

ATTACHMENT F-3

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
 NEW MEXICO TECH
 801 LEROY PLACE, SOCORRO, NM 87801
 Phone: (575) 835-5160 FAX: (575) 835-6333

General Chemistry Analysis

Name	Greg Miller	Date Received	3/16/2009
Address	AMEC	Date Completed	3/18/2009
Address 2	P.O. Box 445		
City, State, Zip code	Socorro NM 87801		
Phone	(575) 835-2569	CHARGES	
FAX	(575) 835-2609		
Cell phone			
Email	greg.miller@amec.com		

Lab ID	09-0186	09-0187
Well Name	M-3668	M1933a
pH	7.7	7.9
Conductivity (uS/cm)	1400	1120
TDS calculated (mg/L)	794	699
Hardness (mg eq/L CaCO3)	105	70
Alkalinity as CO3 ²⁻ (mg/L)		
Alkalinity as HCO3 ⁻ (mg/L)	290	365
Bromide (mg/L)	0.75	<0.5
Chloride (mg/L)	105	51
Fluoride (F-) (mg/L)	4.6	6.0
Nitrite (NO2-) (mg/L)	<0.5	<0.5
Nitrate (NO3-) (mg/L)	11	5.5
Phosphate (mg/L)	<2.5	<2.5
Sulfate (SO4 ²⁻) (mg/L)	210	170
Sodium (Na) (mg/L)	230	205
Potassium (K) (mg/L)	21	17
Magnesium (Mg) (mg/L)	5.8	4.2
Calcium (Ca) (mg/L)	33	21
Total cations (meq/L)	12.64	10.73
Total anions (meq/L)	12.51	11.37
Percent difference	0.50	-2.89

Approved By: _____

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
 NEW MEXICO TECH
 801 LEROY PLACE, SOCORRO, NM 87801
 PH: 505-835-5160 FAX: 505-835-6333

METALS AND MAJOR CATION ANALYSES

Customer name Greg Miller
 Address AMEC
 Address 2 P.O. Box 445
 City, State, Zip code Socorro NM 87801
 Phone (575) 835-2569
 FAX (575) 835-2609
 Cell phone _____
 Email greg.miller@amec.com

Date Received 3/16/2009
 Date Completed 3/18/2009

CHARGES _____

All concentrations in mg/L.

Lab ID	09-0186 flit	09-0186 un	09-0187 flit	09-0187 un
Well Name	M-3668	M-3668	M-1933a	M-1933a
Basis	Filtered	Unfiltered	Filtered	Unfiltered
ICP-MS				
Aluminum (Al)	0.001	0.004	0.006	1.2
Antimony (Sb)	<0.005	<0.005	<0.005	<0.005
Arsenic (As)	0.005	0.007	0.002	0.032
Barium (Ba)	0.18	0.013	0.38	0.094
Beryllium (Be)	<0.001	<0.001	<0.001	0.001
Boron (B)	0.28	0.26	0.31	0.27
Cadmium (Cd)	<0.001	<0.001	<0.001	0.002
Chromium (Cr)	0.001	0.005	0.001	0.10
Cobalt (Co)	<0.001	<0.001	<0.001	0.009
Copper (Cu)	0.008	0.015	0.008	0.16
Lead (Pb)	0.001	0.002	<0.001	0.029
Lithium (Li)	0.21	0.21	0.18	0.19
Manganese (Mn)	0.007	0.015	0.021	0.43
Molybdenum (Mo)	0.030	0.030	0.051	0.024
Nickel (Ni)	0.001	0.001	0.001	0.013
Selenium (Se)	0.006	0.006	<0.005	<0.005
Silicon (Si)	19	19	15	27
Silver (Ag)	<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	0.74	0.74	0.40	0.58
Thallium (Tl)	<0.001	<0.001	<0.001	<0.001
Thorium (Th)	<0.001	<0.001	<0.001	0.003
Tin (Sn)	<0.001	<0.001	<0.001	<0.001
Titanium (Ti)	0.002	0.002	0.002	0.012
Uranium (U)	0.003	0.002	0.005	0.009
Vanadium (V)	0.011	0.013	0.018	0.21
Zinc (Zn)	0.10	0.074	0.11	0.24
ICP-OES				
Iron (Fe)	0.052	0.57	0.066	52

Approved By: _____

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
 NEW MEXICO TECH
 801 LEROY PLACE, SOCORRO, NM 87801
 Phone: (575) 835-5160 FAX: (575) 835-6333

General Chemistry Analysis

Name	Greg Miller	Date Received	3/20/2009
Address	AMEC	Date Completed	3/25/2009
Address 2	P.O. Box 445		
City, State, Zip code	Socorro NM 87801		
Phone	(575) 835-2569	CHARGES	_____
FAX	(575) 835-2609		
Cell phone			
Email	greg.miller@amec.com		

Lab ID	09-0213	09-0214	09-0215	09-0216
Well Name	M-4747	M-4748	M-1598	M-15985
pH	8.5	8.1	7.8	7.6
Conductivity (uS/cm)	910	855	2033	1514
TDS calculated (mg/L)	587	526	1429	992
Hardness (mg eq/L CaCO3)	50	56	244	148
Alkalinity as CO3 ²⁻ (mg/L)	4.5			
Alkalinity as HCO3 ⁻ (mg/L)	295	280	375	395
Bromide (mg/L)	0.31	0.24	<1.0	<0.5
Chloride (mg/L)	43	30	71	62
Fluoride (F-) (mg/L)	3.5	3.7	3.0	4.6
Nitrite (NO2-) (mg/L)	<0.1	<0.1	<1.0	<0.5
Nitrate (NO3-) (mg/L)	7.9	3.7	4.7	8.7
Phosphate (mg/L)	<0.5	<0.5	<5.0	<2.5
Sulfate (SO4 ²⁻) (mg/L)	145	125	650	340
Sodium (Na) (mg/L)	185	165	375	270
Potassium (K) (mg/L)	9.8	11	18	18
Magnesium (Mg) (mg/L)	7.3	4.5	24	12
Calcium (Ca) (mg/L)	8.1	15	59	40
Total cations (meq/L)	9.31	8.59	21.65	15.15
Total anions (meq/L)	9.53	8.30	21.91	15.69
Percent difference	-1.19	1.71	-0.60	-1.74

Approved By: _____

NEW MEXICO BUREAU OF GEOLOGY AND MINERAL RESOURCES
 NEW MEXICO TECH
 801 LEROY PLACE, SOCORRO, NM 87801
 PH: 505-835-5160 FAX: 505-835-6333

METALS AND MAJOR CATION ANALYSES

Customer name Greg Miller
 Address AMEC
 Address 2 P.O. Box 445
 City, State, Zip code Socorro NM 87801
 Phone (575) 835-2569
 FAX (575) 835-2609
 Cell phone _____
 Email greg.miller@amec.com

Date Received 2009-03-20
 Date Completed _____

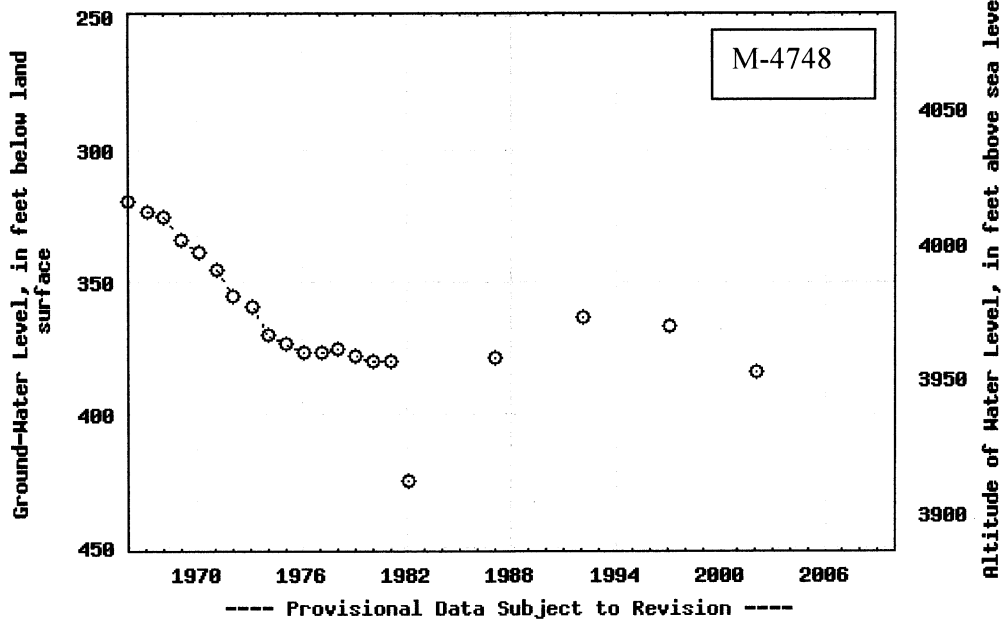
CHARGES _____

All concentrations
 in mg/L

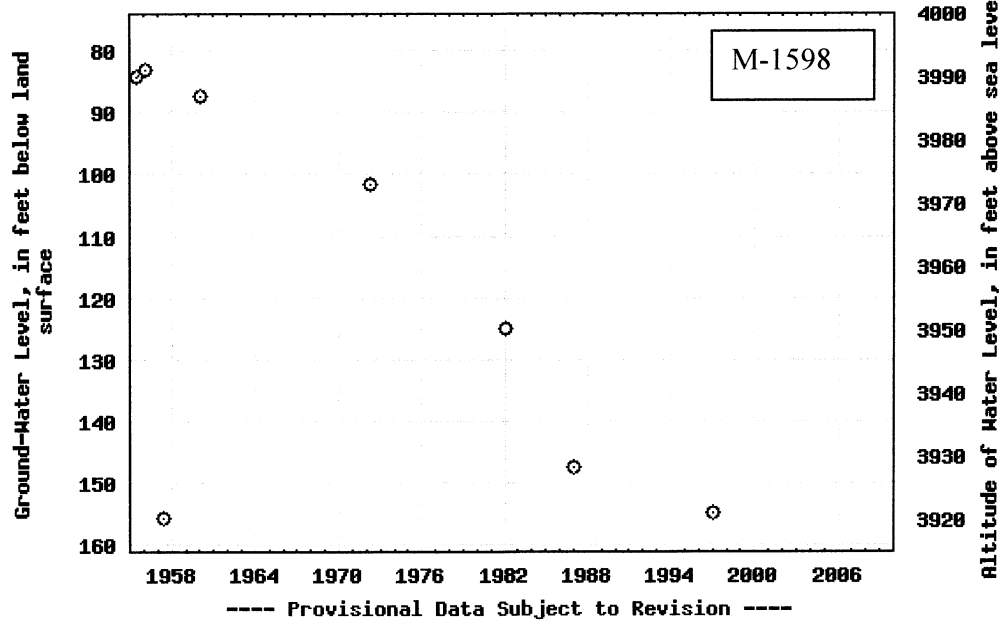
Lab ID	09-0213 fil	09-0214 fil	09-0215 fil	09-0216 fil	09-0213 unf	09-0214 unf	09-0215 unf	09-0216 unf
Well Name	M-4747	M-4748	M-1598	M-1598s	M-4747	M-4748	M-1598	M-1598s
Basis	Filtered	Filtered	Filtered	Filtered	Unfiltered	Unfiltered	Unfiltered	Unfiltered
ICP-MS								
Aluminum (Al)	0.006	<0.005	<0.01	<0.01	0.031	0.16	0.078	<0.01
Antimony (Sb)	<0.025	<0.025	<0.05	<0.05	<0.025	<0.025	<0.05	<0.05
Arsenic (As)	0.006	0.020	<0.01	<0.01	0.006	0.025	<0.01	<0.01
Barium (Ba)	0.18	0.096	0.14	0.13	<0.025	0.013	<0.05	0.127
Beryllium (Be)	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01
Boron (B)	0.36	0.31	0.57	0.56	0.34	0.29	0.55	0.56
Cadmium (Cd)	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01
Chromium (Cr)	<0.005	<0.005	<0.01	<0.01	0.005	<0.005	<0.01	<0.01
Cobalt (Co)	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.01	<0.01
Copper (Cu)	0.007	<0.005	<0.01	<0.01	0.16	0.044	0.013	<0.01
Lead (Pb)	<0.005	<0.005	<0.01	<0.01				
Lithium (Li)	0.12	0.11	0.25	0.22	0.12	0.11	0.25	0.22
Manganese (Mn)	0.005	0.043	0.21	0.12	0.040	0.130	0.27	0.12
Molybdenum (Mo)	0.021	0.015	0.015	0.022	0.020	0.011	<0.01	0.021
Nickel (Ni)	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	0.013	0.002
Selenium (Se)	<0.025	<0.025	<0.05	<0.05	<0.025	<0.025	<0.05	<0.05
Silicon (Si)	16	18	16	14	16	19	17	14
Silver (Ag)	<0.005	<0.005	<0.01	<0.01				
Strontium (Sr)	0.34	0.39	2.1	1.2	0.35	0.40	2.1	1.16
Thallium (Tl)	<0.005	<0.005	<0.01	<0.01				
Thorium (Th)	<0.005	<0.005	<0.01	<0.01				
Tin (Sn)	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.01	0.000
Titanium (Ti)	<0.005	<0.005	<0.01	<0.01	<0.005	0.005	<0.01	0.002
Uranium (U)	0.005	0.005	0.012	0.008				
Vanadium (V)	0.023	0.012	<0.01	<0.01	0.023	0.020	0.013	0.009
Zinc (Zn)	0.021	0.043	0.073	0.064	0.072	0.099	0.045	0.078
ICP-OES								
Iron (Fe)	<0.25	<0.25	<0.5	<0.5	0.30	4.2	15	<0.5
Silicon (Si)	15	18	15	13	15	18	17	13



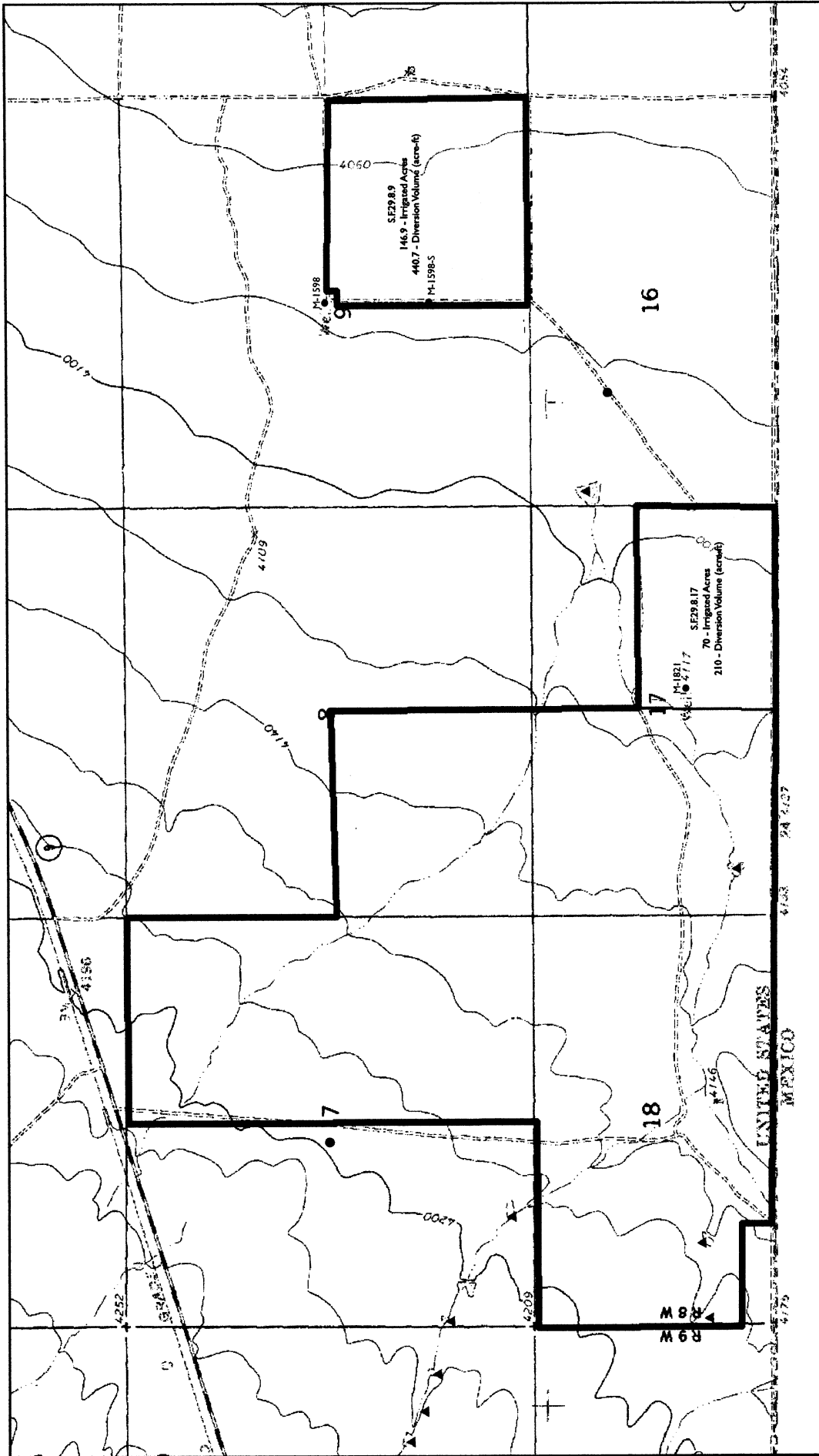
USGS 314754107452701 29S.09W.09.422



USGS 314758107394501 29S.08W.09.4111



Hydrographs for Site Wells



Site Features - East Parcels
Columbus, New Mexico
FIGURE 3

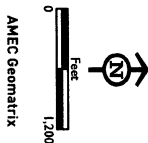
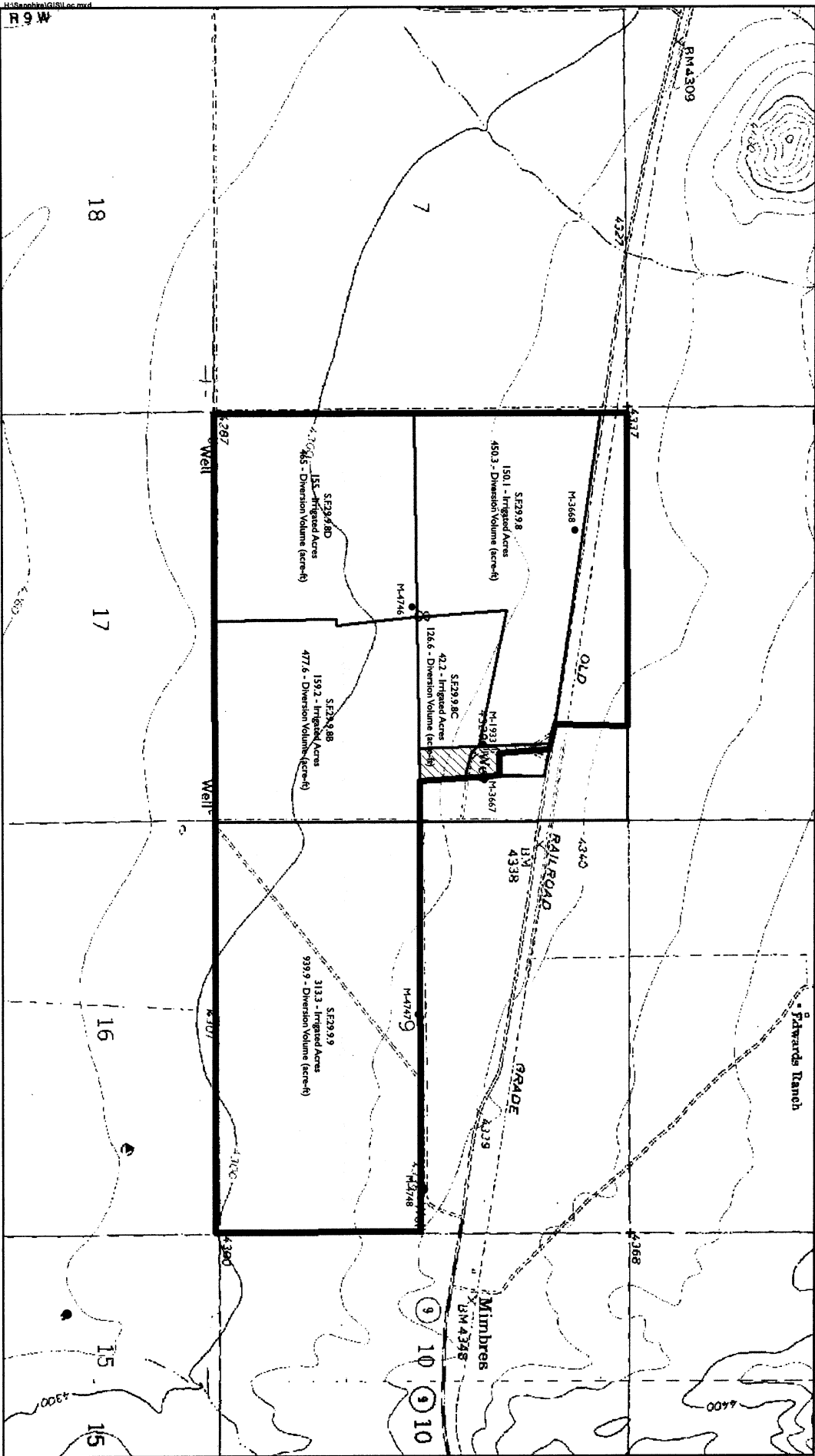
Source: New Mexico, RGS

AMEC Geomatrix

0 1,200 Feet

Legend:

- Injection Well
- Property Boundary
- Road Irrigated - 2.16 ac.
- Road Volume - 6507 acre-ft/year
- Irrigated Property
- Wetlands (NW1)
- Palustrine Fac. Wetland
- Palustrine Open Water Wetland

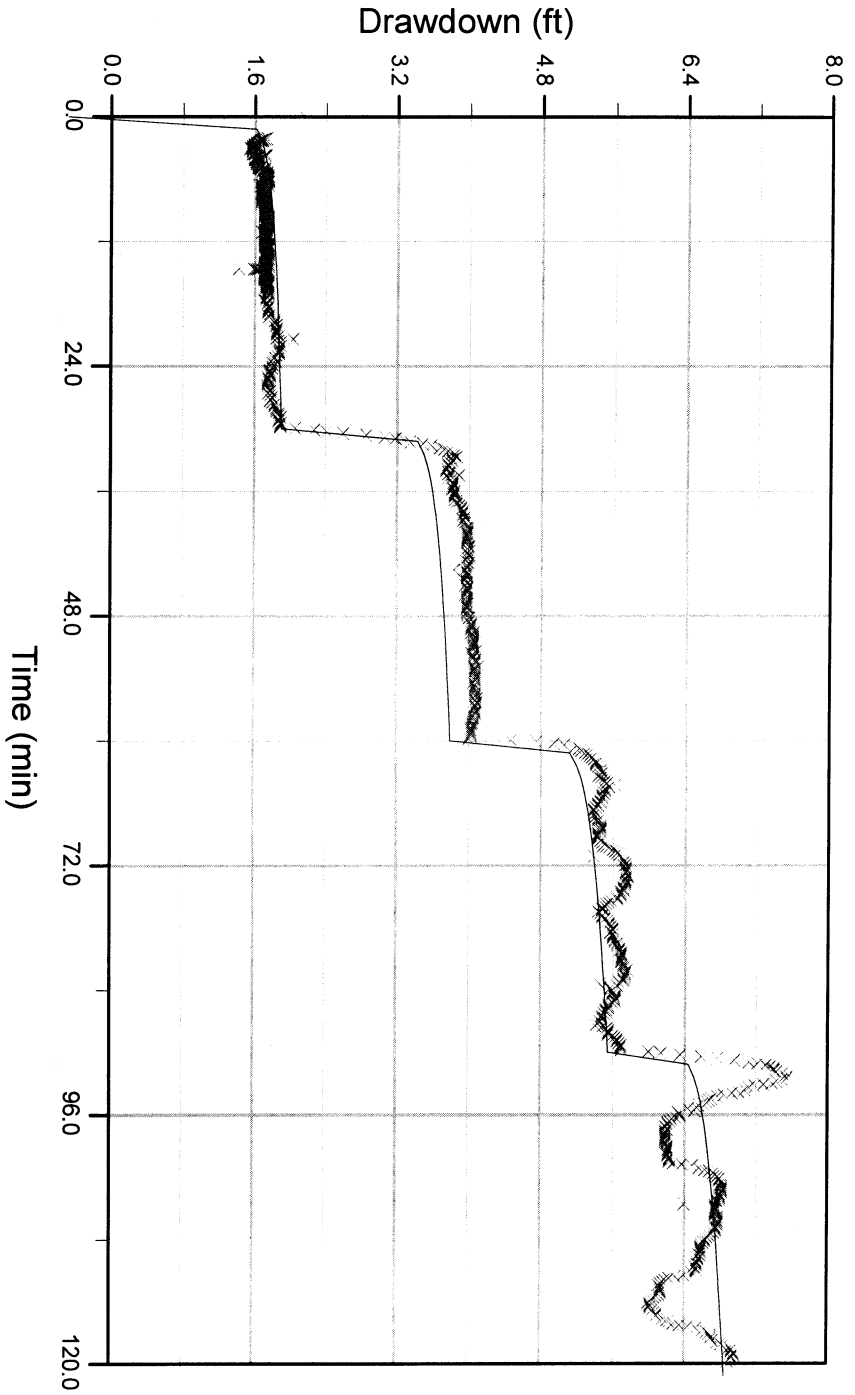


- Irrigation Well
- ▣ Property Boundary
- ▣ Total Irrigated - 819.8 ac
- ▣ Total Volume - 2,659.4 ac-ft/yr
- ▣ Irrigated Property
- ▣ Proposed for sale to Hwy
- ▣ Irrigated Property
- ▣ Cook Property
- ▣ Hwy Property
- ▣ Wetlands (NMN)
- ▲ Palustrine Flax Wetland
- Palustrine Open Water Wetland

Source: New Mexico, RGIS

Site Features - West Parcels
Columbus, New Mexico
FIGURE 4

Proprietary Information: This information was developed at private expense and includes trade secrets, commercial or financial information, or both, that is subject to the exemption of 5 U.S.C. section 552(b)(4).



Step Test of Well: M-1598S

Pumping Rates:

Step 1:	47	Step 1:	4.31
Step 2:	98	Step 2:	5.17
Step 3:	151	Step 3:	6.14
Step 4:	188	Step 4:	7.56

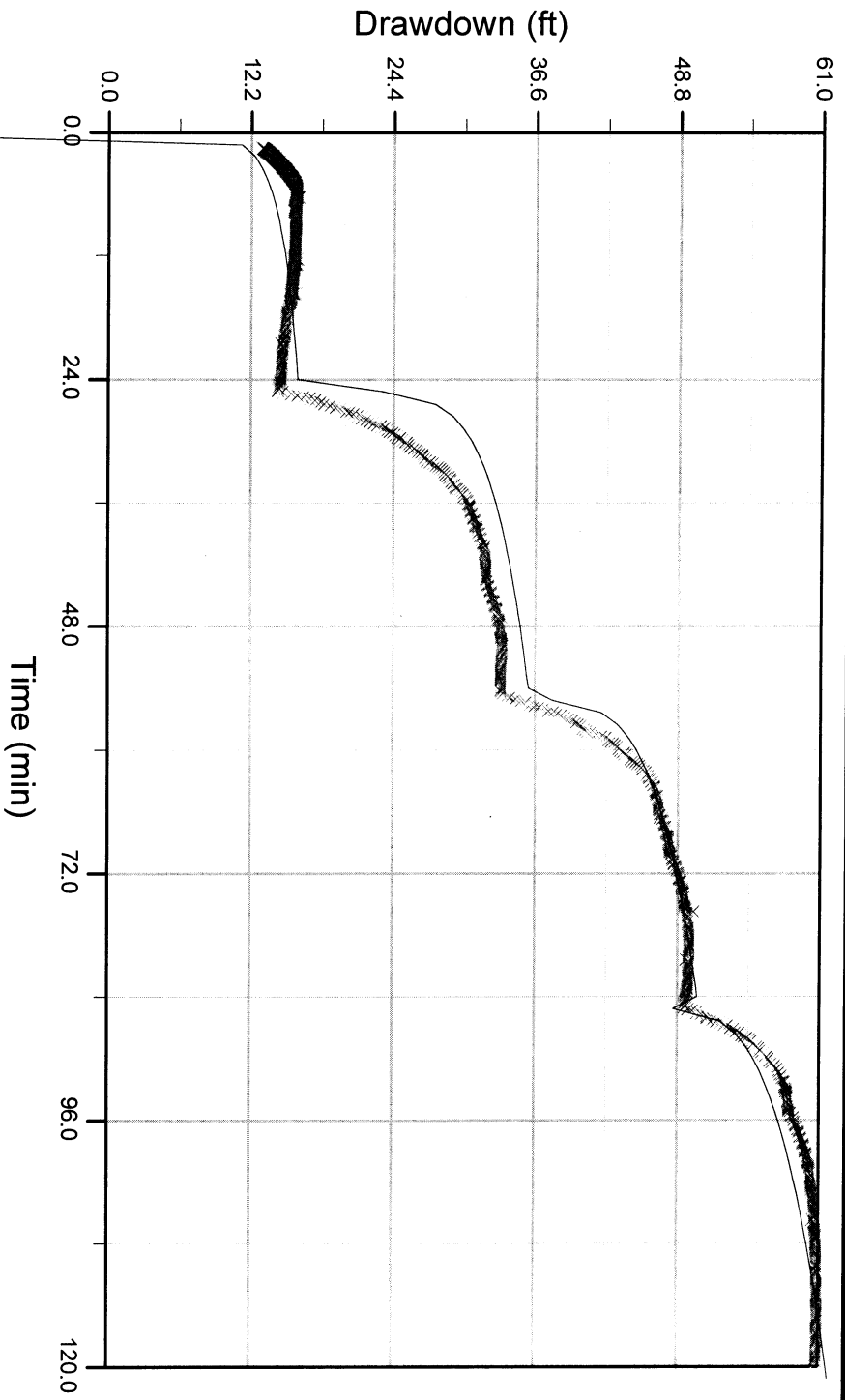
Maximum Drawdown:

Results:

Transmissivity:
7,958 sq ft/d

Eden and Hazel, 1973





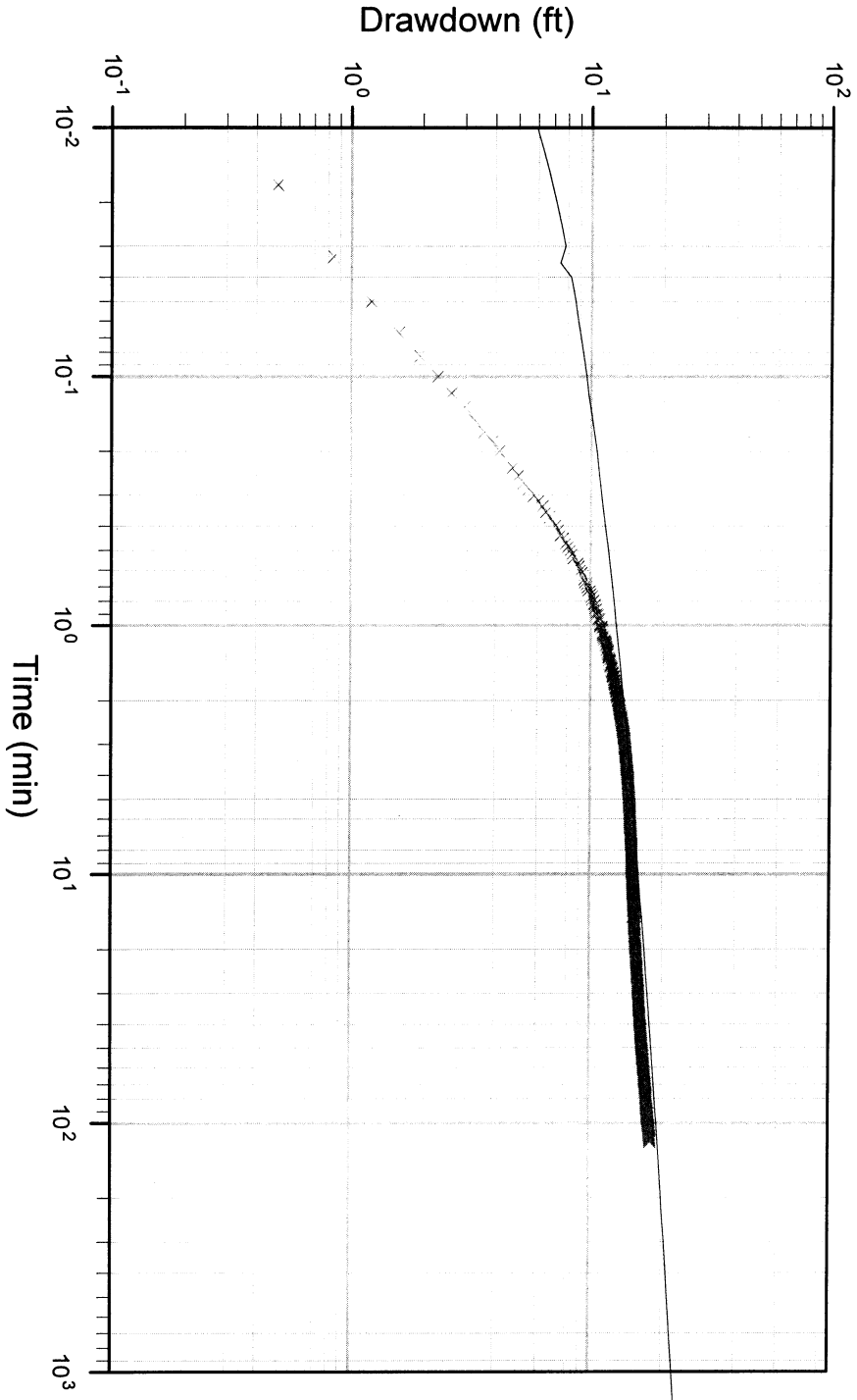
Step Test of Well: M-1933

Pumping Rates:

Step	Rate	Maximum Drawdown
Step 1:	41	26.5
Step 2:	98	44.9
Step 3:	150	57.9
Step 4:	199	60.9

Results:
 Transmissivity:
 1,398 sq ft/d
 Eden and Hazel, 1973





Step Test of Well: M-3668

Pumping Rates: Step 1: 243 Step 1: 18.5

Maximum Drawdown: 18.5

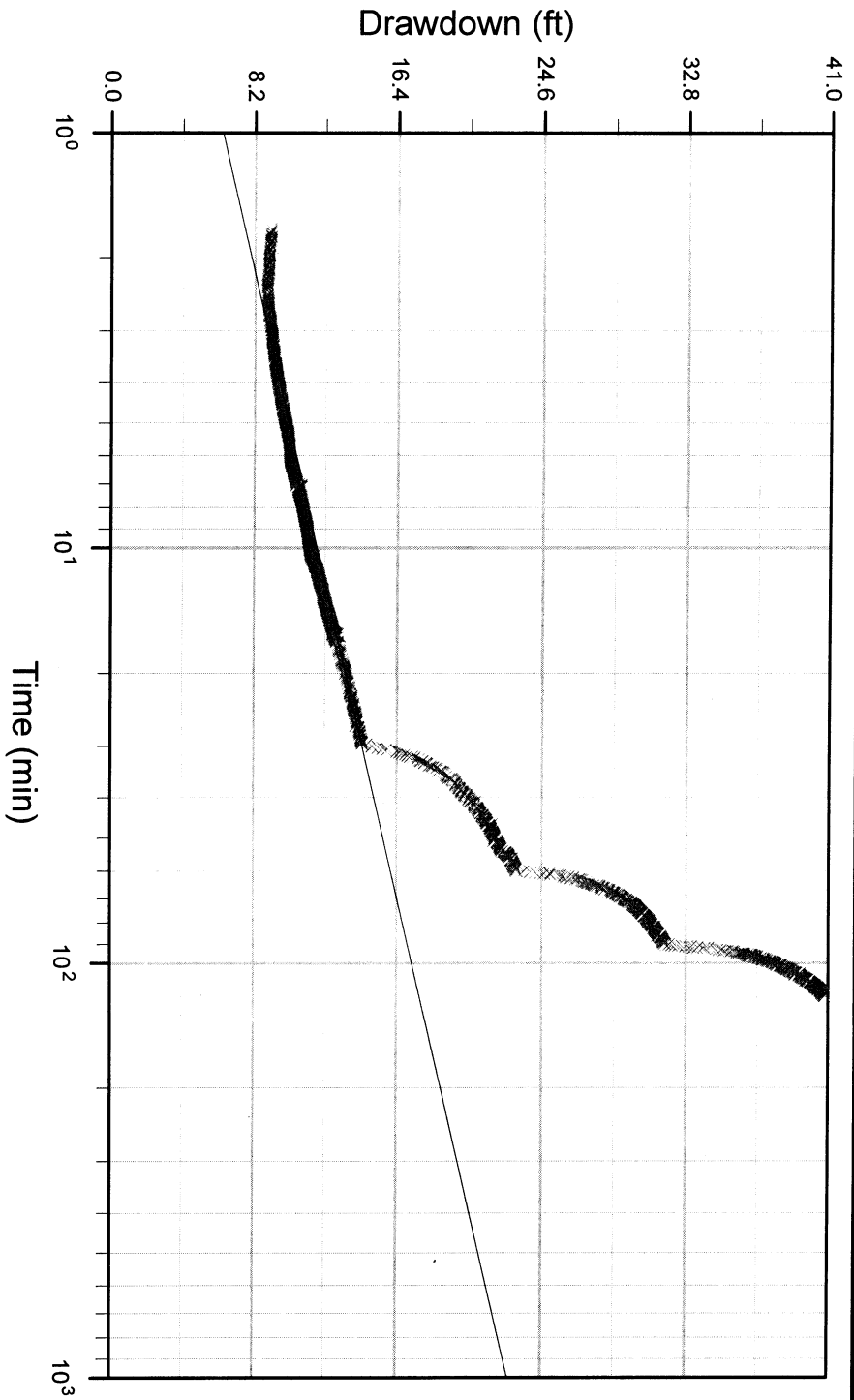
Results:

Transmissivity:

3,769 sq ft/d

Papadopolus and Cooper, 1967





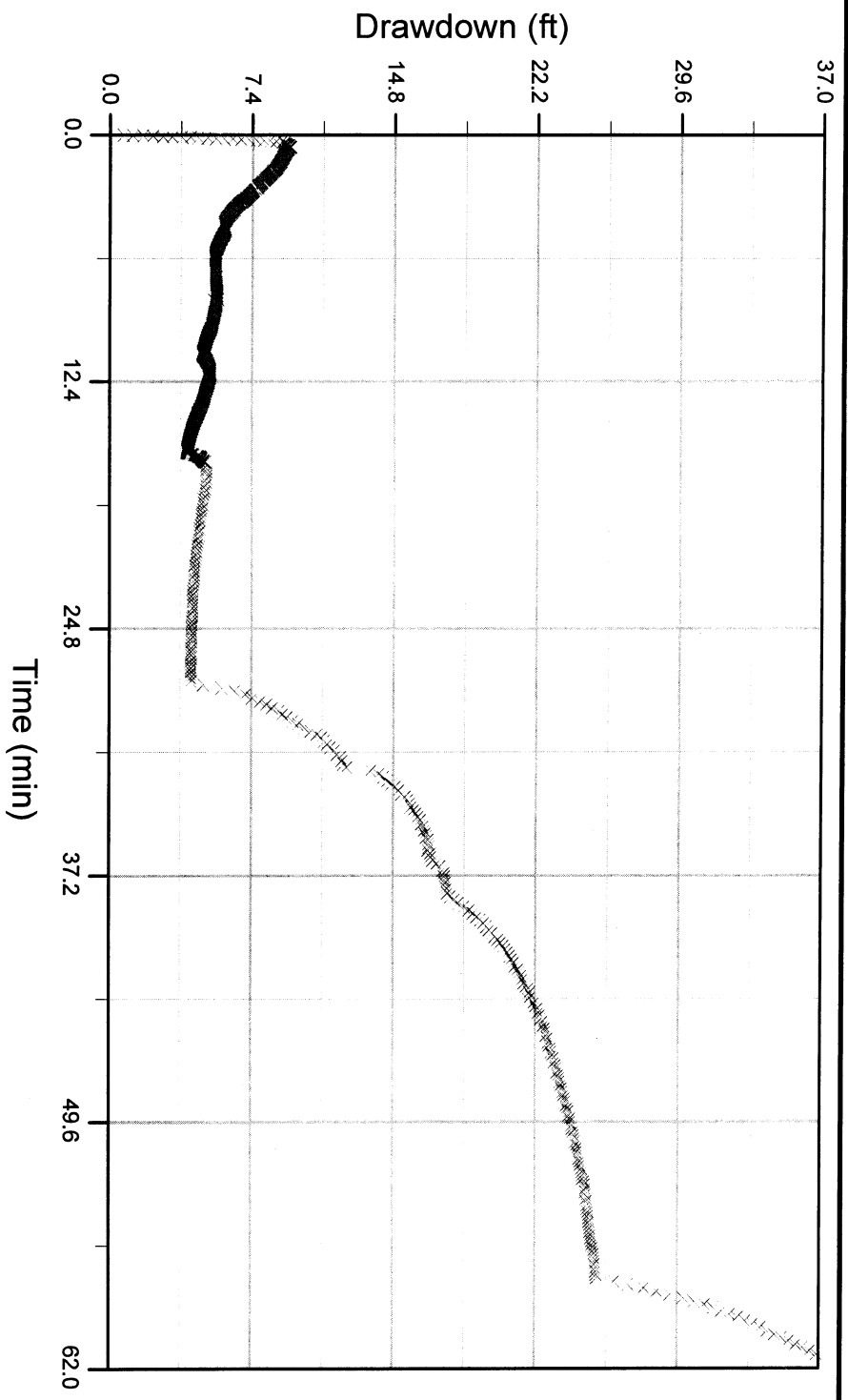
Step Test of Well: M-4748

Pumping Rates:

Step	Rate	Maximum Drawdown
Step 1:	99	15.0
Step 2:	149	23.2
Step 3:	199	33.8
Step 4:	247	40.8

Results:
 Transmissivity:
 960 sq ft/d
 Cooper and Jacob, 1946





Step Test of Well: M-1598

Pumping Rates:

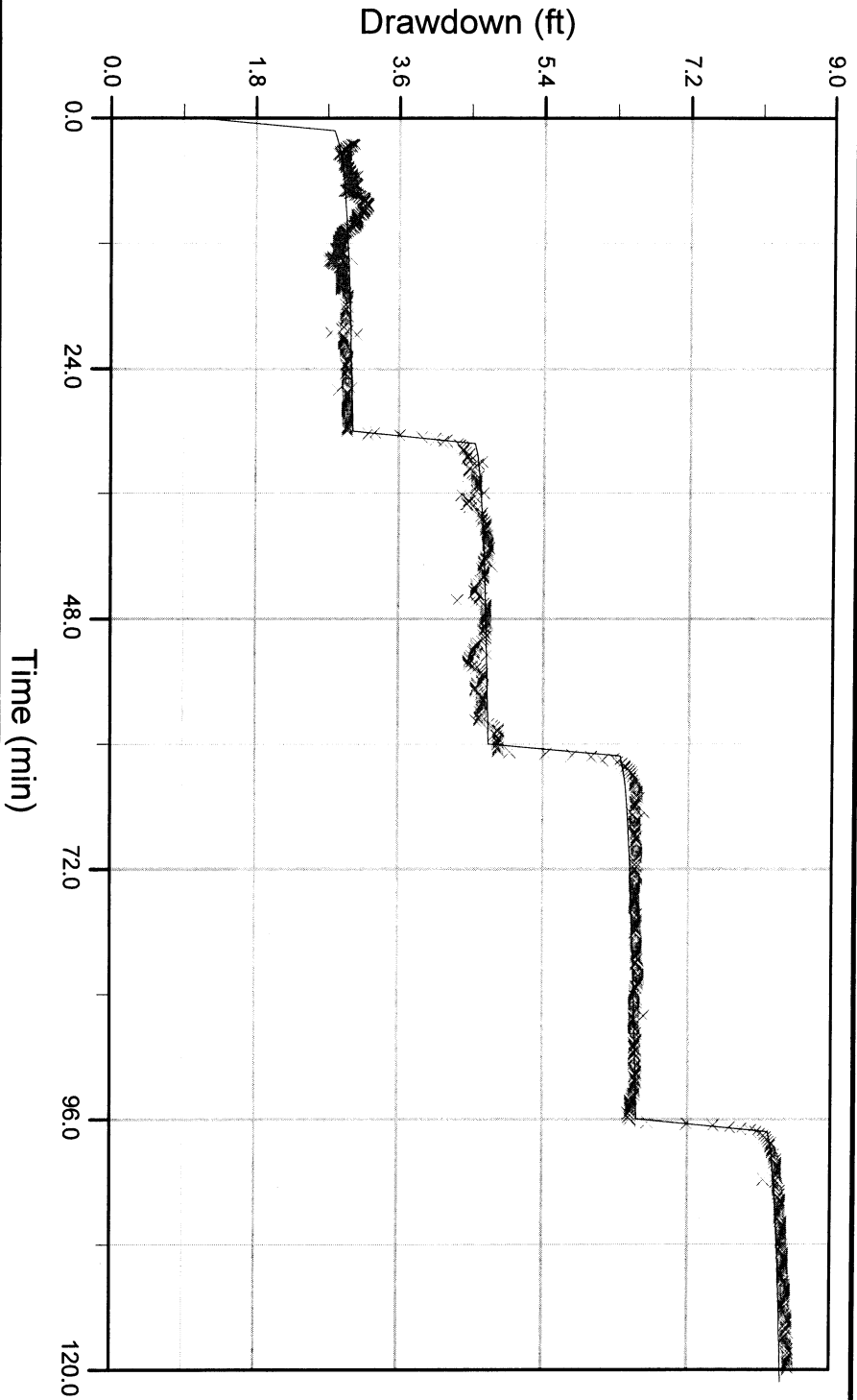
Step 1:	44	Step 1:	10.8
Step 2:	104	Step 2:	34.3
Step 3:	162	Step 3:	37.3

Maximum Drawdown:

Results:



Transmissivity:
Not calculated



Step Test of Well:

Pumping Rates:

Step	Rate	Maximum Drawdown
Step 1:	94	7.19
Step 2:	145	4.87
Step 3:	199	6.65
Step 4:	253	8.64

Results:

Transmissivity:
10,965 sq ft/d
Eden and Hazel, 1973



