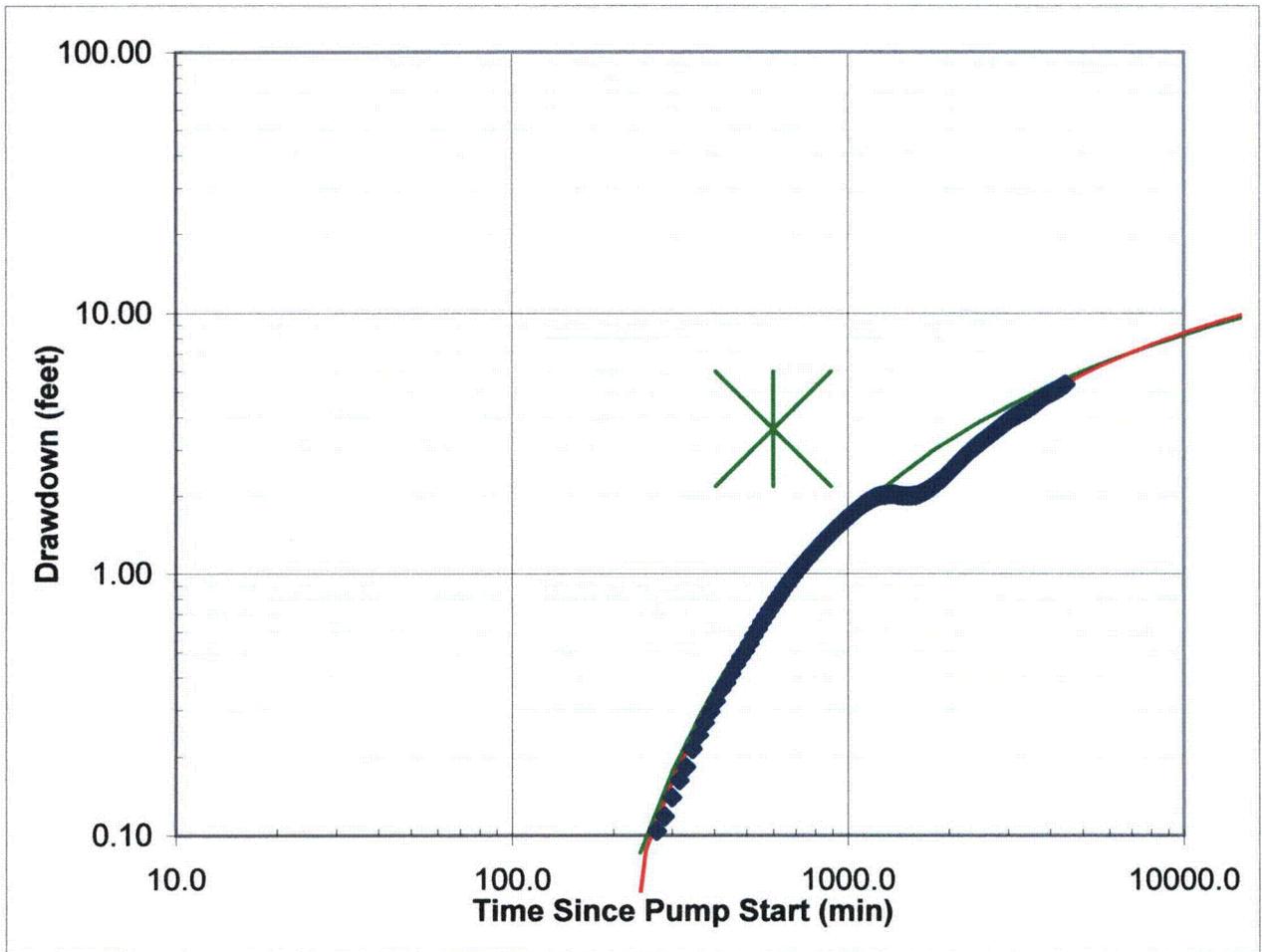
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2240
Drawdown Match Point (ft)	3.80
Time Match Point (min)	1000.0
Calculated Transmissivity (gal/day/ft)	870
Calculated Storage Coefficient (ft/ft)	6.5E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	870
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	6.5E-05

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-30. DRAWDOWN IN OBSERVATION WELL M-942, LOG-LOG



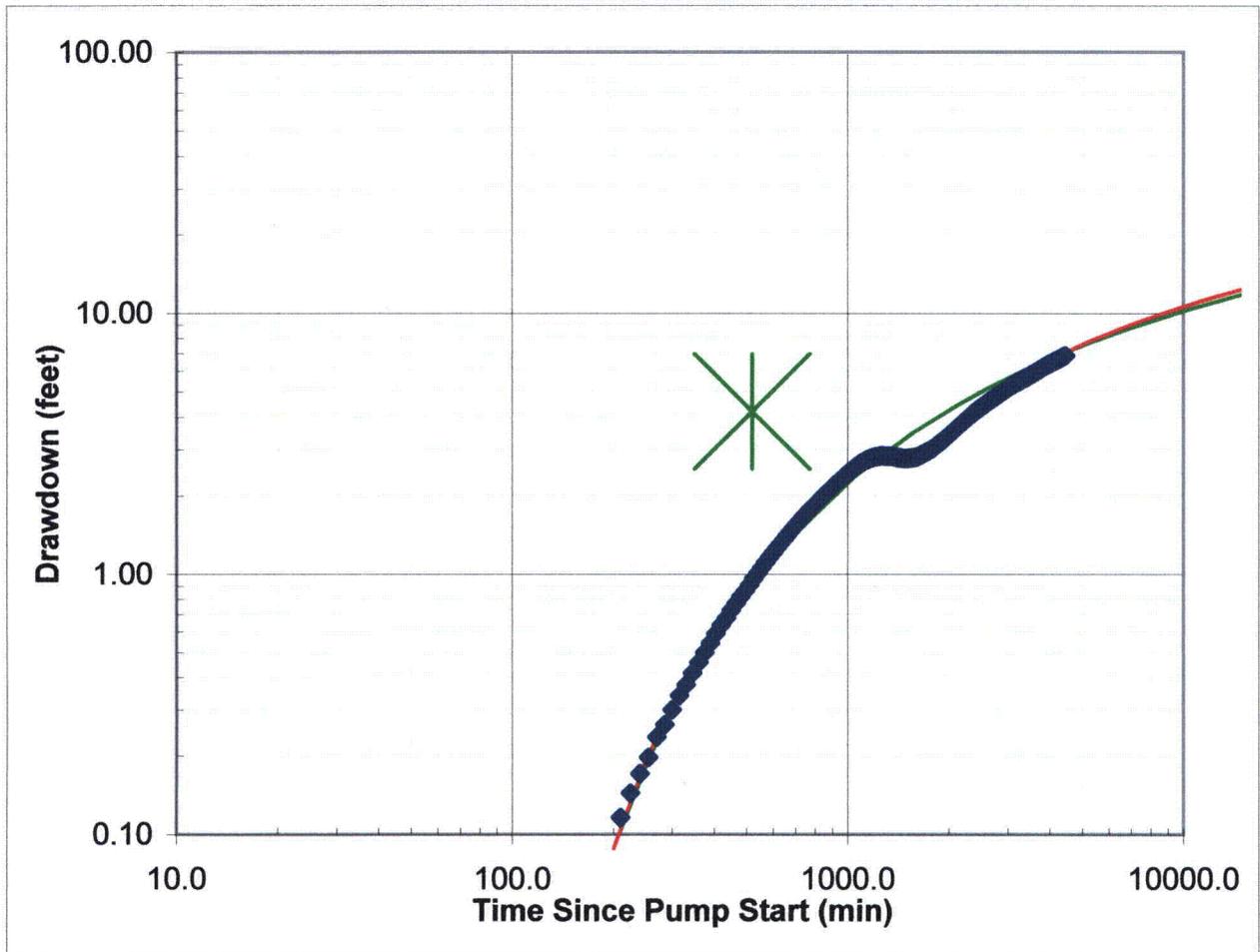
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1750
Drawdown Match Point (ft)	3.60
Time Match Point (min)	600.0
Calculated Transmissivity (gal/day/ft)	920
Calculated Storage Coefficient (ft/ft)	6.7E-05
Refined Transmissivity Estimate (gal/day/ft)	880
Refined Storage Coefficient Estimate (ft/ft)	6.7E-05

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-31. DRAWDOWN IN OBSERVATION WELL M-943, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1345
Drawdown Match Point (ft)	4.20
Time Match Point (min)	520.0
Calculated Transmissivity (gal/day/ft)	790
Calculated Storage Coefficient (ft/ft)	8.4E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>750</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>8.0E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-32. DRAWDOWN IN OBSERVATION WELL M-944, LOG-LOG

5-37

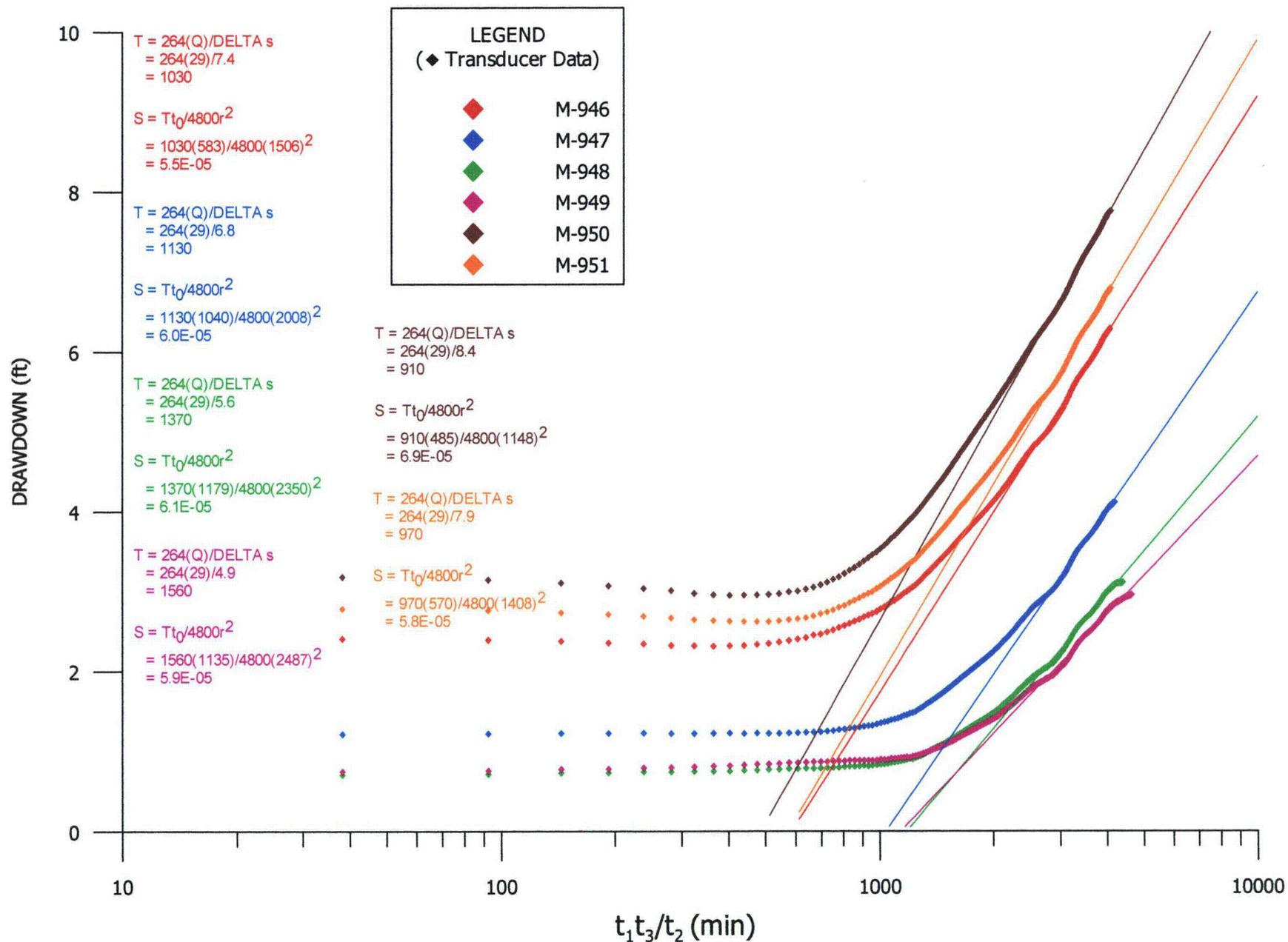
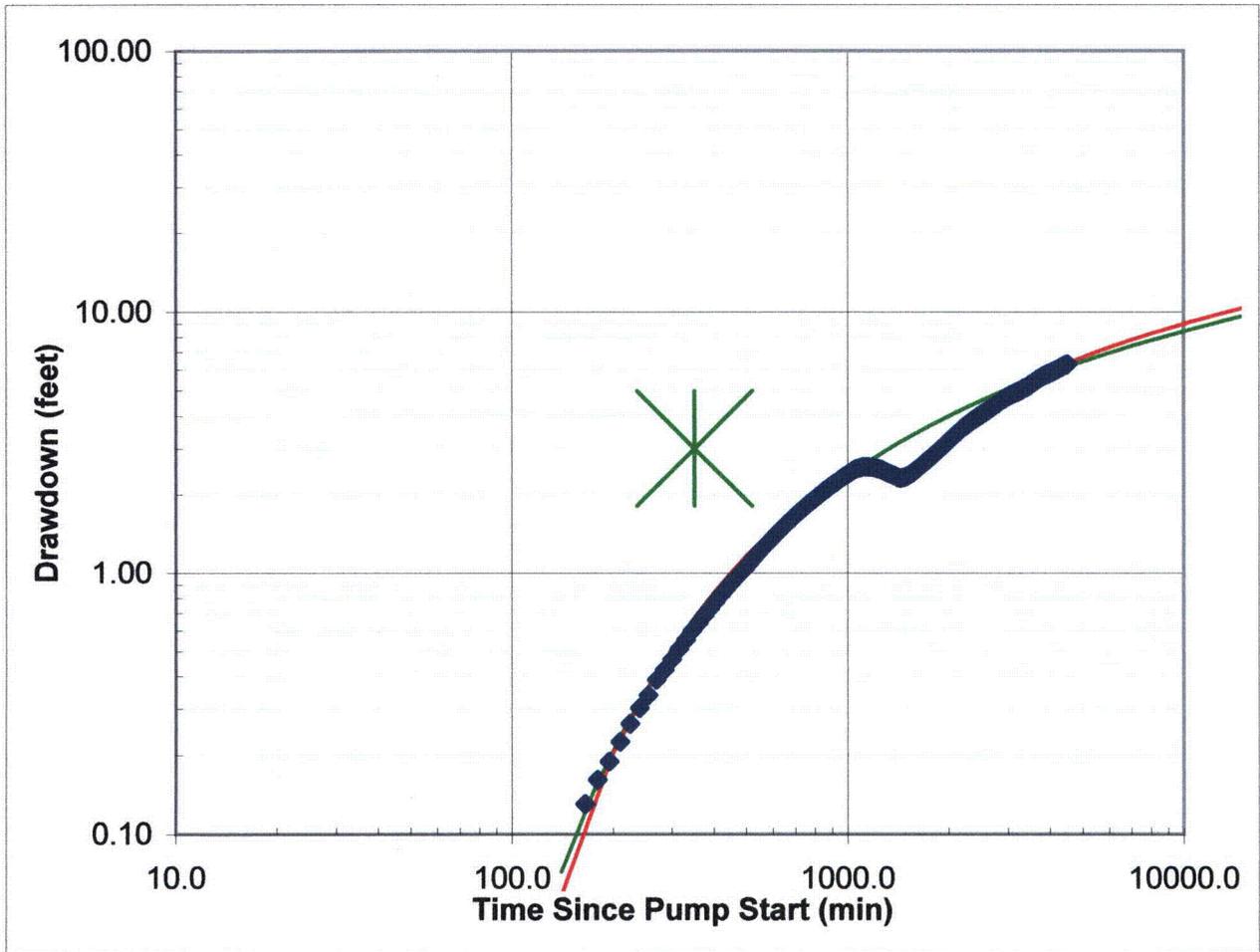


FIGURE 5-33. DRAWDOWN IN OBSERVATION WELLS M-946, M-947, M-948, M-949, M-950 AND M-951, SEMI-LOG



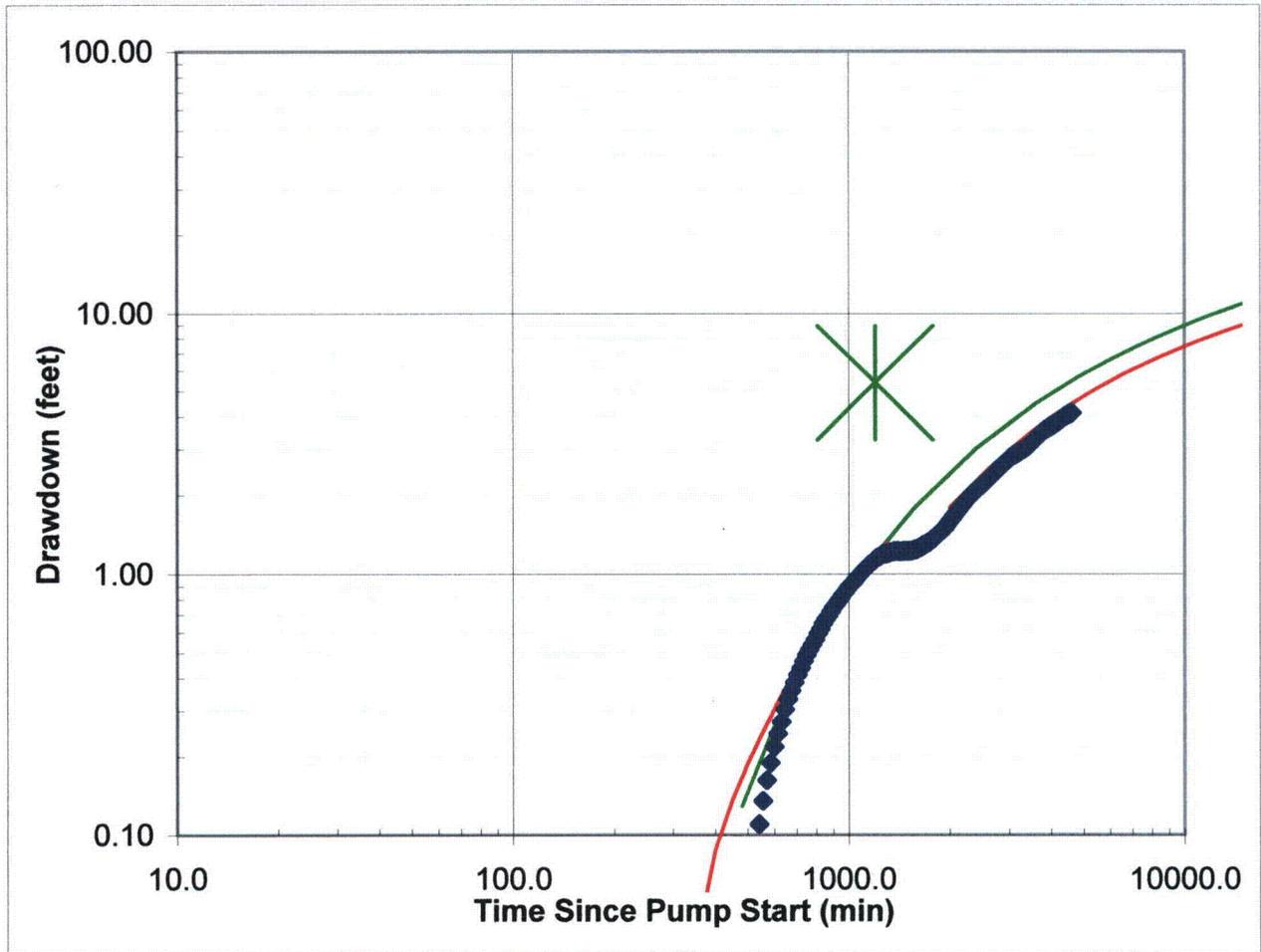
This Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1506
Drawdown Match Point (ft)	3.00
Time Match Point (min)	350.0
Calculated Transmissivity (gal/day/ft)	1110
Calculated Storage Coefficient (ft/ft)	6.3E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>1010</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.0E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-34. DRAWDOWN IN OBSERVATION WELL M-946, LOG-LOG



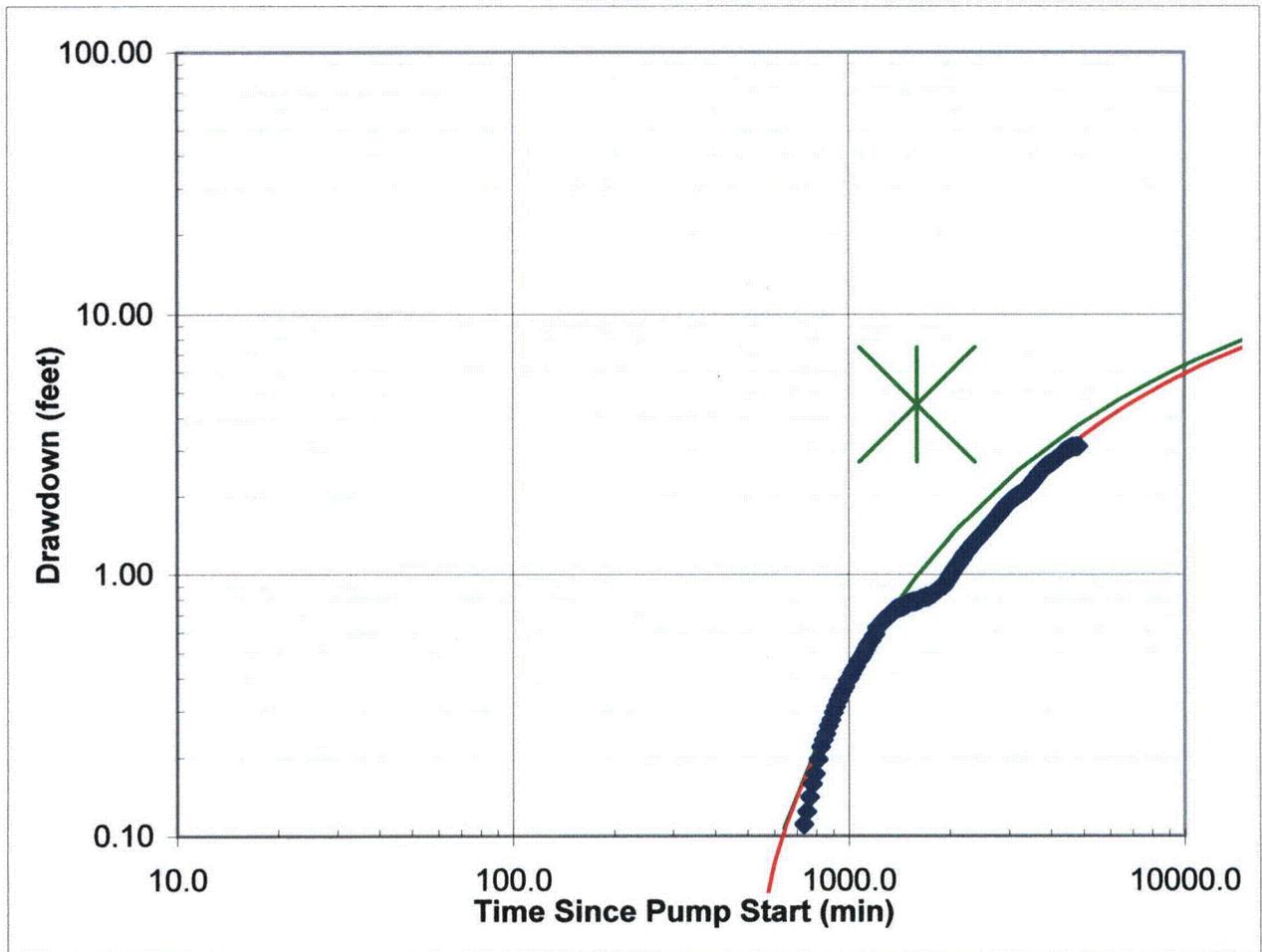
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2008
Drawdown Match Point (ft)	5.40
Time Match Point (min)	1200.0
Calculated Transmissivity (gal/day/ft)	620
Calculated Storage Coefficient (ft/ft)	6.8E-05
Refined Transmissivity Estimate (gal/day/ft)	790
Refined Storage Coefficient Estimate (ft/ft)	7.5E-05

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-35. DRAWDOWN IN OBSERVATION WELL M-947, LOG-LOG



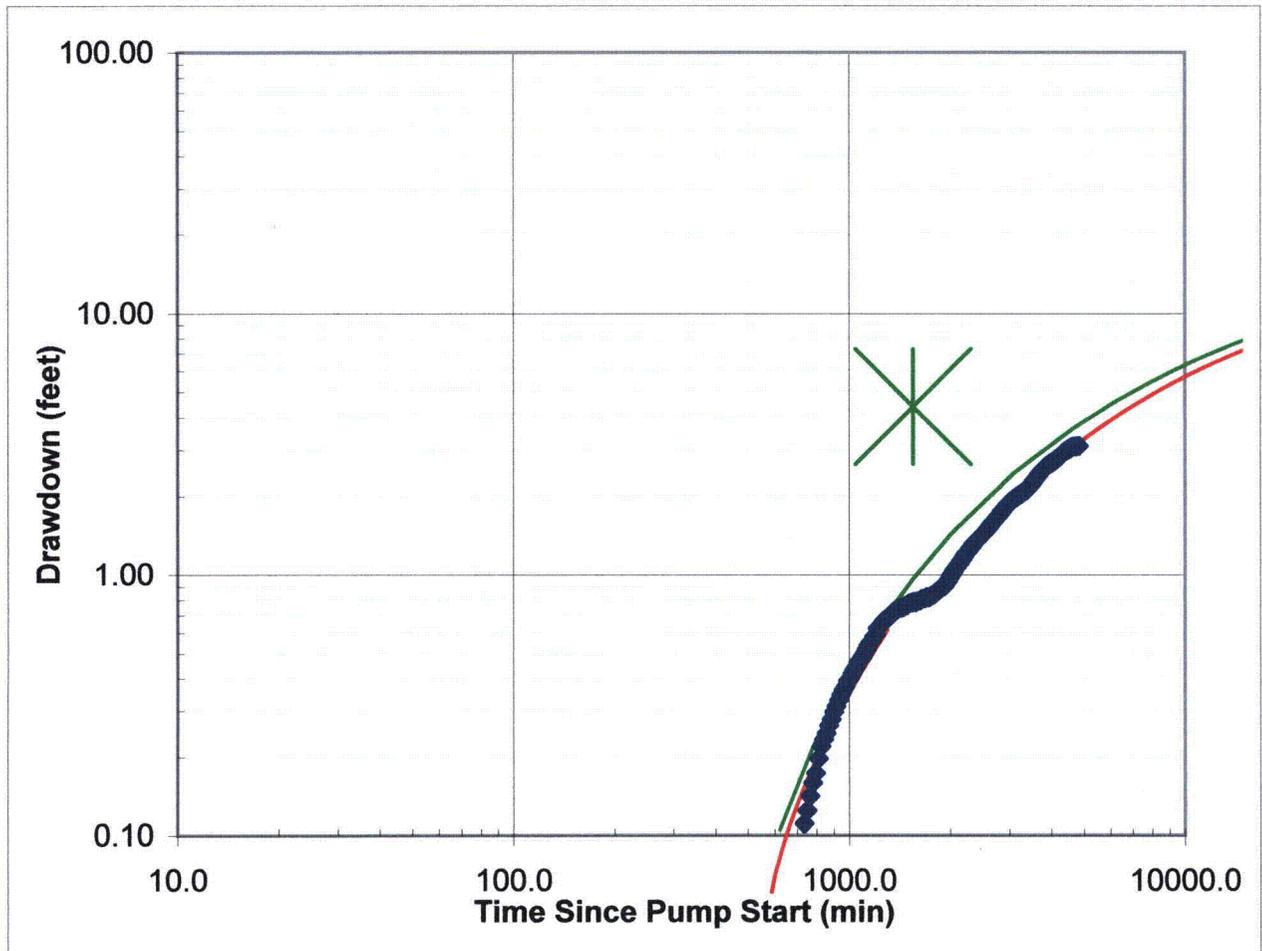
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2350
Drawdown Match Point (ft)	4.50
Time Match Point (min)	1600.0
Calculated Transmissivity (gal/day/ft)	740
Calculated Storage Coefficient (ft/ft)	7.9E-05
Refined Transmissivity Estimate (gal/day/ft)	780
Refined Storage Coefficient Estimate (ft/ft)	8.3E-05

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-36. DRAWDOWN IN OBSERVATION WELL M-948, LOG-LOG



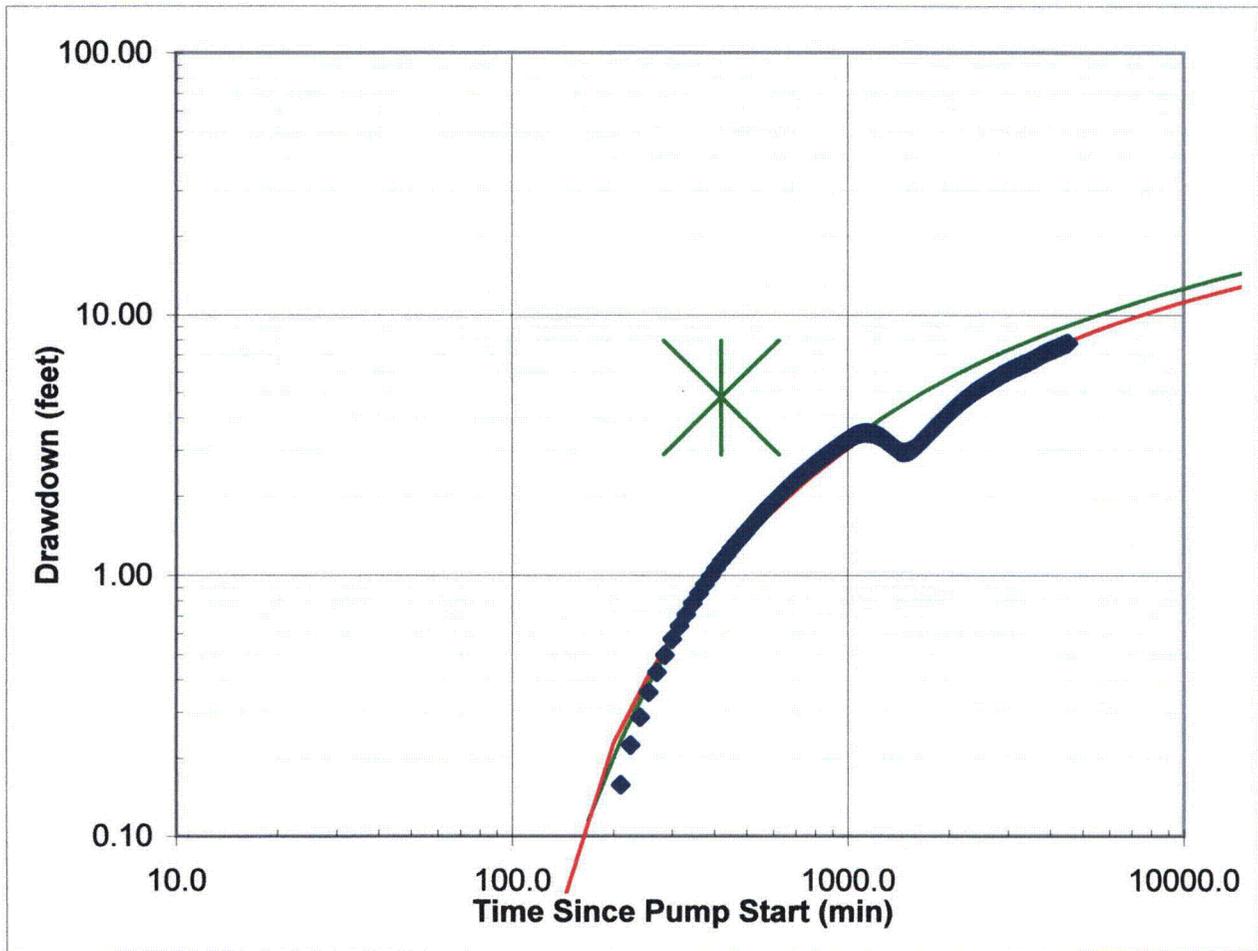
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	2350
Drawdown Match Point (ft)	4.40
Time Match Point (min)	1550.0
Calculated Transmissivity (gal/day/ft)	760
Calculated Storage Coefficient (ft/ft)	7.9E-05
Refined Transmissivity Estimate (gal/day/ft)	800
Refined Storage Coefficient Estimate (ft/ft)	8.7E-05

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-37. DRAWDOWN IN OBSERVATION WELL M-949, LOG-LOG



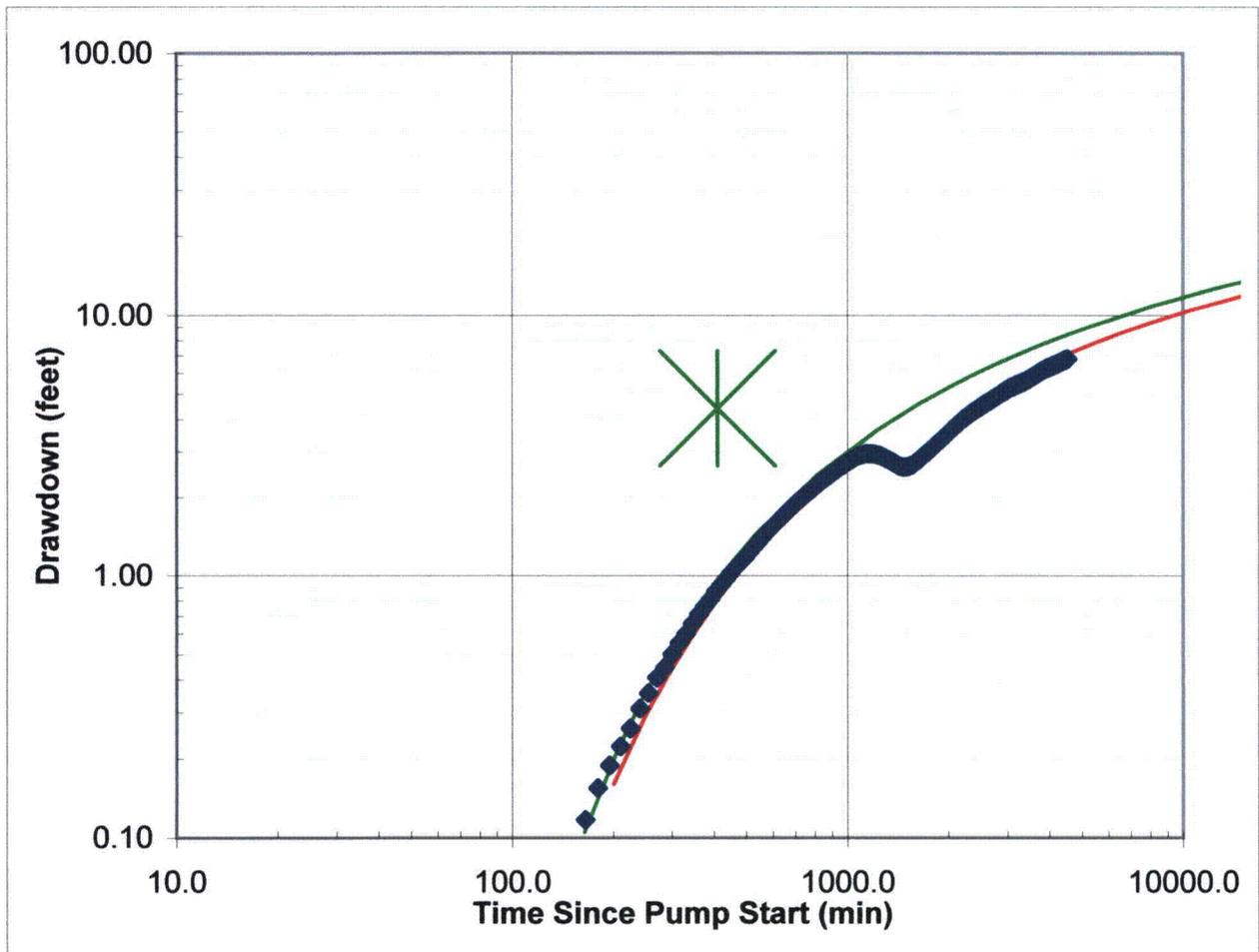
Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1148
Drawdown Match Point (ft)	4.80
Time Match Point (min)	420.0
Calculated Transmissivity (gal/day/ft)	690
Calculated Storage Coefficient (ft/ft)	8.2E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>800</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>8.6E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-38. DRAWDOWN IN OBSERVATION WELL M-950, LOG-LOG



Theis Match Point

Initial Discharge (gpm)	29
Radius to Pumping Well (ft) (<1 indicates pumping well)	1408
Drawdown Match Point (ft)	4.40
Time Match Point (min)	410.0
Calculated Transmissivity (gal/day/ft)	760
Calculated Storage Coefficient (ft/ft)	5.8E-05
<i>Refined Transmissivity Estimate (gal/day/ft)</i>	<i>840</i>
<i>Refined Storage Coefficient Estimate (ft/ft)</i>	<i>6.7E-05</i>

Test Interruption Data

Pump Off Time (minutes after initial pump start)	985
Pump Restart Time (minutes after initial pump start)	1325
Pump Restart Rate (gpm)	29

FIGURE 5-39. DRAWDOWN IN OBSERVATION WELL M-951, LOG-LOG

6.0 TEST RESULTS – CONFINING UNITS FOR 9PW-2A TEST

6.1 HYDRAULIC CONDUCTIVITY OF CONFINING UNITS

Confining unit vertical hydraulic conductivities have been defined on some of the PRI wellfields and other areas in the Powder River Basin. The Mine Unit 15 pump test report summarizes the hydraulic conductivity of the confining layers defined by PRI tests.

The data indicate the vertical conductivities from core and pumping test results range from 9.3×10^{-11} cm/sec (2.6×10^{-7} ft/d) to 4.2×10^{-7} cm/sec (1.4×10^{-3} ft/d). Therefore the vertical conductivity of these confining units are considered to be more than adequate to retard connections between the Overlying and Underlying aquifers to the mining zone.

This test was conducted to define the adequacy of the continuity of the aquitard to separate the K Sand from the adjacent aquifers.

6.2 OVERLYING AQUIFERS

Plots of depths of water levels in the Overlying (9MO) aquifers for the pre-test, pumping and recovery periods are presented in Figures 6-1 through 6-5 for wells 9MO-1B through 9MO-9. The water levels are compared to barometric pressure from a (Hermit logger) for the entire period.

These linear plots show the period of pumping with the manual data used to correlate the transducers shown as large solid dots. Figure 6-1 contains the depth to water versus time for both overlying wells 9MO-3 and 9MO-7.

The response from the overlying wells is steady to a gradual declining (upward on the graphs) or gradual rising trend during the pre-test, the pumping period and recovery period. Barometric pressure has affected the water level changes but the small change in barometric pressure could only result in very small changes in the water levels due to the barometric change.

The water level plots for the overlying wells do not indicate any connection between the K-Sand production zone and the Overlying aquifer.

6.3 UNDERLYING AQUIFERS

Plots of the water level versus time for the Underlying aquifer wells are presented in Figures 6-6 through 6-10 for well 9MU-1A through 9MU-9B.

The water levels in the Underlying aquifer wells are generally steady or gradually rising. Barometric pressure changes influence the water levels only slightly during this test and therefore the water levels were not corrected for barometric pressure changes. Some

of the Underlying wells were showing a gradual rising trend prior to the pump test and continued to gradually rise during the recovery phase of the test. The water level rose at a higher rate in well 9MU-1A two and one-half days after the pump was turned off. This increase in the rate of rise in well 9MU-1A is not thought to be a function of the 9PW-2A pumping.

The water level data collected on the Underlying wells indicates no connection between the K-Sand and the Underlying aquifers in the MU9 mine area.

6.4 INTERGRITY OF CONFINING UNITS

The 9PW-2A test indicates that adequate confinement in this portion of MU9 is present above and below the K Sand such that mining in MU9 can proceed in accordance with permit 633.

6-9

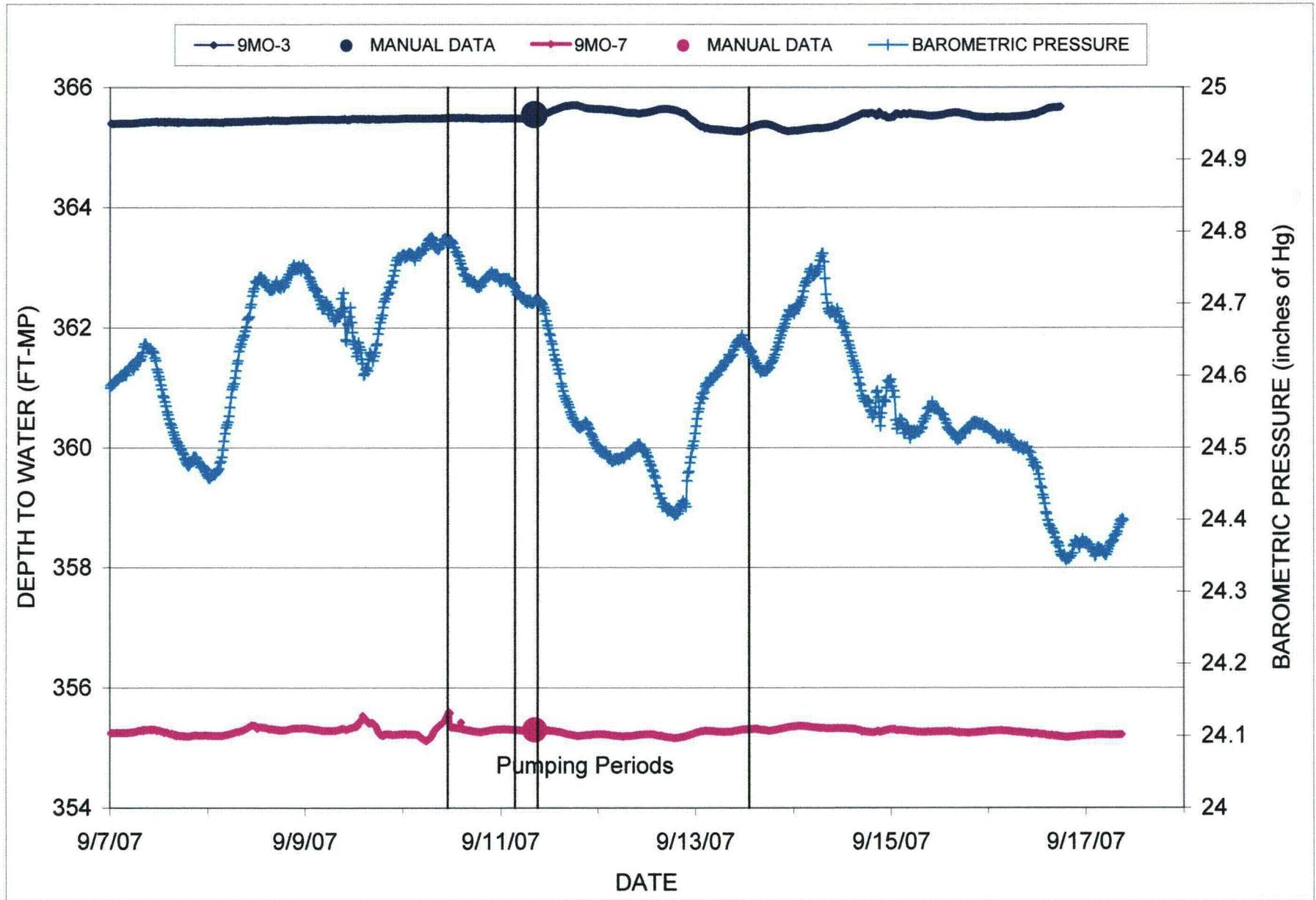


FIGURE 6-1. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MO-3 and 9MO-7

6-4

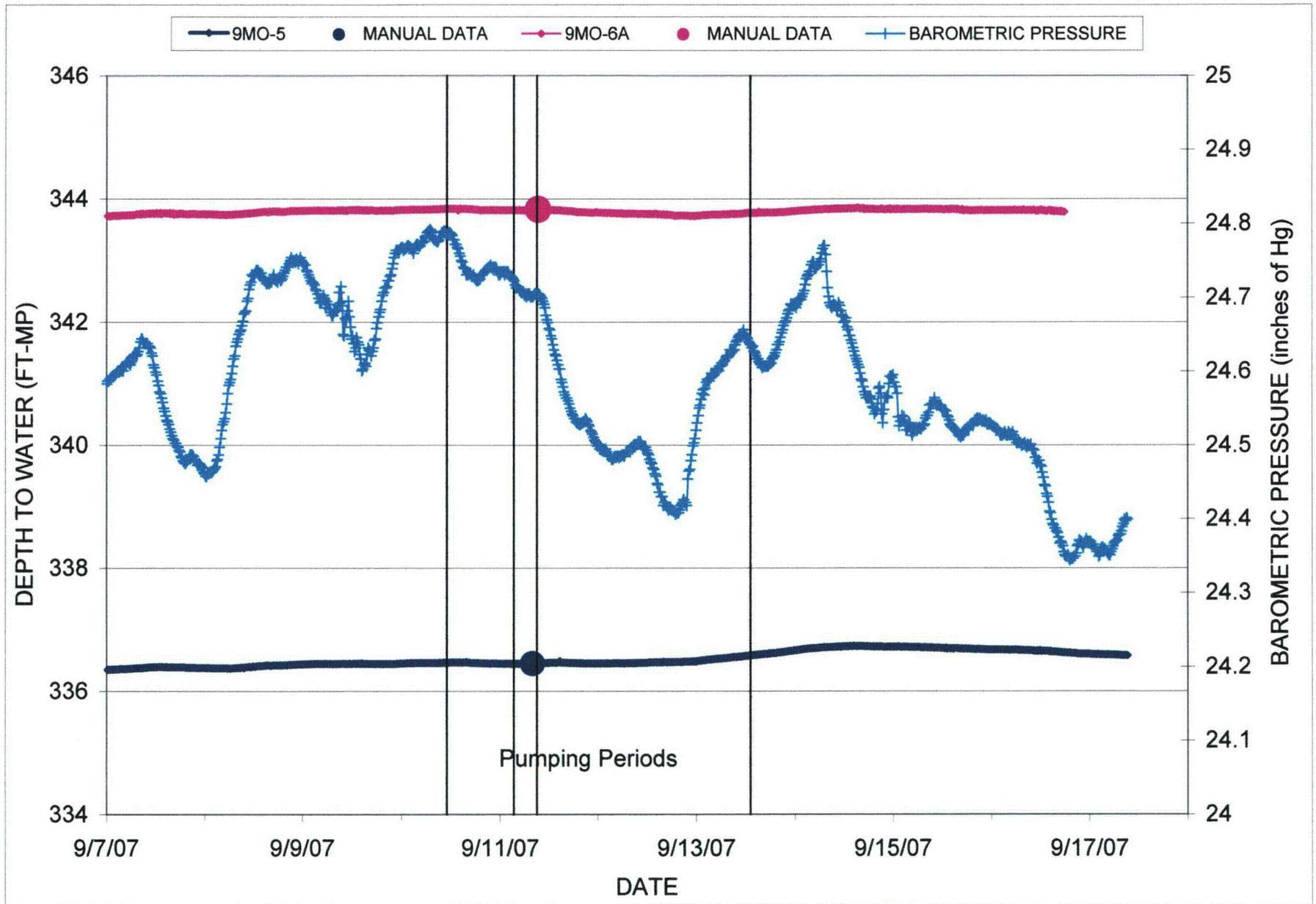


FIGURE 6-2. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MO-5 and 9MO-6A

5-9

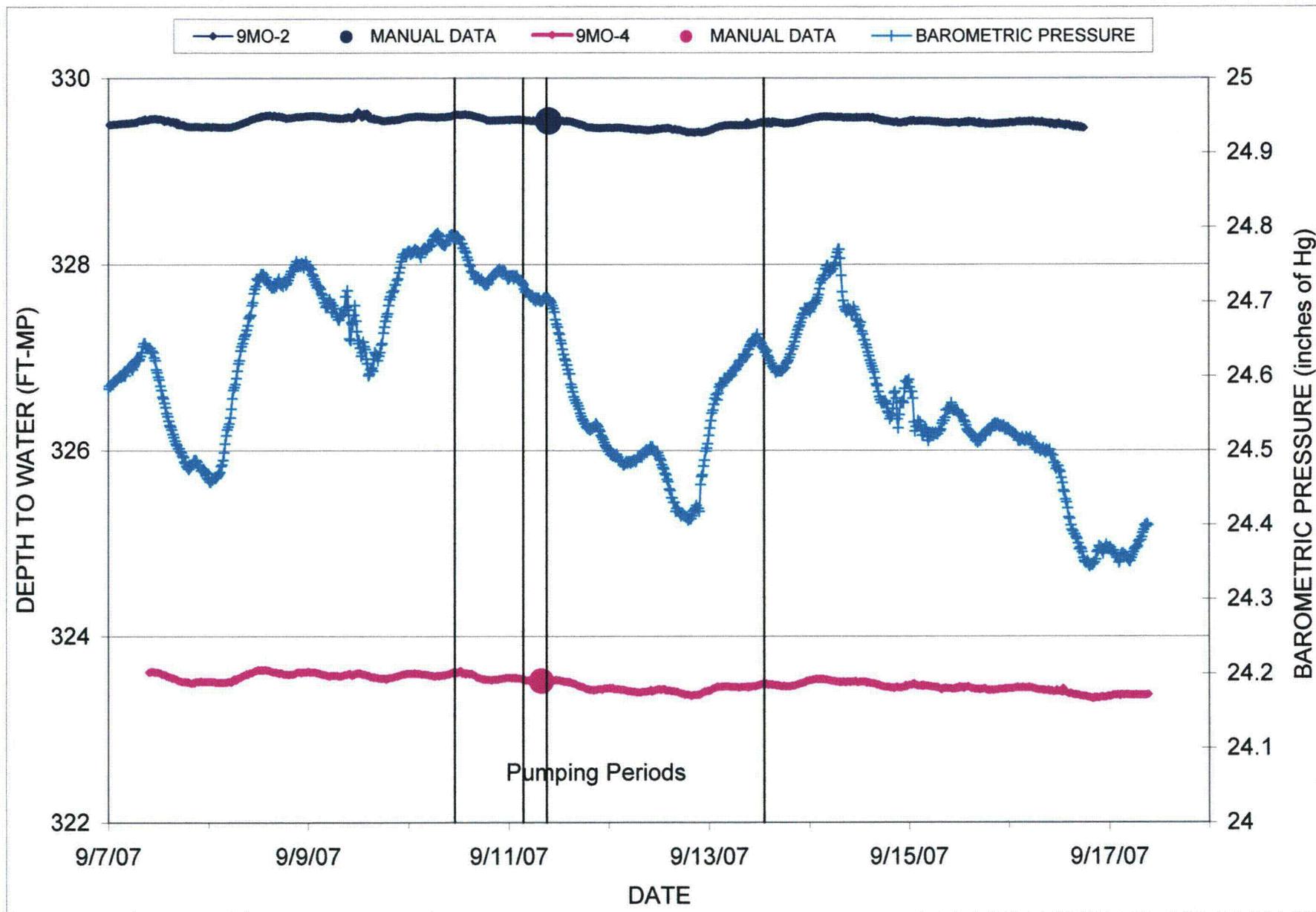


FIGURE 6-3. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MO-2 and 9MO-4

9-9

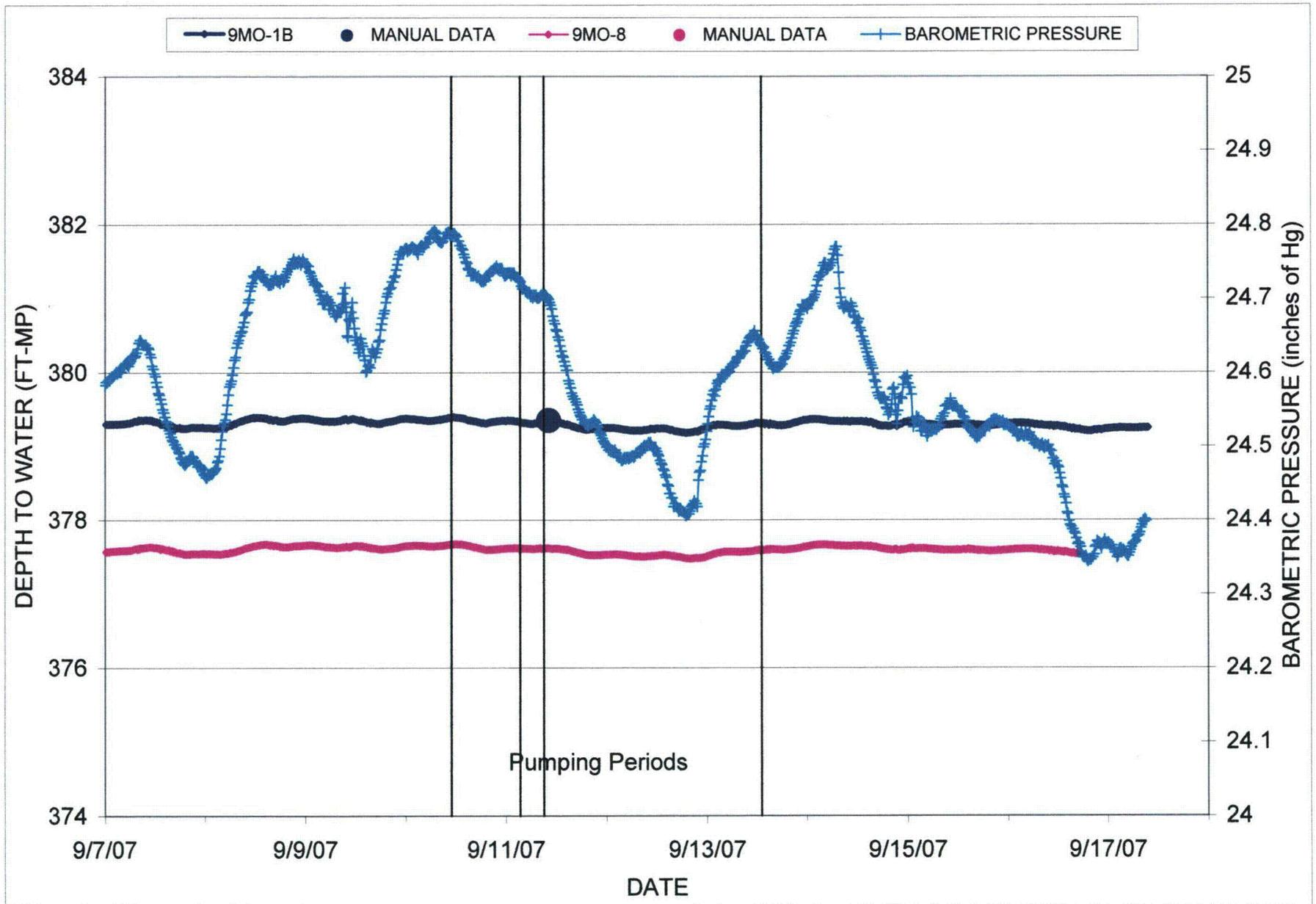


FIGURE 6-4. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MO-1B and 9MO-8

6-7

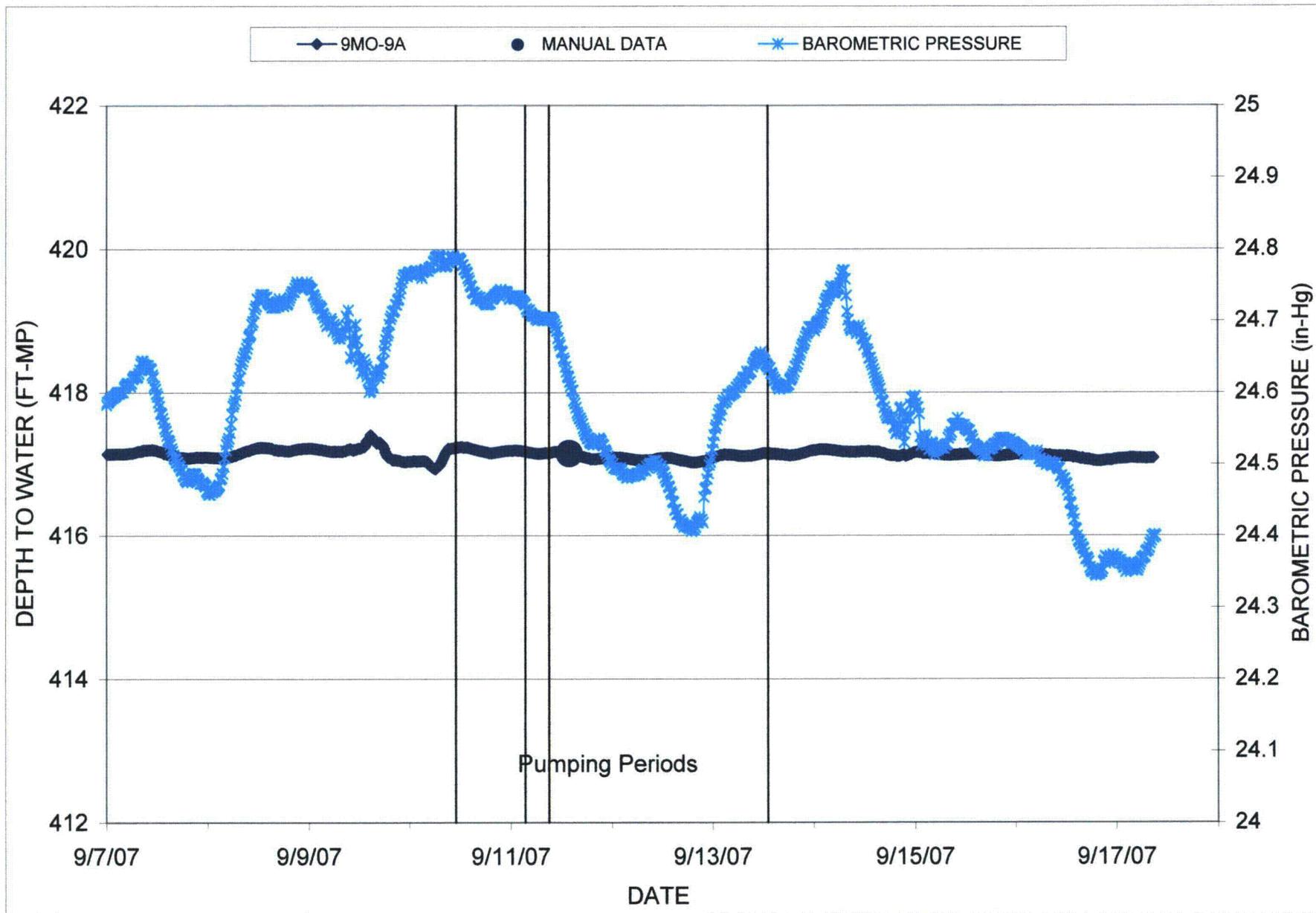


FIGURE 6-5. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL 9MO-9A

8-9

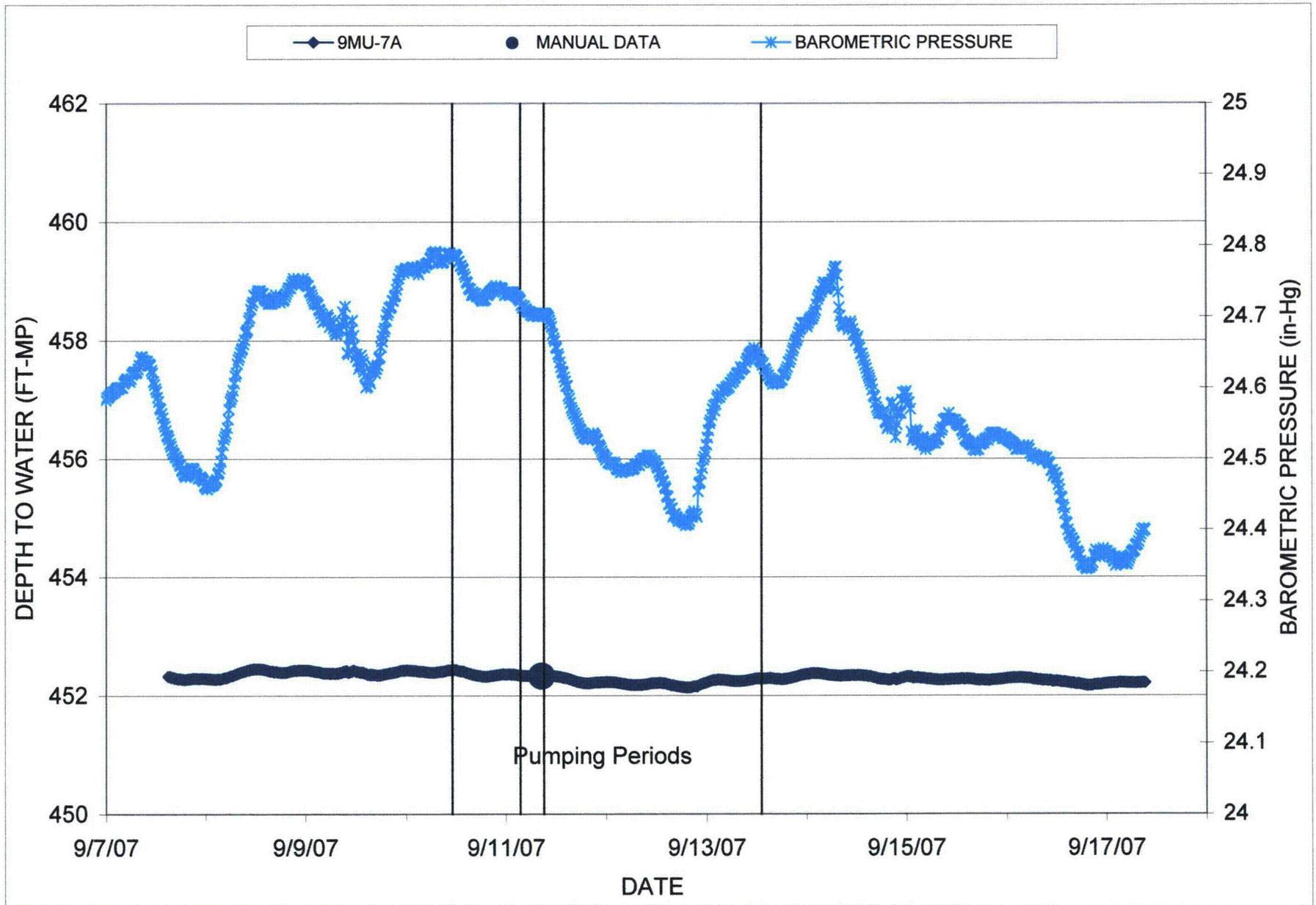


FIGURE 6-6. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL 9MU-7A

6-9

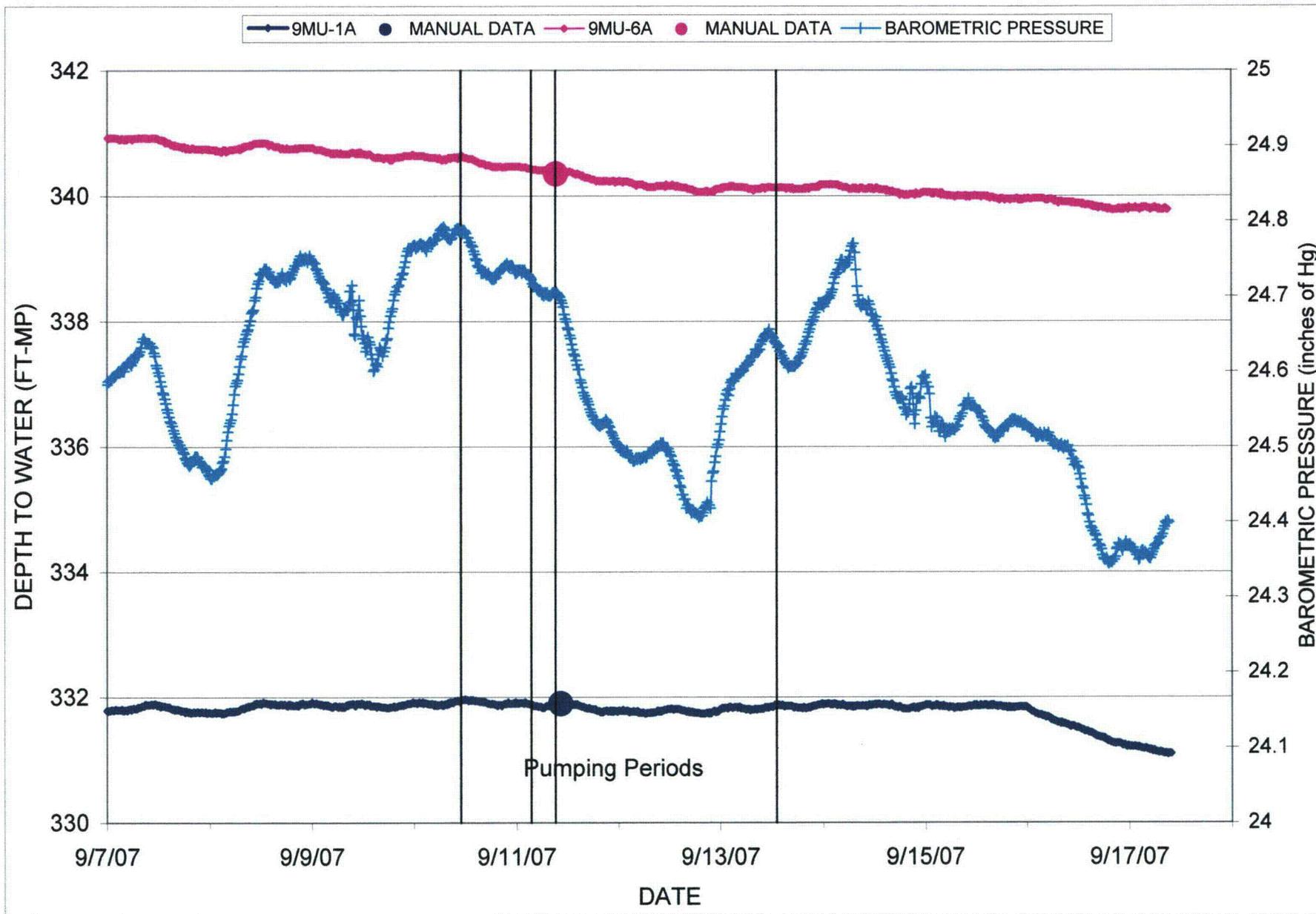


FIGURE 6-7. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL 9MU-1A AND MU-6A

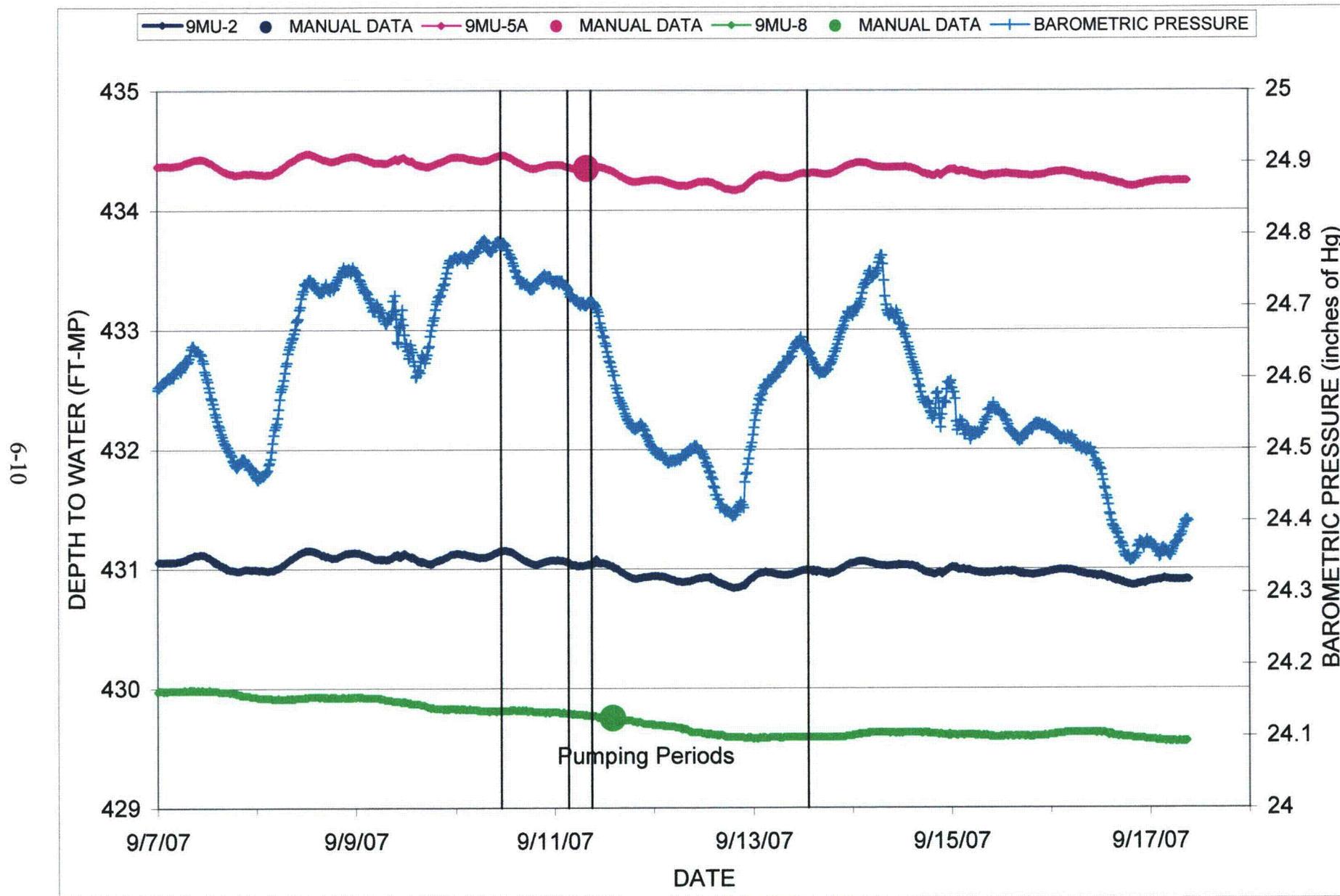


FIGURE 6-8. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MU-2, 9MU-5A AND 9MU-8

6-11

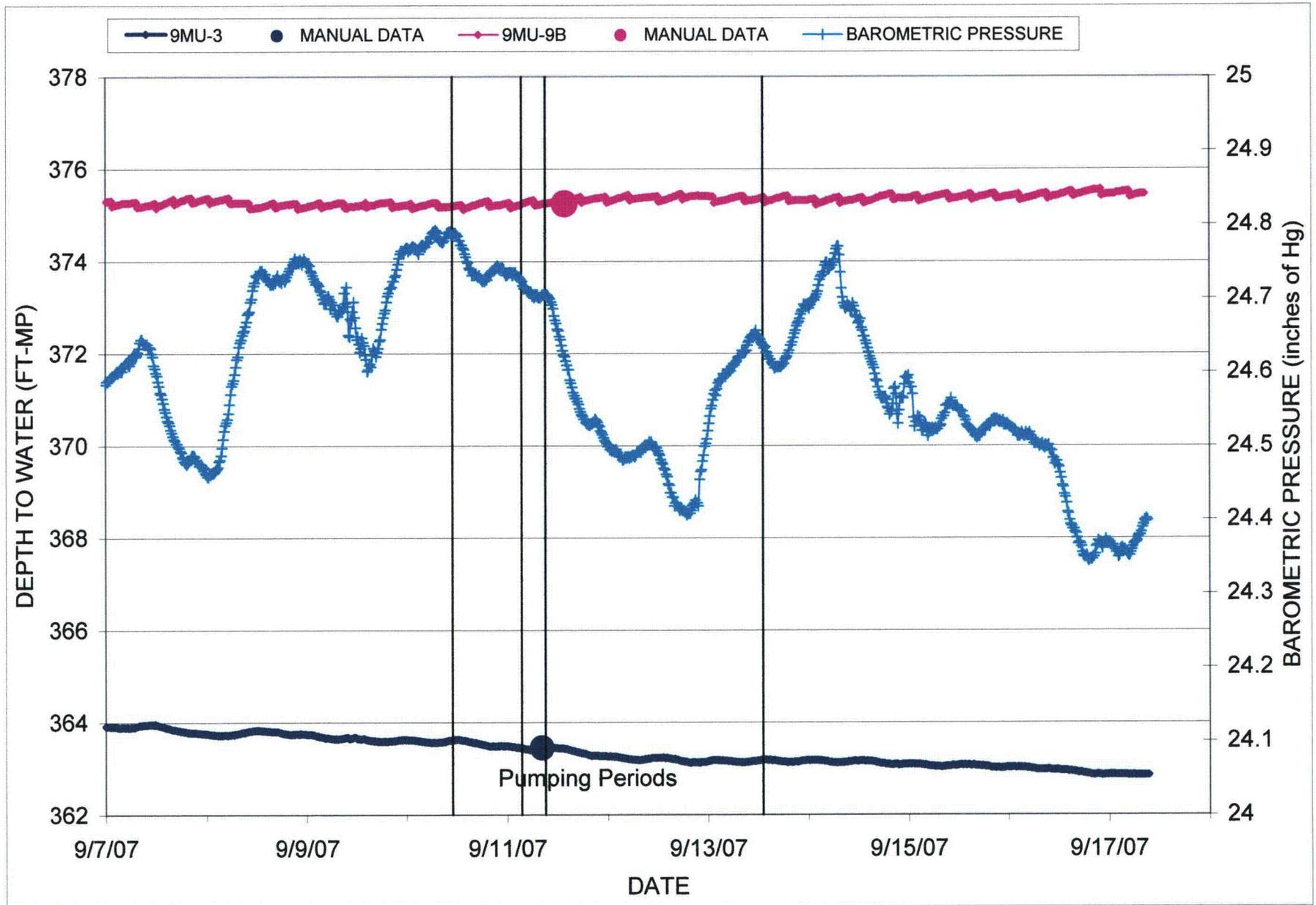


FIGURE 6-9. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MU-3 AND 9MU-9B

6-12

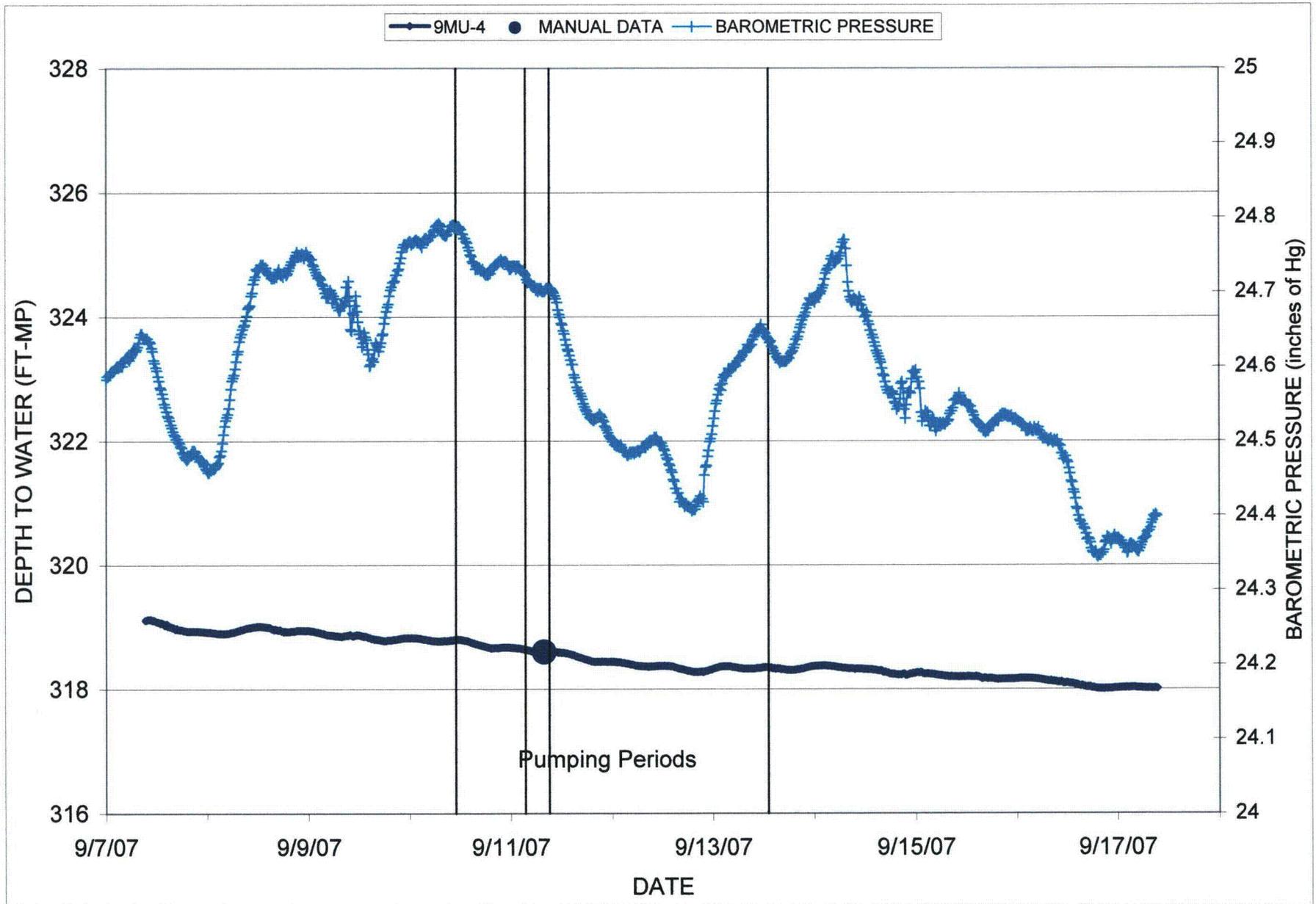


FIGURE 6-10. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL 9MU-4

7.0 PUMP TEST DESIGN AND WATER LEVEL DATA FOR 9PW-1 TEST

7.1 TEST DESIGN

The MU9 9PW-1 pump test was conducted with the following objectives:

- Demonstrate hydraulic communication between the Production Zone and the surrounding monitor well ring (M wells);
- Determine the hydrologic characteristics of the Production Zone aquifer;
- Evaluate the presence or absence of hydrologic boundaries within the Production Zone; and,
- Demonstrate sufficient hydrologic isolation between the Production Zone and the Overlying and Underlying sands for the purposes of ISL mining.

The pump tests were designed to cause a minimum of 1 to 2 feet of water level drawdown in the K Sand at a radius of 3,000 feet from the pumping well.

Figure 7-1 presents the wellfield outline and the locations of the pumping and observation (monitoring) wells used during the 9PW-1 hydrologic test. The pumping well (9PW-1) was screened across the entire thickness of the K Sand (Table 3-1). The pump was installed to a depth of 750 feet with a check valve.

The general testing procedures were as follows:

- ◆ Install automated monitoring equipment in the wells selected to be used in the test. Verify setting depths and head reading with manual water level measurements.
- ◆ Measure and record background water levels at least every 12 hours for a minimum of 48 hours prior to the start of the test.
- ◆ Pump the Well 9PW-1 at a constant rate (or as close as possible). Record water levels and barometric pressure throughout the background, pumping and recovery periods.

7.2 EQUIPMENT LAYOUT

Prior to the background monitoring period for the test, PRI installed a 30 gpm electric submersible pump with a check valve in the pumping well. Dual Halliburton MC-II meters were used to measure instantaneous flowrate and record total gallons pumped.

The monitoring equipment layout for the 9PW-1 test is shown on Figure 7-1. All the monitor wells for the test were equipped with automated water level recorders, either one In-situ TROLL data logger/transducer unit (pumping well), three In-situ Hermit data loggers with transducers or 39 Instrumentation Northwest transducer/data loggers. Water levels were also measured by hand for correlation of the automated equipment. The pumping equipment performed as designed. For consistency, occasional erroneous data (e.g., inaccurate readings that resulted when the equipment tried to log data during a data download) were edited out of the database. Further, PRI personnel performed hand (e-line) measurements to check any equipment with potential accuracy problems.

PRI personnel installed the monitoring equipment prior to testing and provided day-to-day downloads. Prior to the test, HYDRO and PRI personnel selected the data logger and transducer layout. Thereafter, PRI collected data daily and transferred the data to HYDRO for analysis.

The monitor wells used for the test, distance from each monitor well to the pumping well, and the drawdown observed are presented in Table 7-1. The equipment layout, including distinction between equipment types and pressure ratings for each transducer, is listed on Table 7-2. Figure 7-1 also shows the transducers used for each well. Section 8 presents the K Sand drawdown plots while Appendix D presents a tabulation of water levels for all of the 9PW-1 pump test wells.

7.3 BACKGROUND MONITORING, TEST PROCEDURES AND DATA COLLECTION

A potentiometric map for the K Sand, based on water level prior to the start of both tests, is shown in Figure 2-13. Background monitoring data along with the pumping and recovery period data for the K Sand monitoring wells are shown on Figures 7-2 through 7-16. These plots present the depth to water versus time on a linear scale. A tabulation of the water level data is presented in Appendix D.

The pump test was performed by pumping 9PW-1 at an average rate of 26.5 gpm from 9:15 on September 25, 2007 until 21:00 on September 28, 2007. The total pumping duration was 83.75 hours (5,025 minutes). The drawdown achieved in the pumping well was 63.8 feet; drawdown in the K Sand monitoring wells ranged from 1.4 to 16.2 feet (Table 7-1). Water levels were automatically measured and recorded every 15 minutes during the pumping and recovery periods. Pumping rate data for the test are shown on Table 7-3. Water level recovery was monitored for 3600 minutes. A list of K Sand monitoring wells, the distance of those wells from the pumping well, and the drawdown measured during the pumping period for all the wells are summarized in Table 7-1.

**Table 7-1.
MONITORING WELL DISTANCE AND DRAWDOWN AT THE END OF THE 9PW-1 TEST**

1st Start Date & Time	9/25/2007 9:15		
1st End Date & Time	9/28/2007 21:00		
Duration	101.5		
Avg. Pumping Rate	26.5		
Pumping Well	9PW-1	Distance from	Maximum Drawdown
		Pumping Well	During Test
Monitoring Wells	33	(ft)	(ft)
	9PW-1	0	63.8
Ore Zone Completions	9MP-9	2893	1.7
	9MP-10	2185	3.3
	9MP-11	1516	5.3
	9MP-12	620	10.1
	9MP-13	865	8.0
	9MP-14	2123	3.6
	M-916	2818	2.0
	M-917	2313	2.9
	M-918	1827	4.0
	M-919	1342	6.1
	M-920	862	8.7
	M-921A	332	13.6
	M-922	164	16.2
	M-923	661	9.5
	M-924A	1198	6.9
	M-925A	1662	5.1
	M-926	2162	3.6
	M-927A	2618	2.3
	M-928	3102	1.8
	M-929	3421	1.6
	M-930	3509	1.4
	M-931	3284	1.7
	M-932	2850	2.1
	M-933A	2468	2.8
	M-934	1990	3.7
	M-935	1627	5.1
	M-936	1272	6.4
	M-937	1233	6.6
	M-938	1157	6.9
	M-939	1351	5.8
	M-940	1720	4.6
	M-941	2204	3.1
	M-942	2669	2.1
Overlying Completions	9MO-10	2253	*
	9MO-11A	1516	*
	9MO-12	680	*
	9MO-13	930	*
	9MO-14	2073	*
Underlying Completions	9MU-10	2223	*
	9MU-11	1547	*
	9MU-12	690	*
	9MU-13	920	*
	9MU-14	2068	*

Note: * = No Drawdown Observed

e = estimated maximum drawdown because water level was below transducer

Table 7-2.

DATA LOGGER AND TRANSDUCER EQUIPMENT FOR MONITROING WELLS FOR THE 9PW-1 TEST

Well ID.	Transducer Type	Transducer SN #	Transducer Range	Well ID.	Transducer Type	Transducer SN #	Transducer Range
M-916	PT2X	2710036	30	9MP-9	PXD	2710012	30
M-917	PT2X	2710033	30	9MP-10	PXD	2710005	30
M-918	PT2X	2710011	30	9MP-11	PXD	2710035	30
M-919	PXD	9032	20	9MP-12	PXD	2710014	30
M-920	PT2X	2710030	30	9MP-13	PXD	2710040	30
M-921A	PT2X	2710038	30	9MP-14	PXD	2710015	30
M-922	PXD	9813	20				
M-923	PT2X	2710009	30	9MO-10	PXD	2710021	30
M-924A	PT2X	2710002	30	9MO-11A	PXD	2710006	30
M-925A	PT2X	2710003	30	9MO-12	PXD	2710016	30
M-926	PT2X	2710001	30	9MO-13	PXD	2710007	30
M-927A	PT2X	2711042	30	9MO-14	PXD	2710029	30
M-928	PT2X	2710034	30				
M-929	PT2X	2710017	30	9MU-10	PXD	2713018	30
M-930	PT2X	2710023	30	9MU-11	PXD	2710019	30
M-931	PT2X	2710004	30	9MU-12	PXD	2710021	30
M-932 (SWMP-1A)	PT2X	2714001	30	9MU-13	PXD	2712009	30
M-933A	PT2X	2713010	30	9MU-14	PXD	2710008	30
M-934	PXD	5953	20				
M-935	PXD	9824	20	9PW-1	Level Troll	105371	100
M-936	PT2X	2710018	30				
M-937	PT2X	2710037	30				
M-938	PT2X	2710027	30				
M-939	PT2X	2710013	30				
M-940	PT2X	2710025	30				
M-941	PT2X	2710032	30				
M-942	PT2X	2710022	30				

TABLE 7-3. FLOW RATE VS. TIME FOR PUMPING WELL 9PW-1

**POWER RESOURCES, INC.
MINE UNIT 9 PUMP TEST (PHASE 2)
PUMPING RATE DATA**

<u>DATE</u>	<u>TIME</u>	<u>TOTALIZER #1</u>	<u>#1 GPM</u>	<u>TOTALIZER #2</u>	<u>#2 GPM</u>	<u>PSI</u>	
9/25/2007	915						
			PUMP ON				
9/25/2007	920	146	27.462	147	27.462	1	
9/25/2007	1500	9194	26.841	9171	26.841	1	
9/25/2007	2100	18147	27.048	18091	26.91	1	
9/26/2007	300	28693	26.91	28553	26.703	1	
9/26/2007	1000	40304	26.634	40067	26.565	1	
9/26/2007	1400	47167	28.152	46886	26.565	1	
9/26/2007	2121	58143	27.048	57790	26.634	1	
9/27/2007	300	67249	26.91	66814	26.634	1	
9/27/2007	830	75035	25.634	74559	26.496	1	
9/27/2007	1435	85544	26.432	85028	26.421	0	
9/27/2007	2101	95808	26.979	95238	26.013	0	
9/28/2007	340	106403	26.385	105733	26.151	1	
9/28/2007	120	11248	26.469	114512	25.902	1	
9/28/2007	1400	1122655	26.841	121876	26.565	1	
9/28/2007	2100	133665	26.703	132814	26.151	1	
9/28/2007	2100		PUMP OFF				

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. FIGURE 7-1, "DATA
LOGGER AND TRANSDUCER
EQUIPMENT LAYOUT FOR THE 9PW-1
TEST"**

**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DOCUMENT/REPORT NO.
FIGURE 7-1**

D-12

7-7

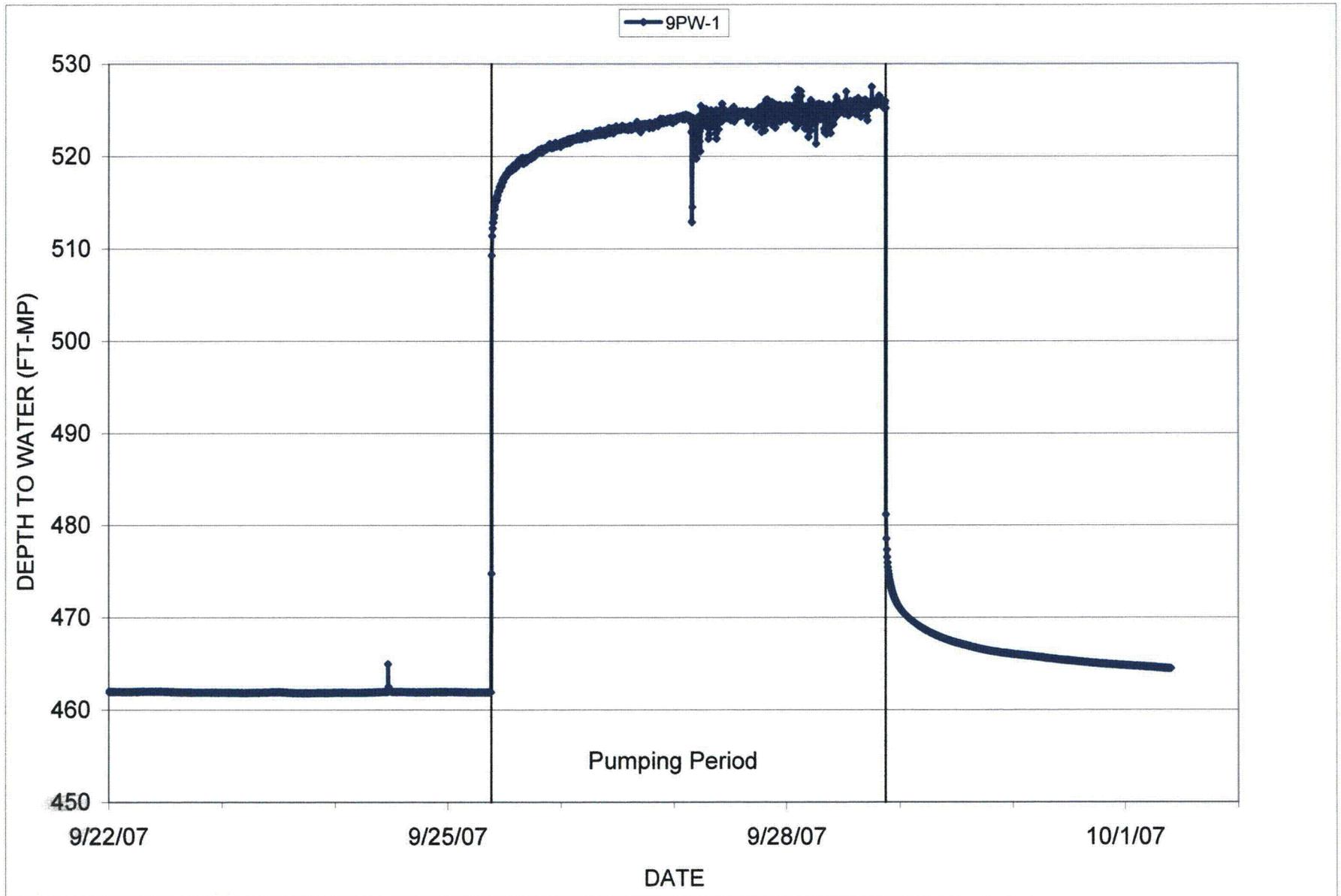


FIGURE 7-2. DEPTH TO WATER VERSUS TIME FOR PUMPING WELL 9PW-1

7-8

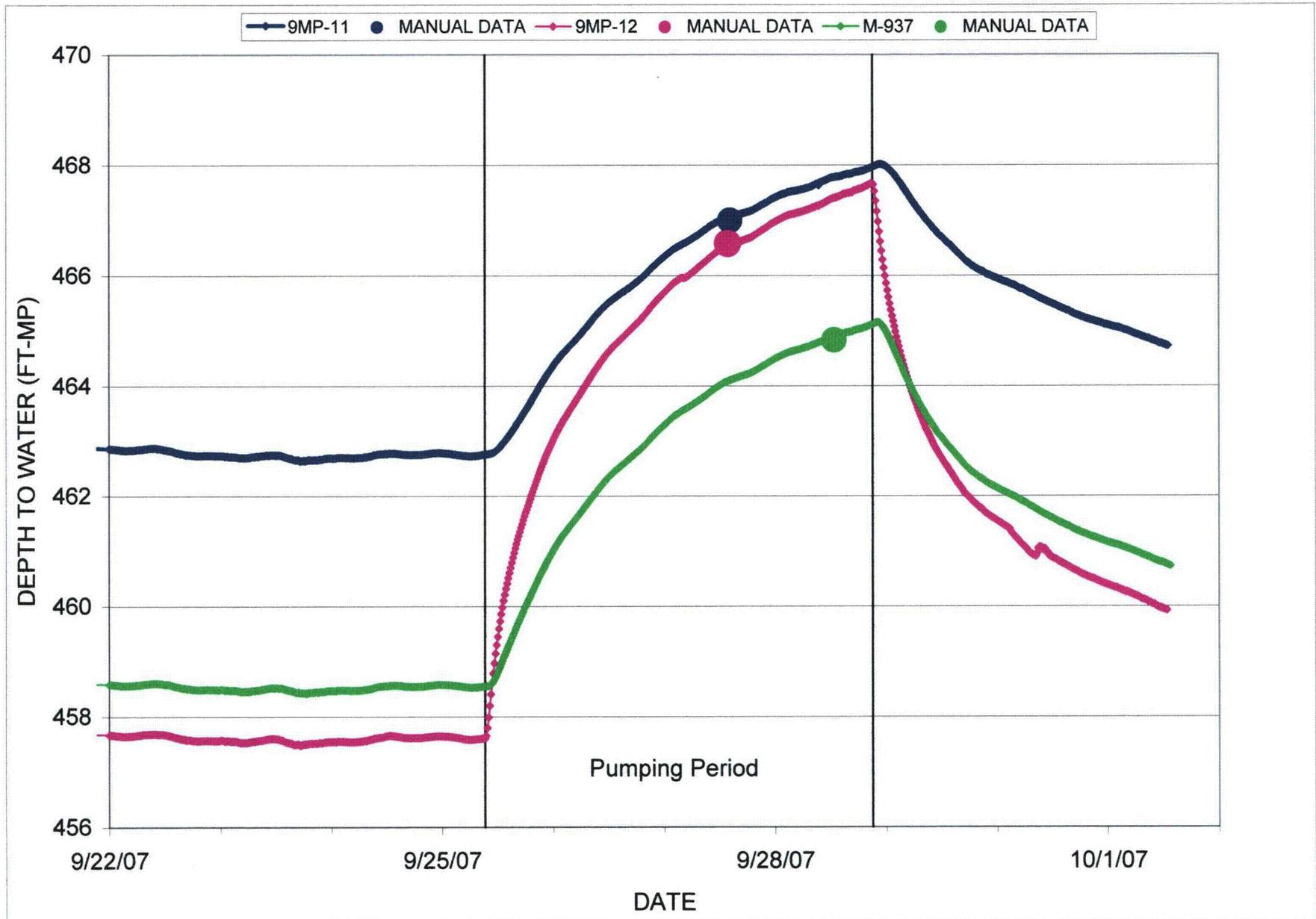


FIGURE 7-3. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-11, 9MP-12 AND M-937

7-9

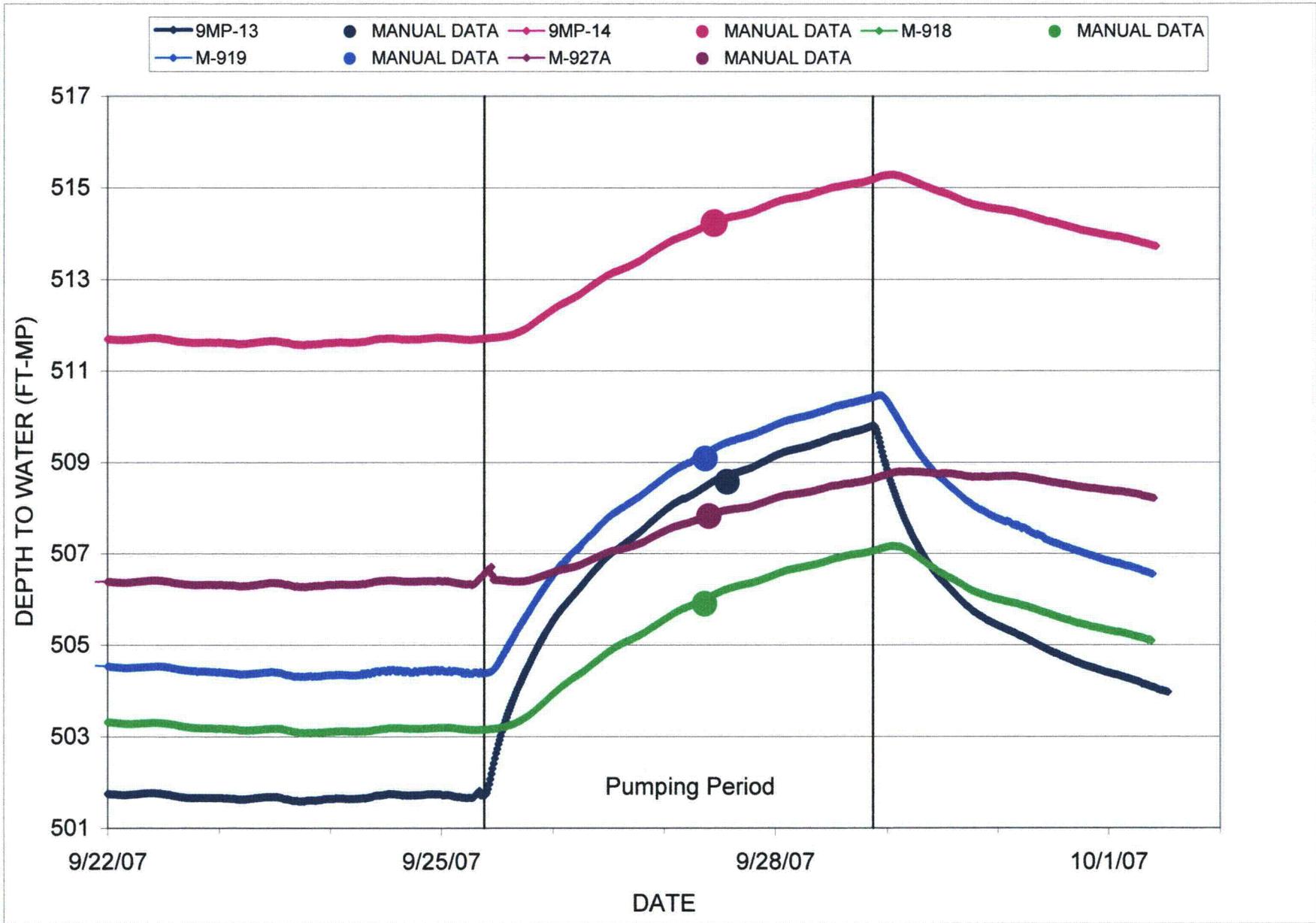


FIGURE 7-4. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-13, 9MP-14, M-918, M-919 AND M-927A

7-10

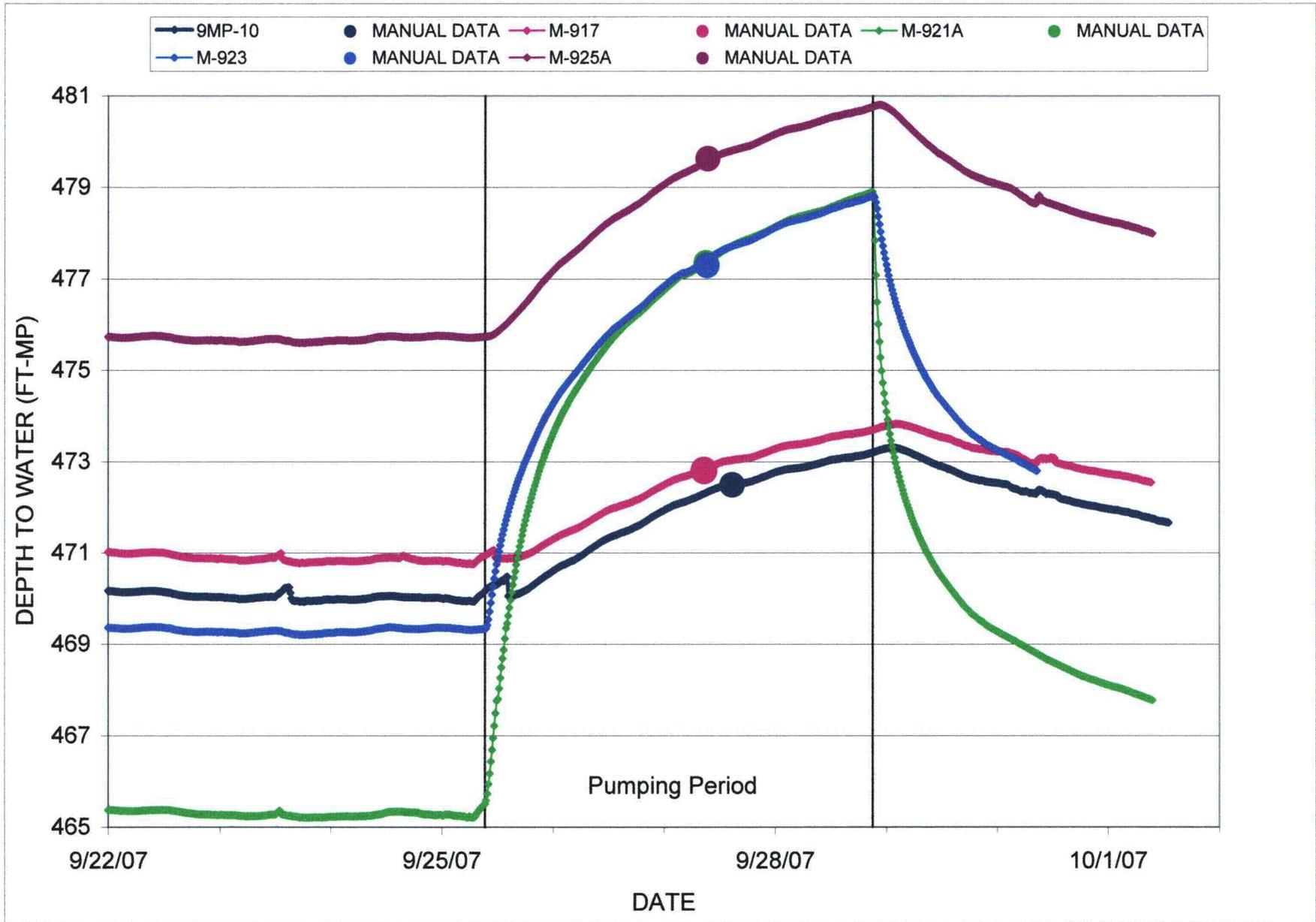


FIGURE 7-5. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-10, M-917, M-921A, M-923 AND M-925A

7-11

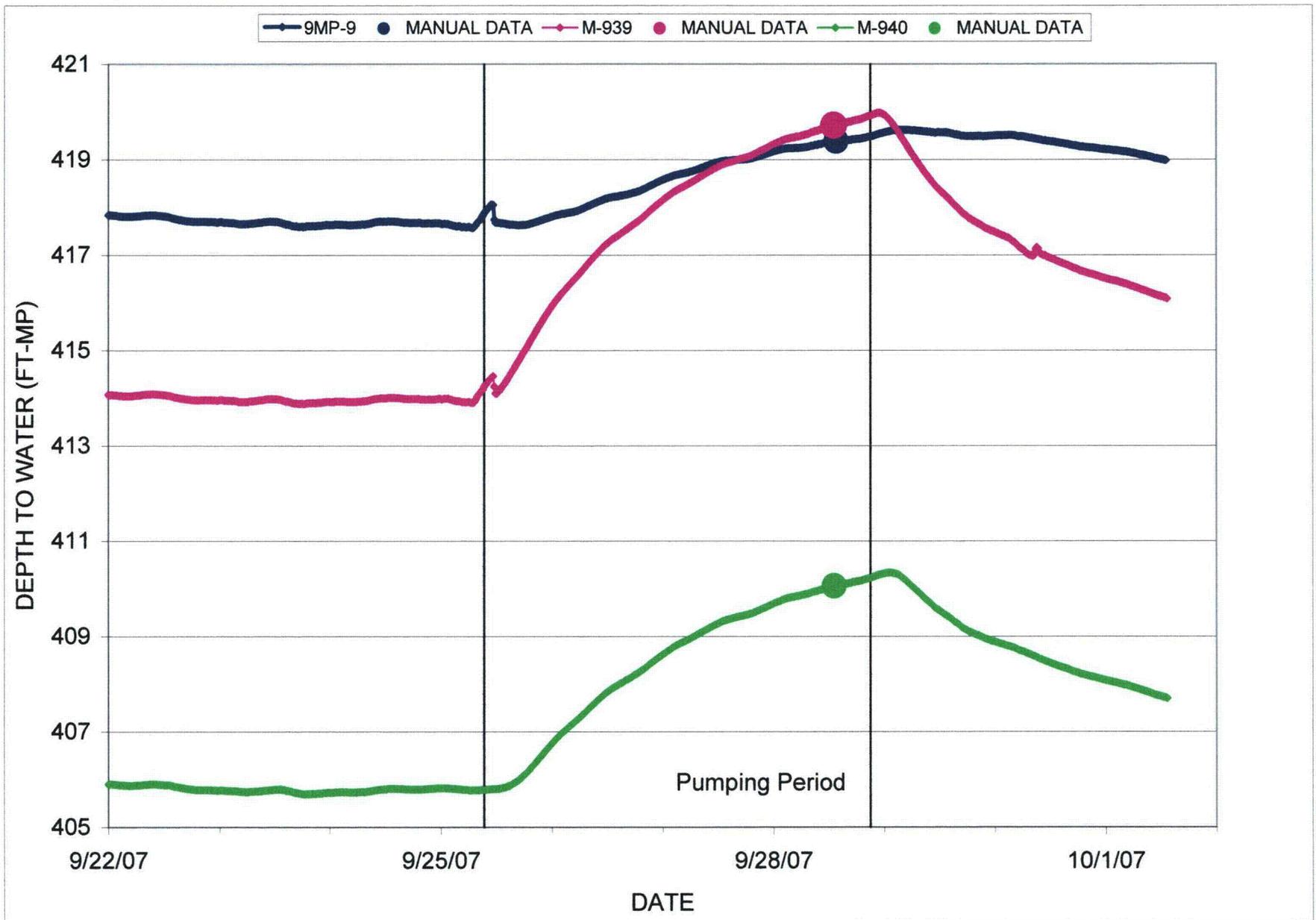


FIGURE 7-6. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS 9MP-9, M-939 AND M-940

7-12

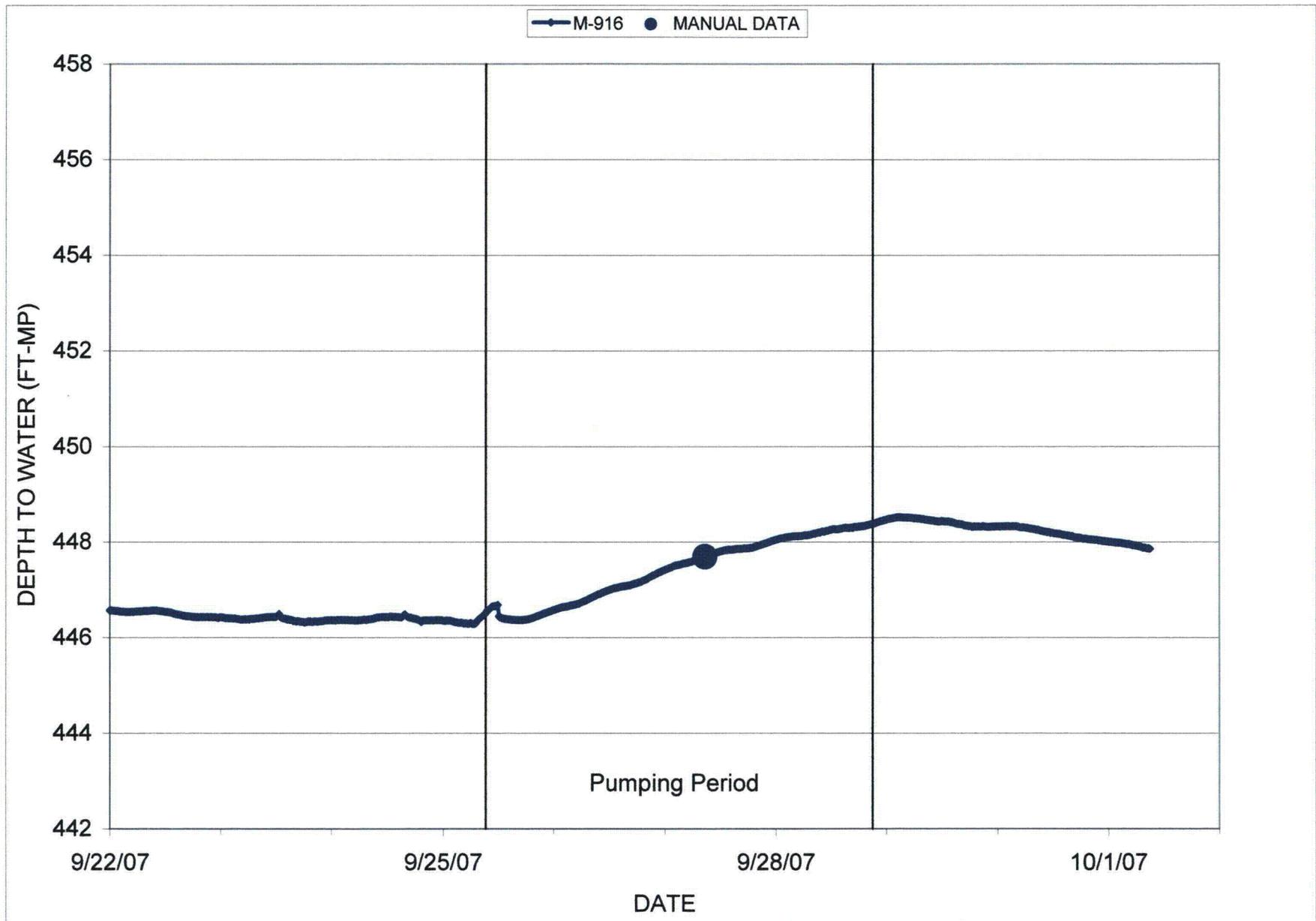


FIGURE 7-7. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-916

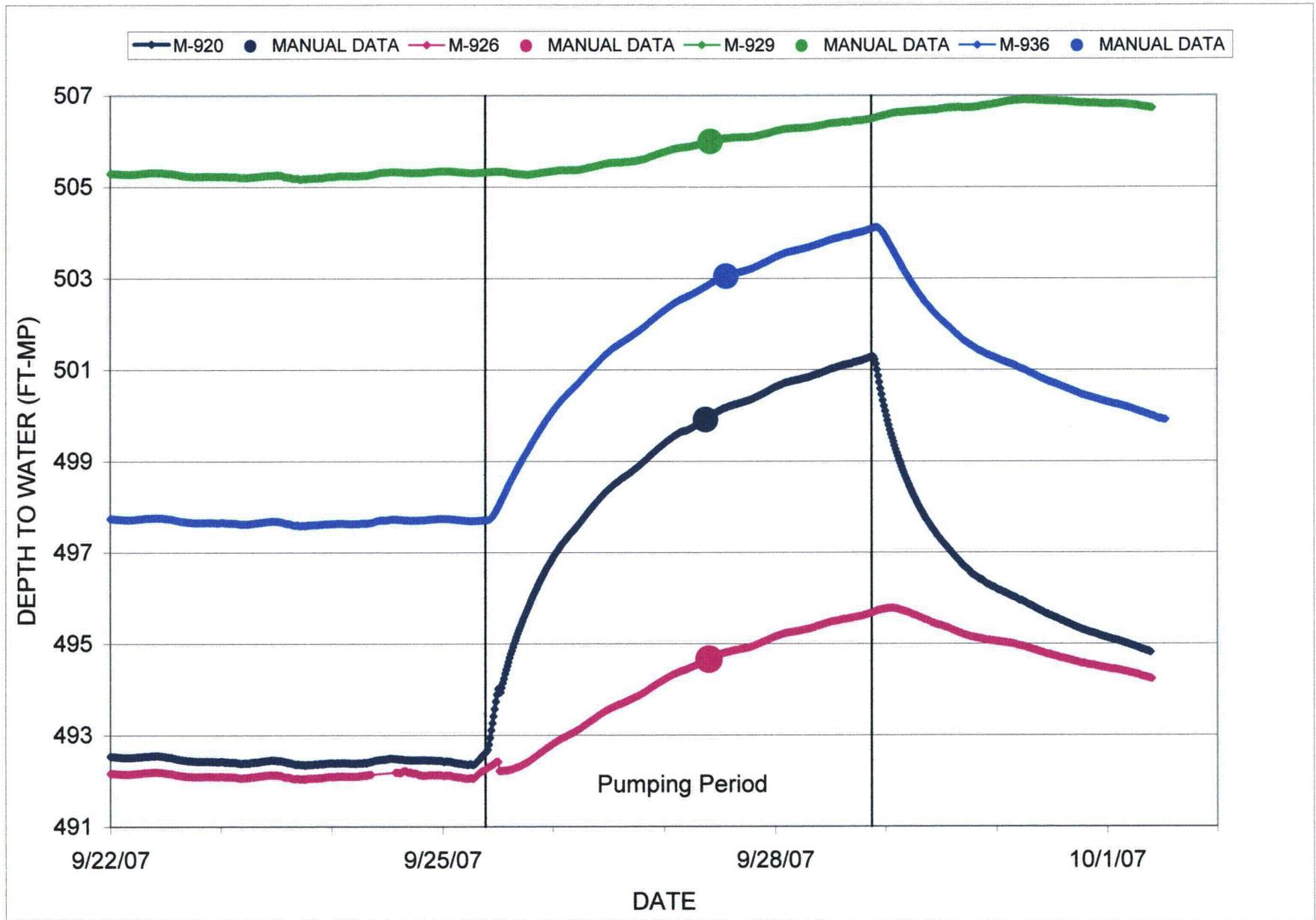


FIGURE 7-8. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-920, M-926, M-929 AND M-936

7-14

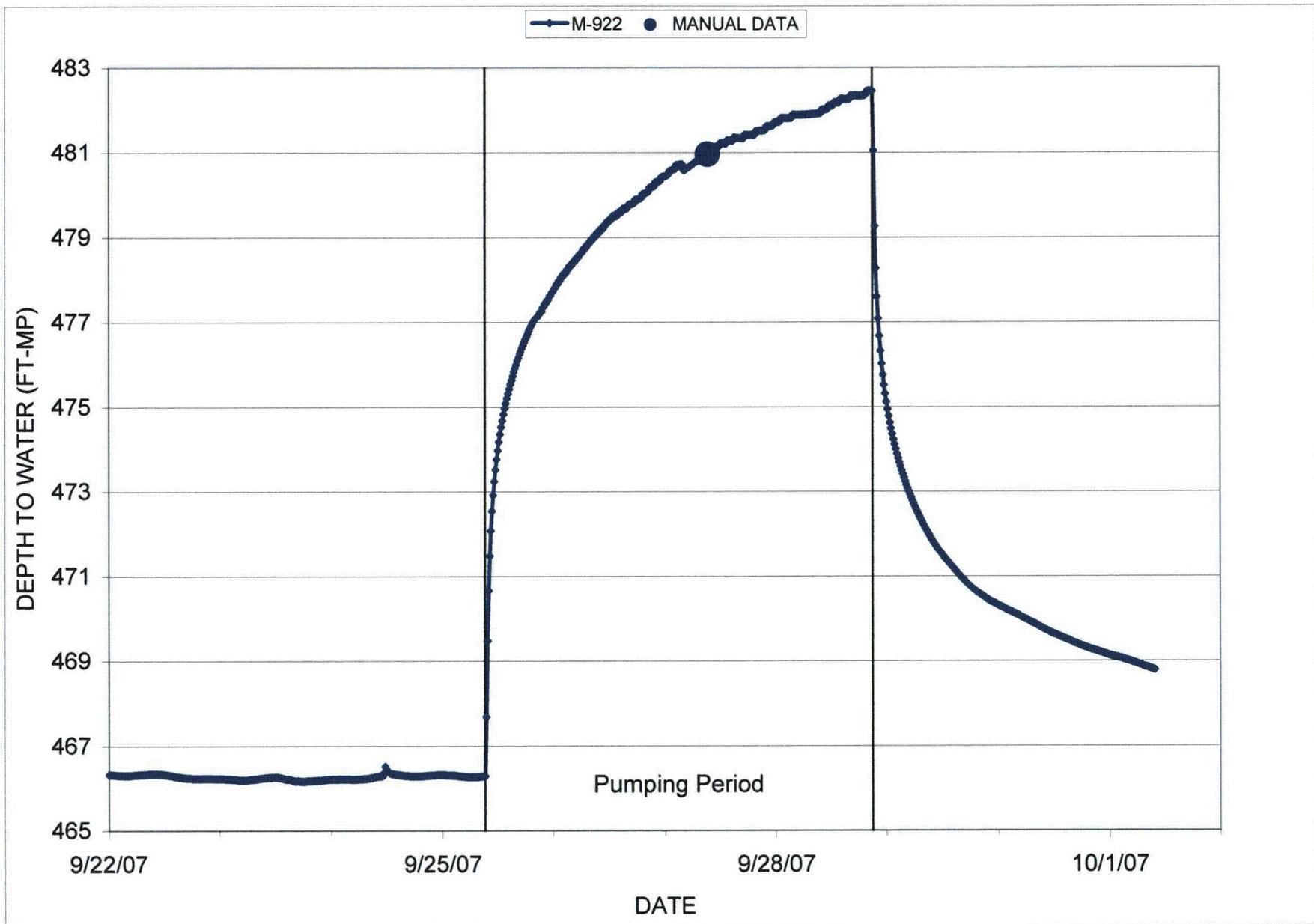


FIGURE 7-9. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-922

7-15

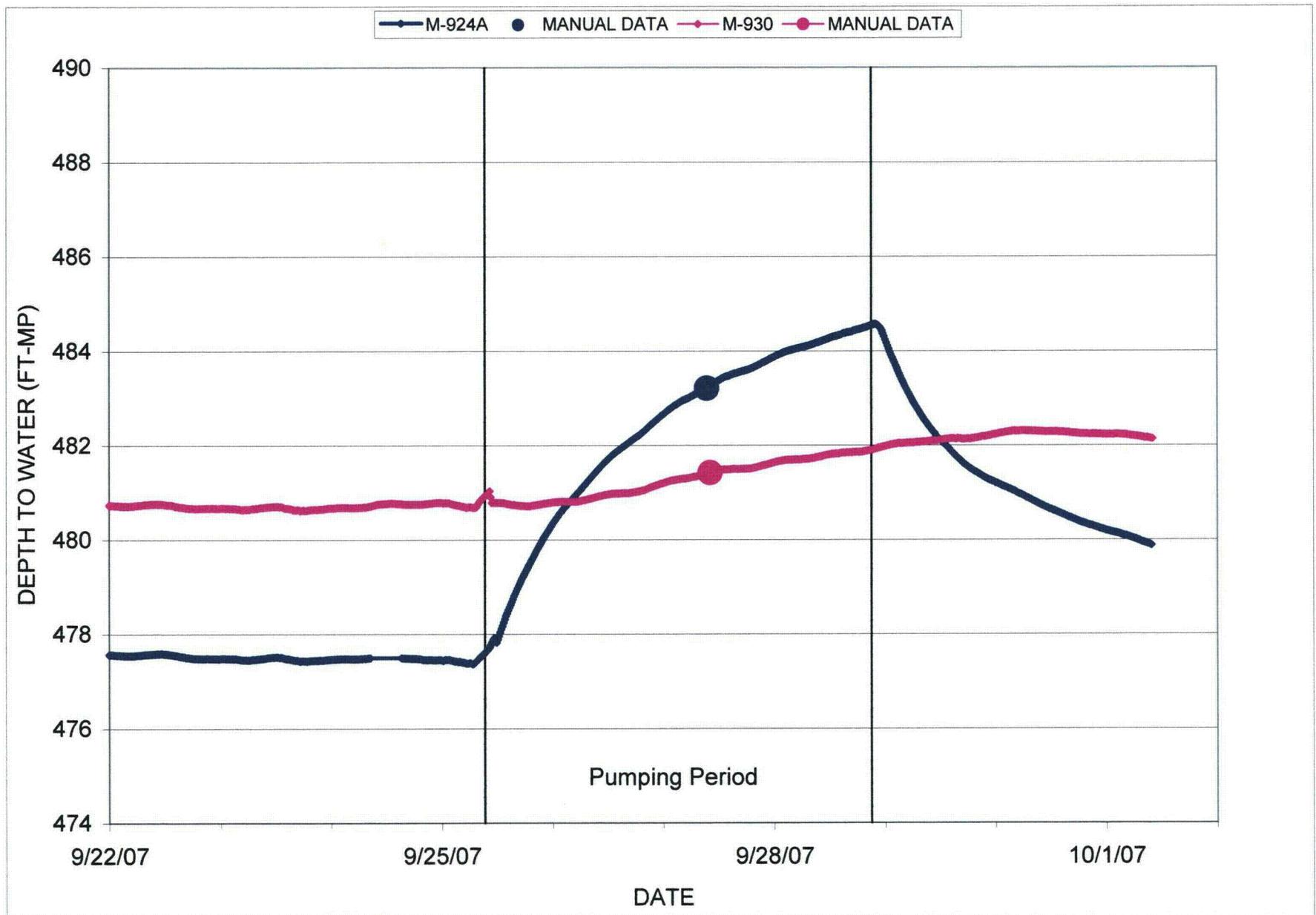


FIGURE 7-10. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-924A AND M-930

7-16

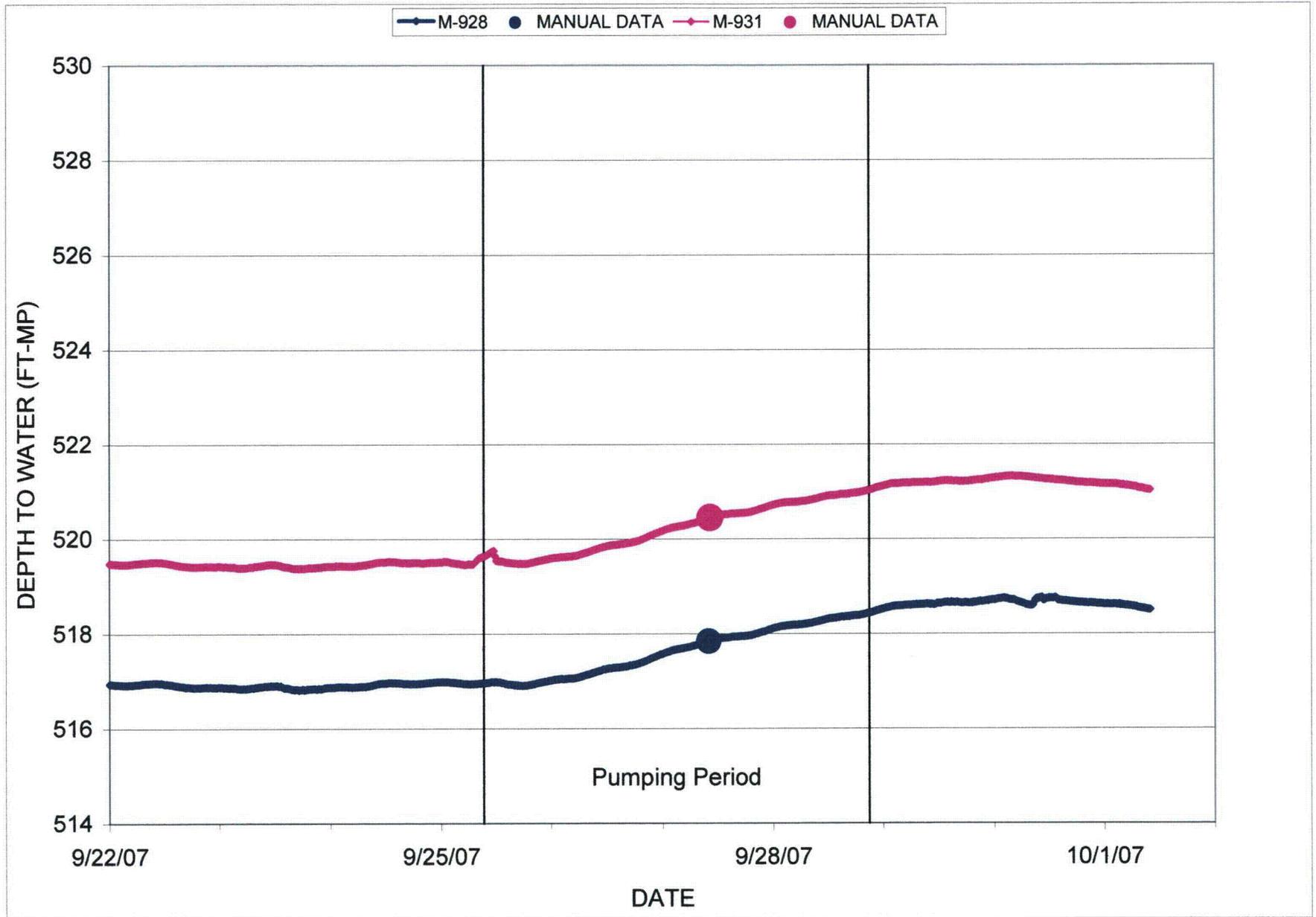


FIGURE 7-11. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-928 AND M-931

7-17

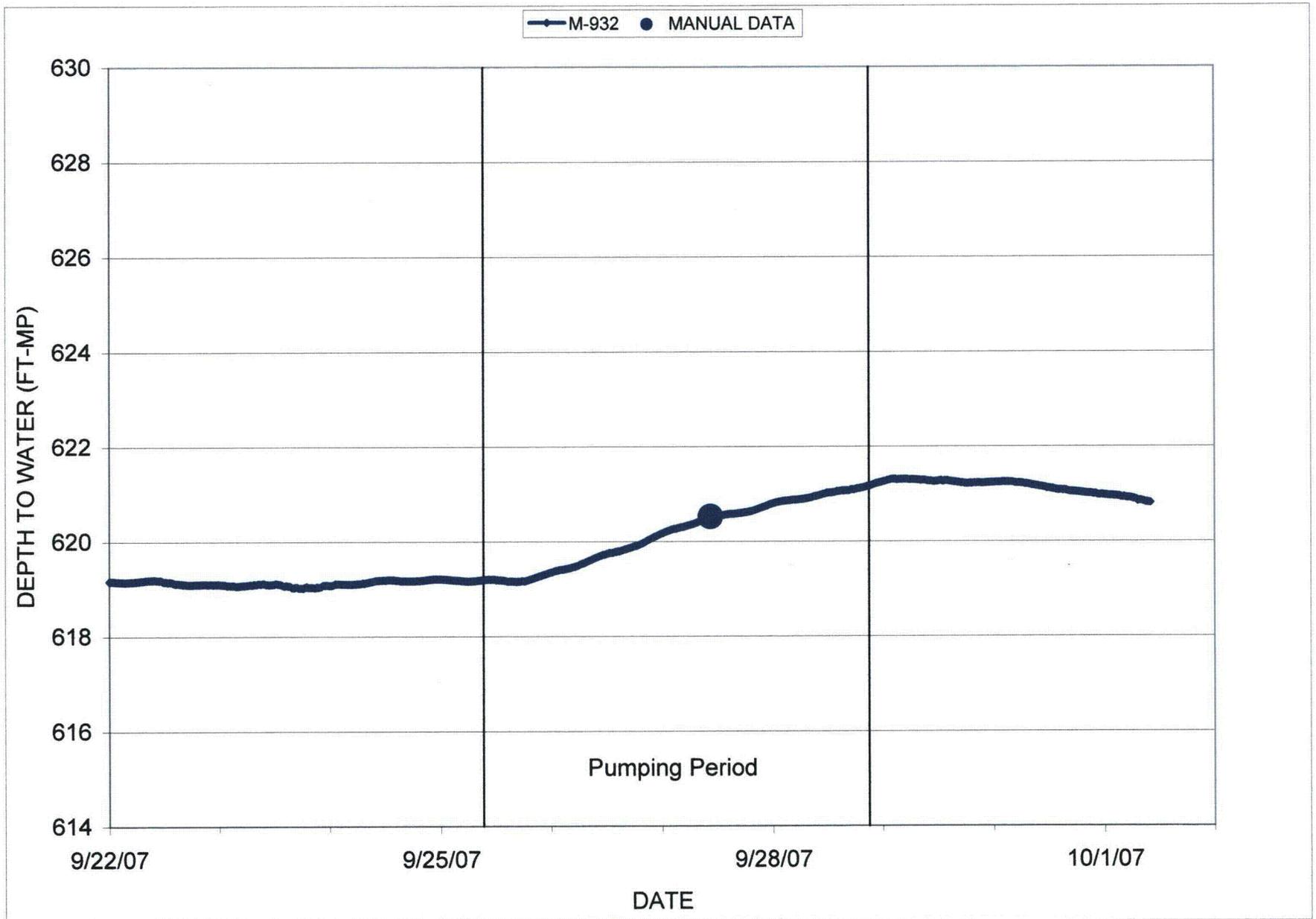


FIGURE 7-12. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-932

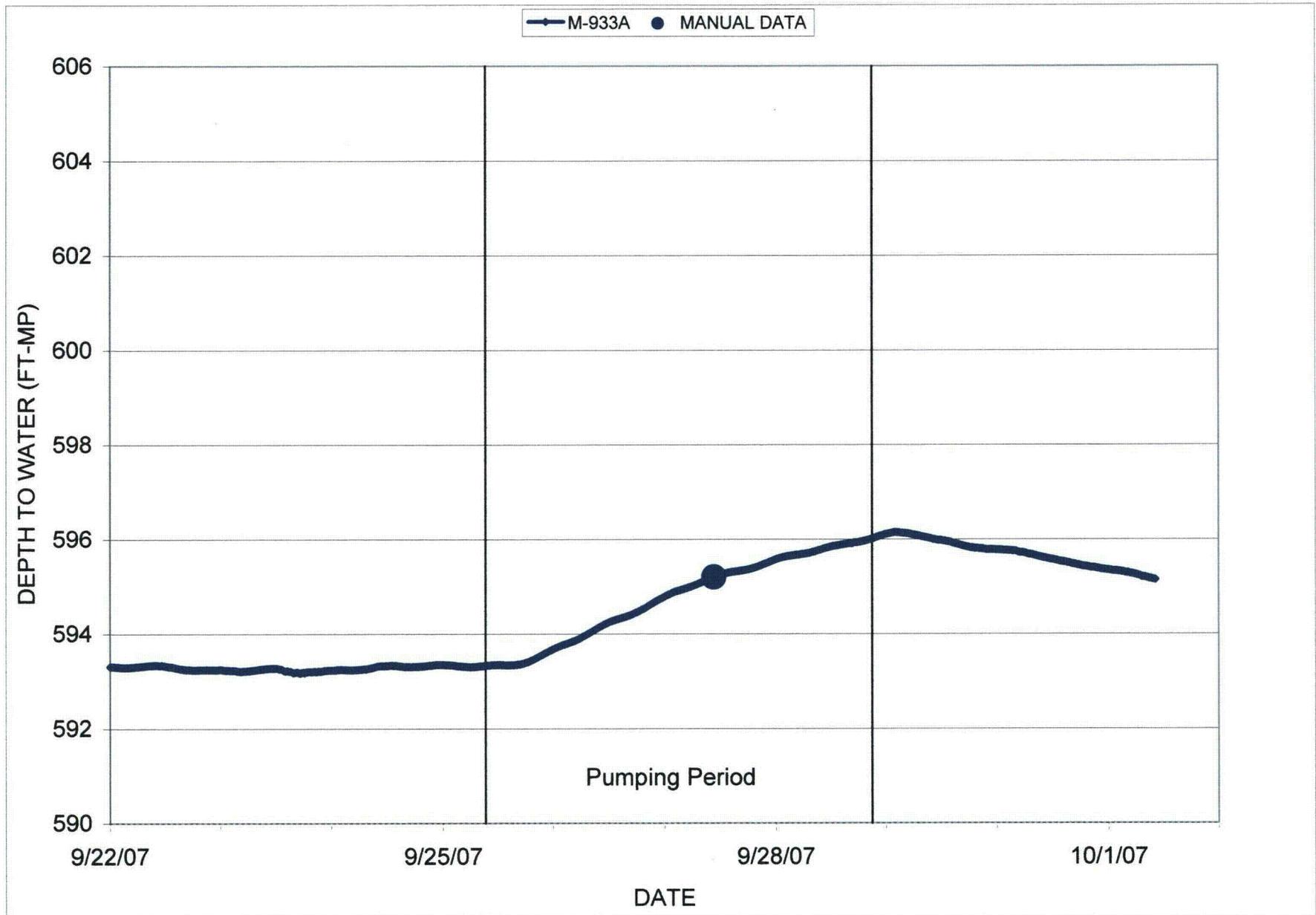


FIGURE 7-13. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-933A

7-19

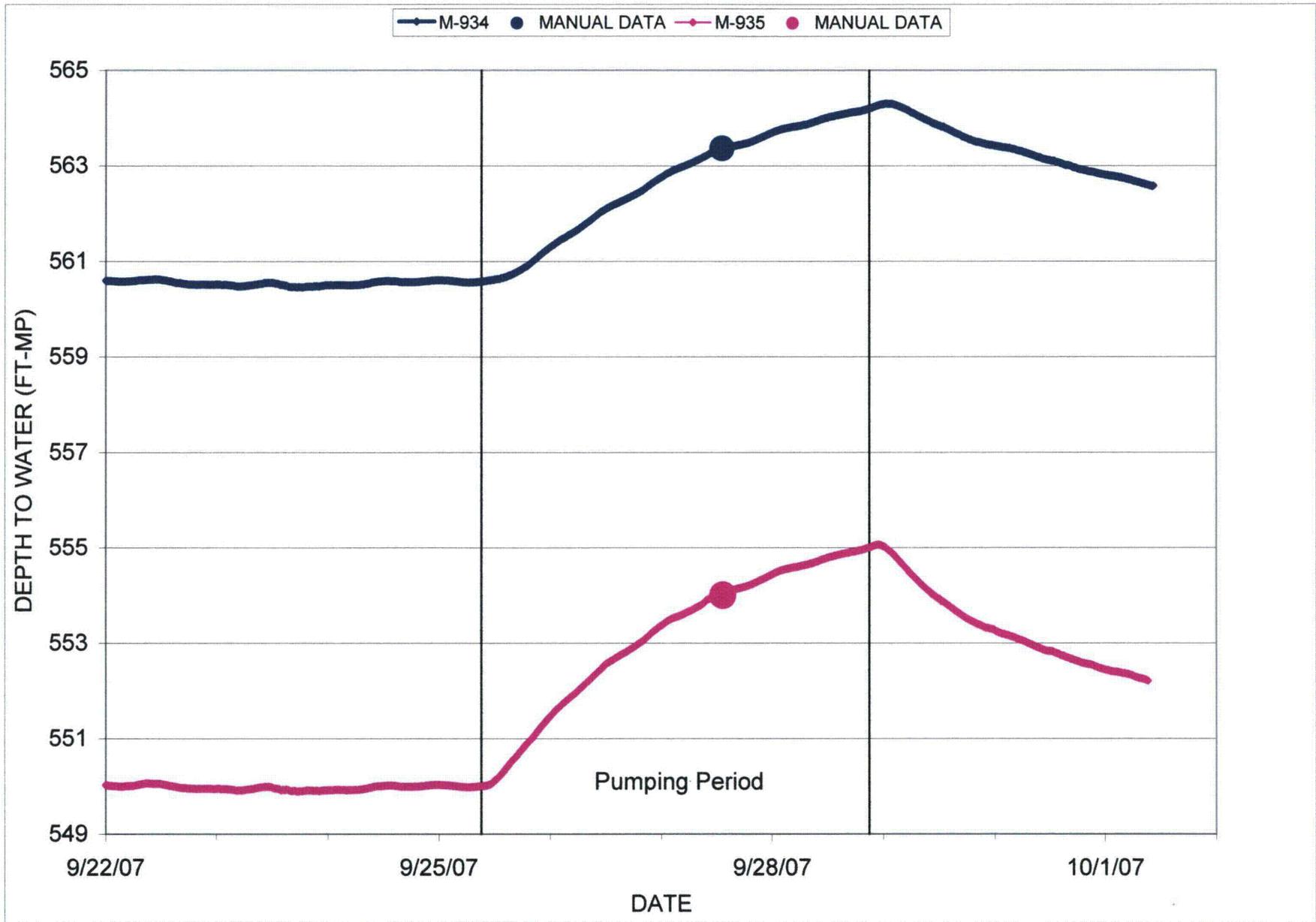


FIGURE 7-14. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-934 AND M-935

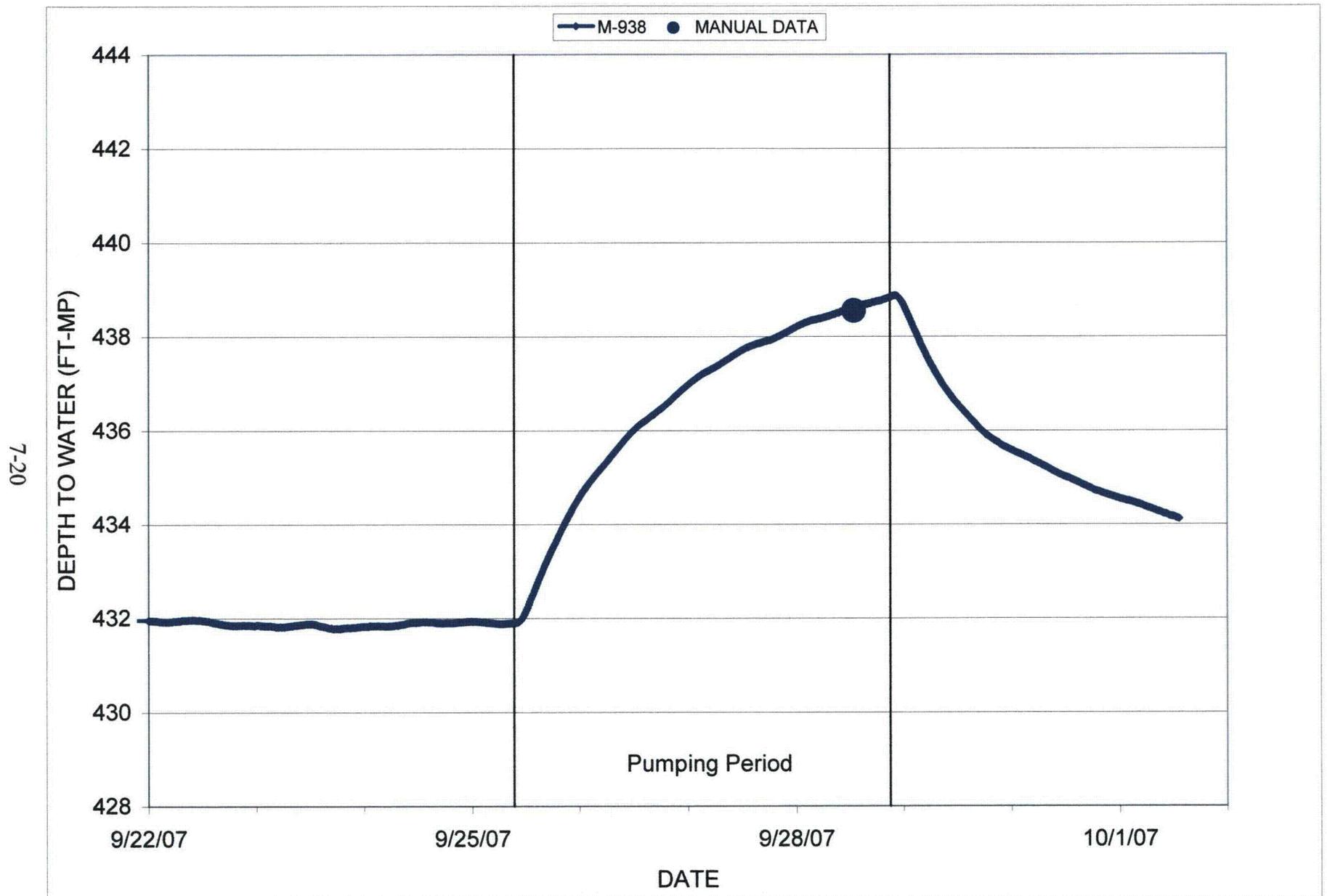


FIGURE 7-15. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELL M-938

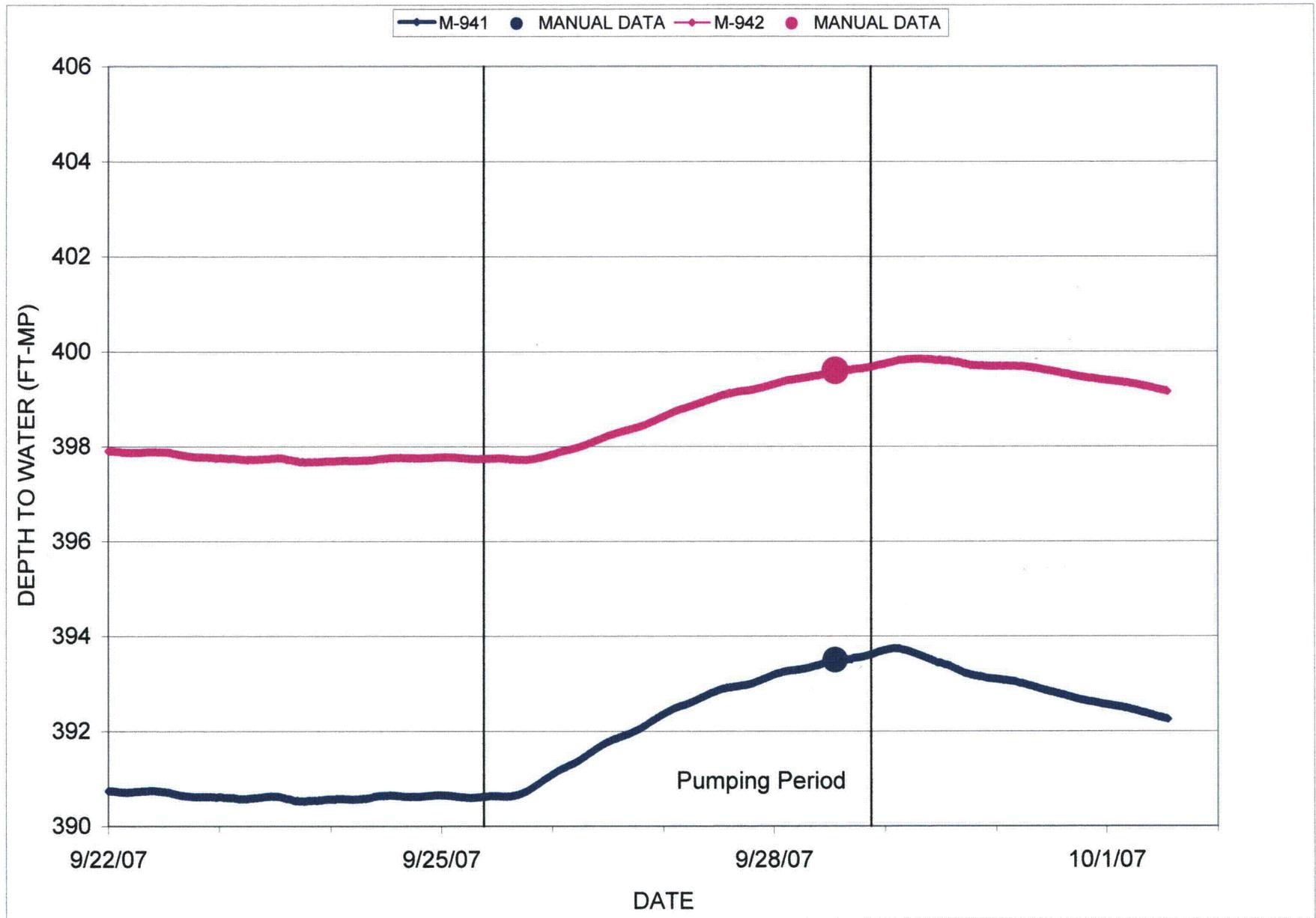


FIGURE 7-16. DEPTH TO WATER VERSUS TIME FOR OBSERVATION WELLS M-941 AND M-942