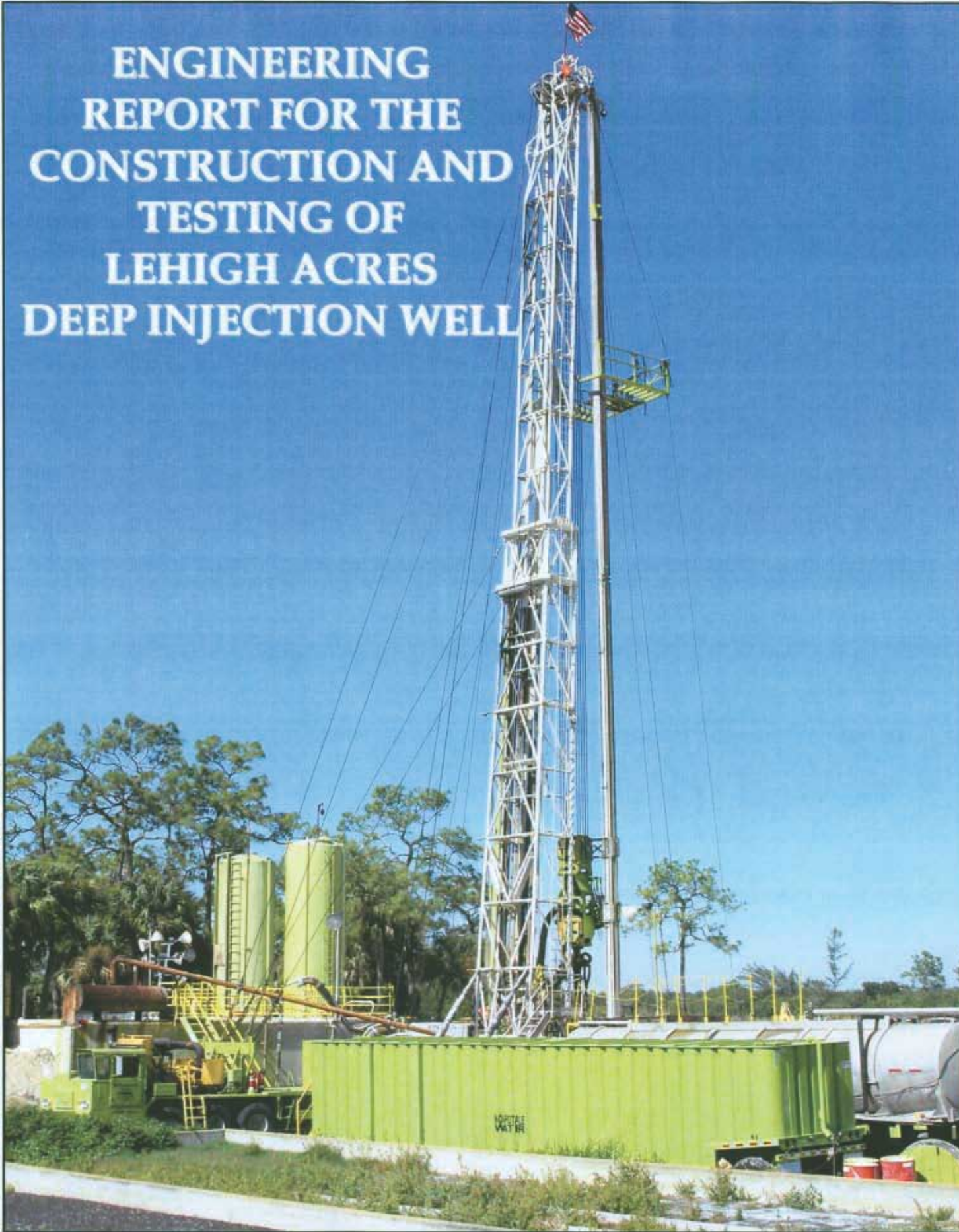


**ENGINEERING
REPORT FOR THE
CONSTRUCTION AND
TESTING OF
LEHIGH ACRES
DEEP INJECTION WELL**



**FLORIDA DEPARTMENT
OF
ENVIRONMENTAL
PROTECTION
CLASS I INJECTION
WELL**

**TEST WELL
CONSTRUCTION
PERMIT**

No. 48064-078-UC

**Appendix R - S
Volume 6**

PREPARED FOR



**FLORIDA GOVERNMENT
UTILITY AUTHORITY
LEHIGH ACRES,
FLORIDA**

PREPARED BY



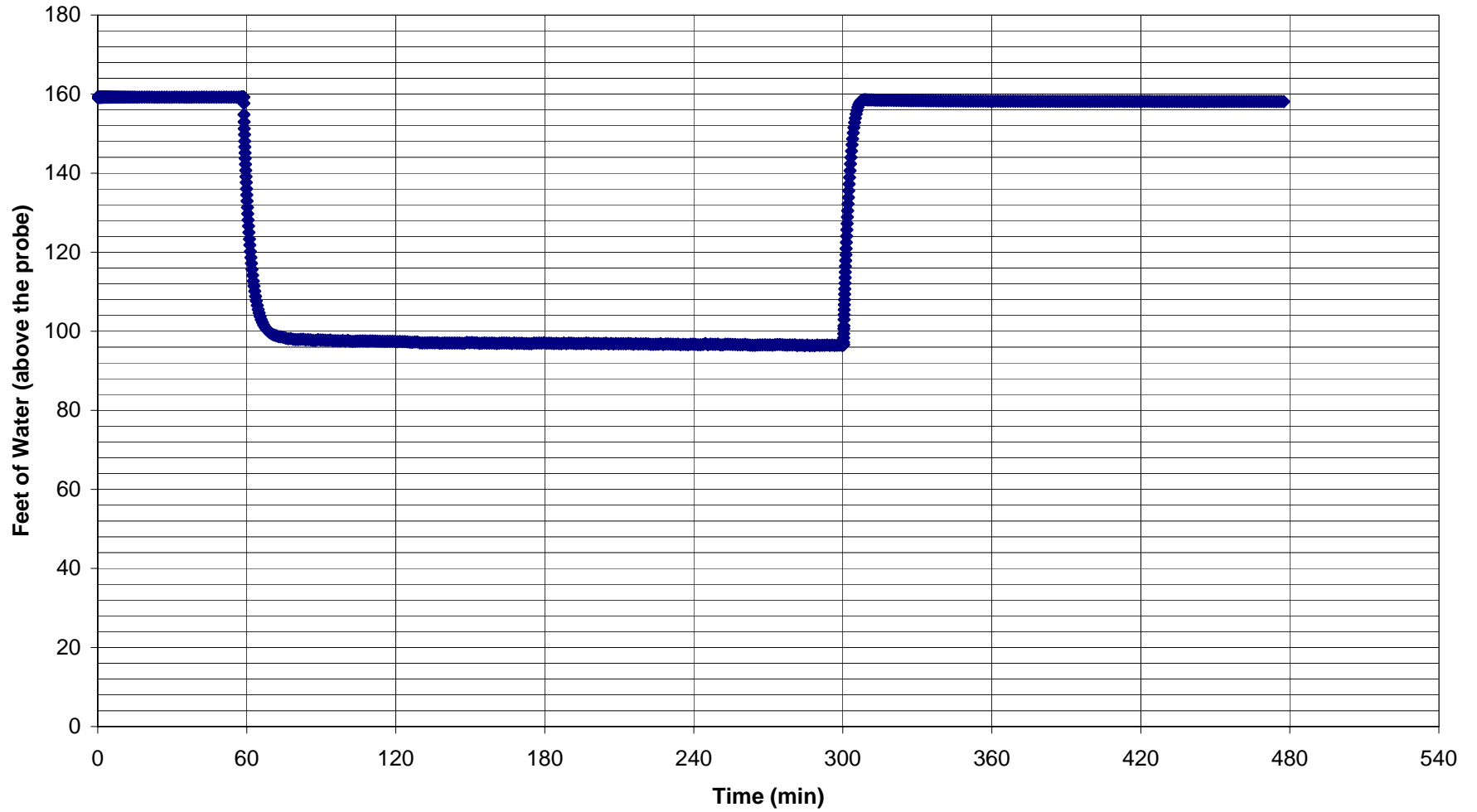
**5300 West Cypress Street
Tampa, FL 33607**

JUNE 2008

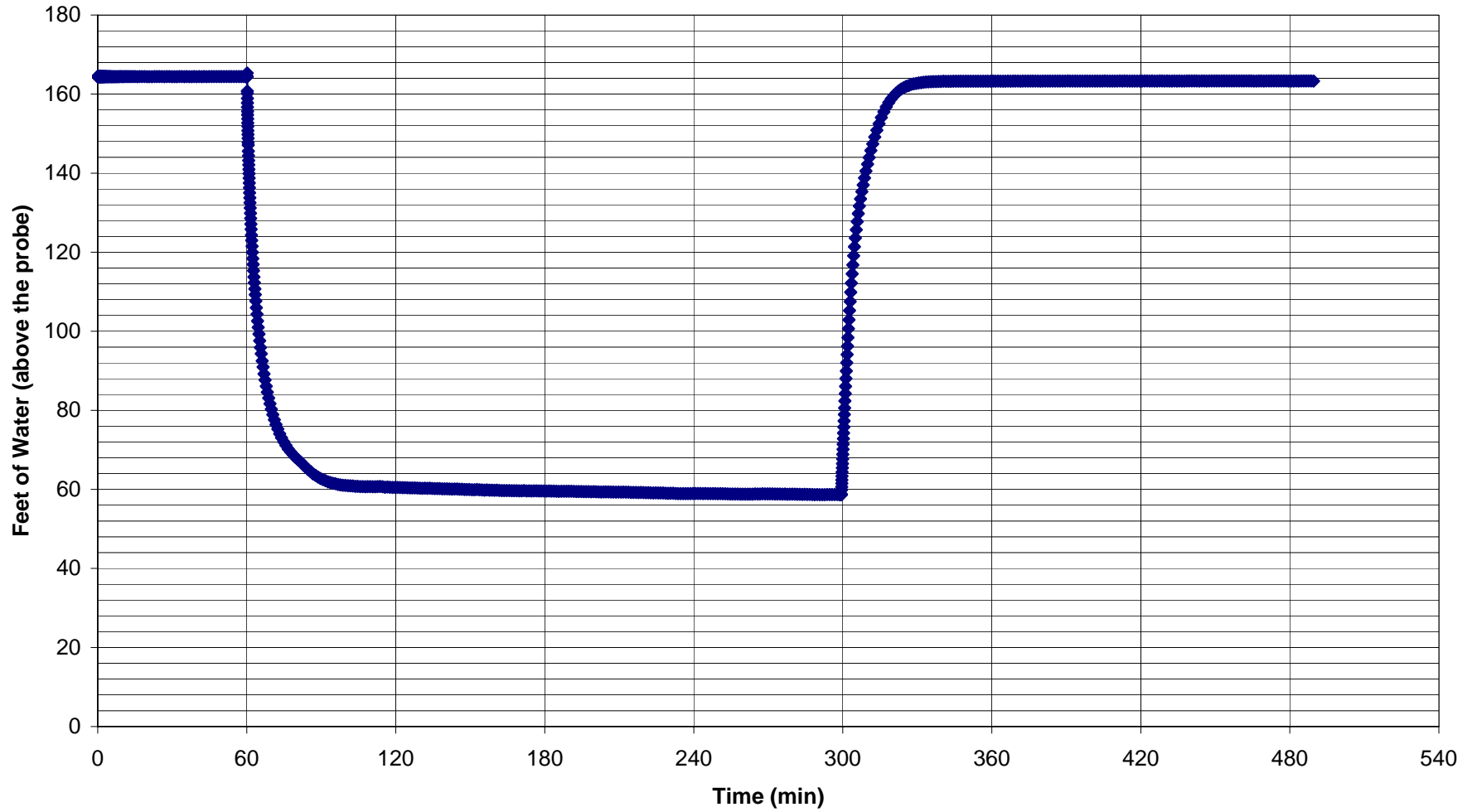
APPENDIX R

Injection Test Data

LEHIGH ACRES DIW SYSEM
DIW-1
Testing Interval 1940-1970 feet bls
Packer Test 1- Full Test

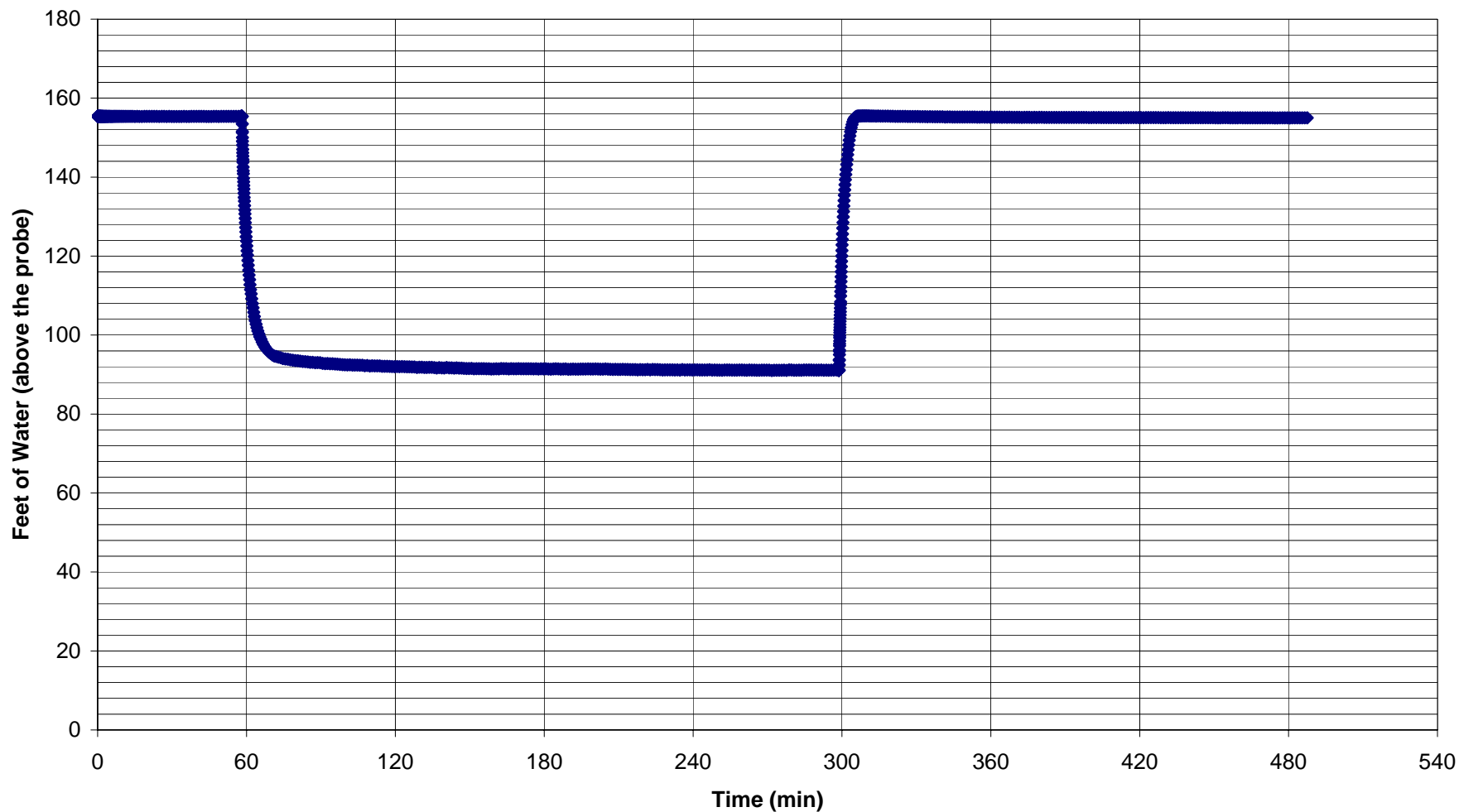


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DIW-1
Testing Interval 1885-1918 feet bls
Packer Test 2- Full Test

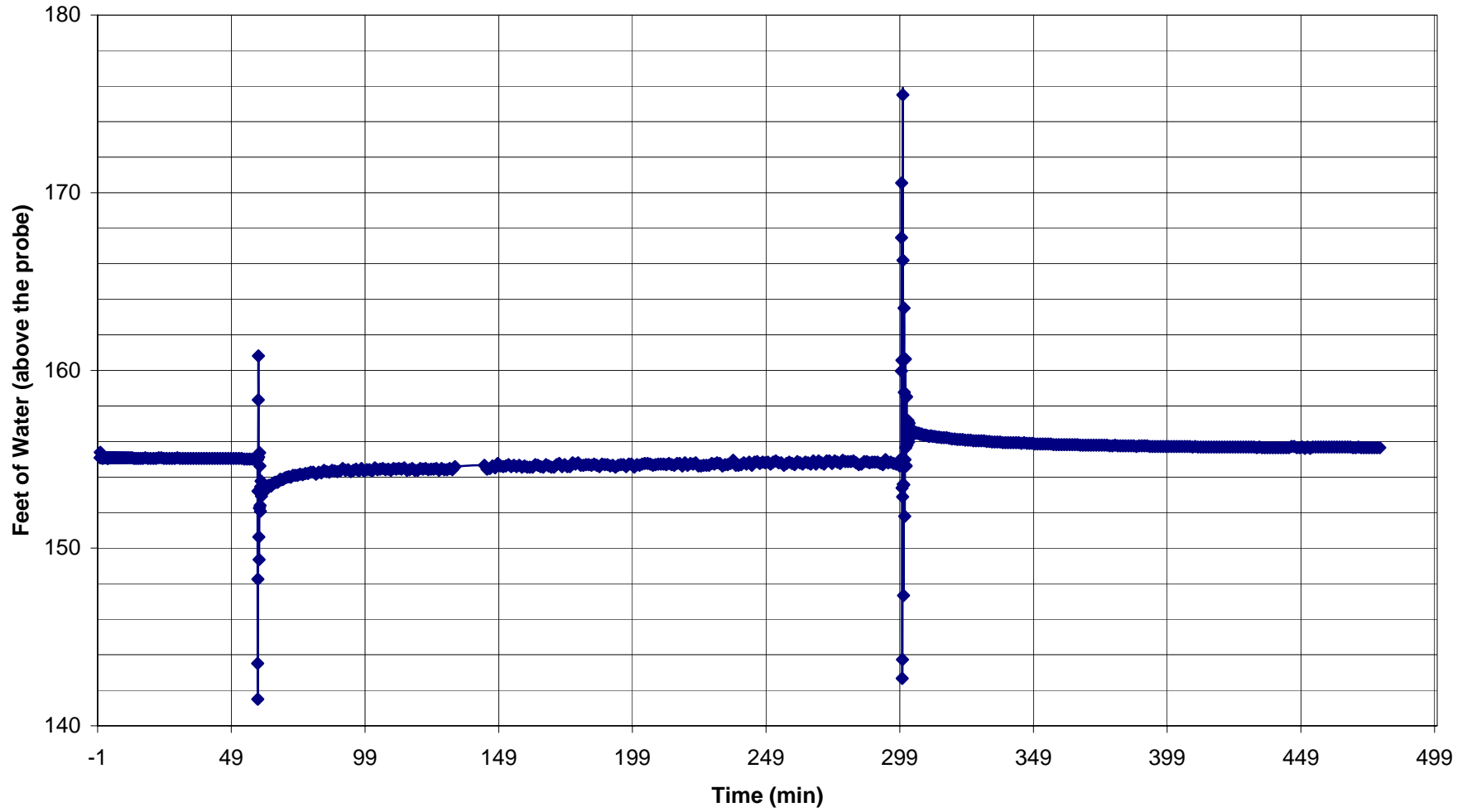




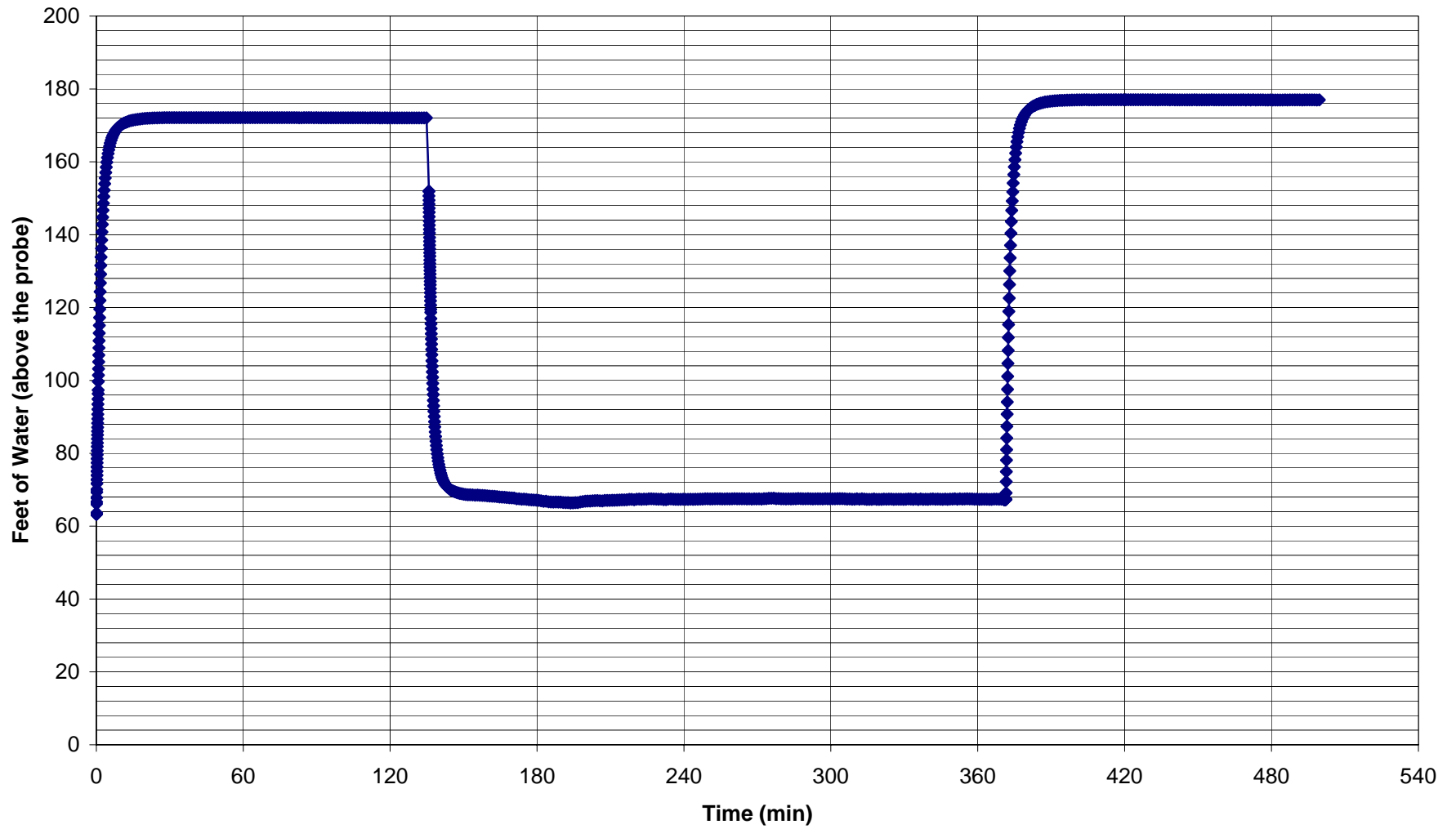
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DIW-1
Testing Interval 1990-2088 feet bls
Packer Test 3- Full Test



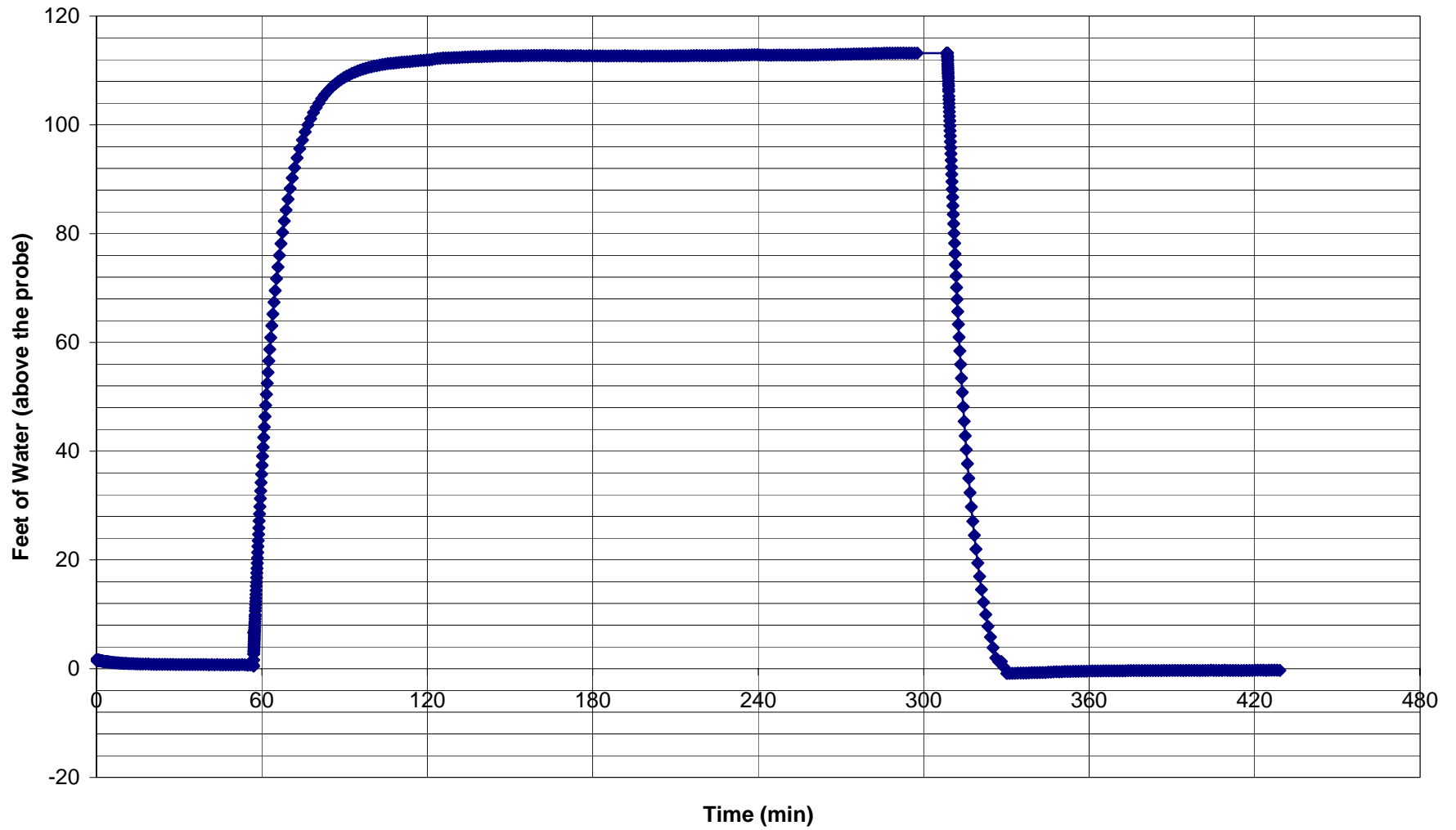
LEHIGH ACRES DIW SYSEM
DIW-1
Testing Interval 2130-2230 feet bls
Packer Test 4- Full Test



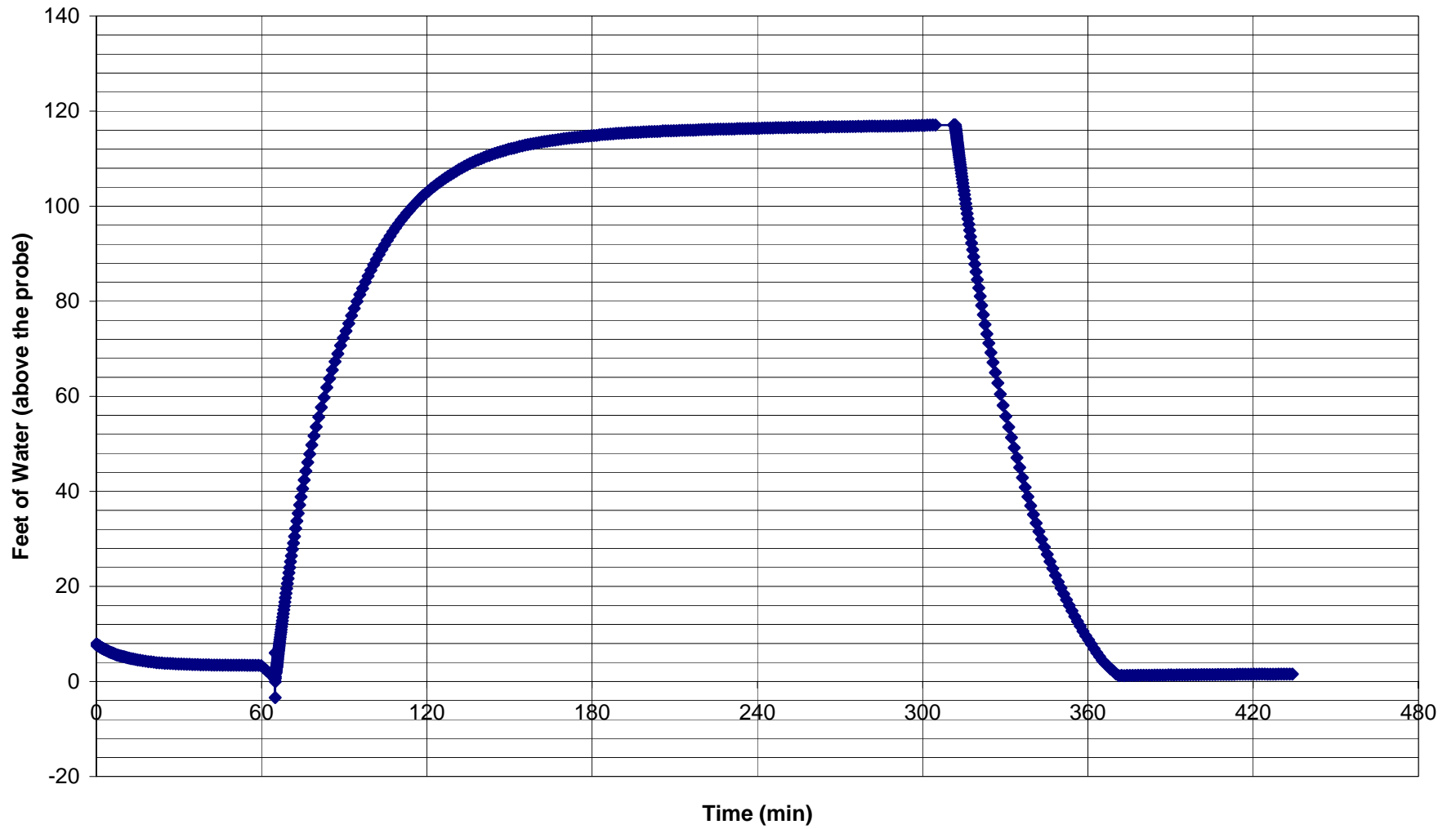
Lehigh Acres DIW Project
LZMW-1B
Packer Test 1- Full Test



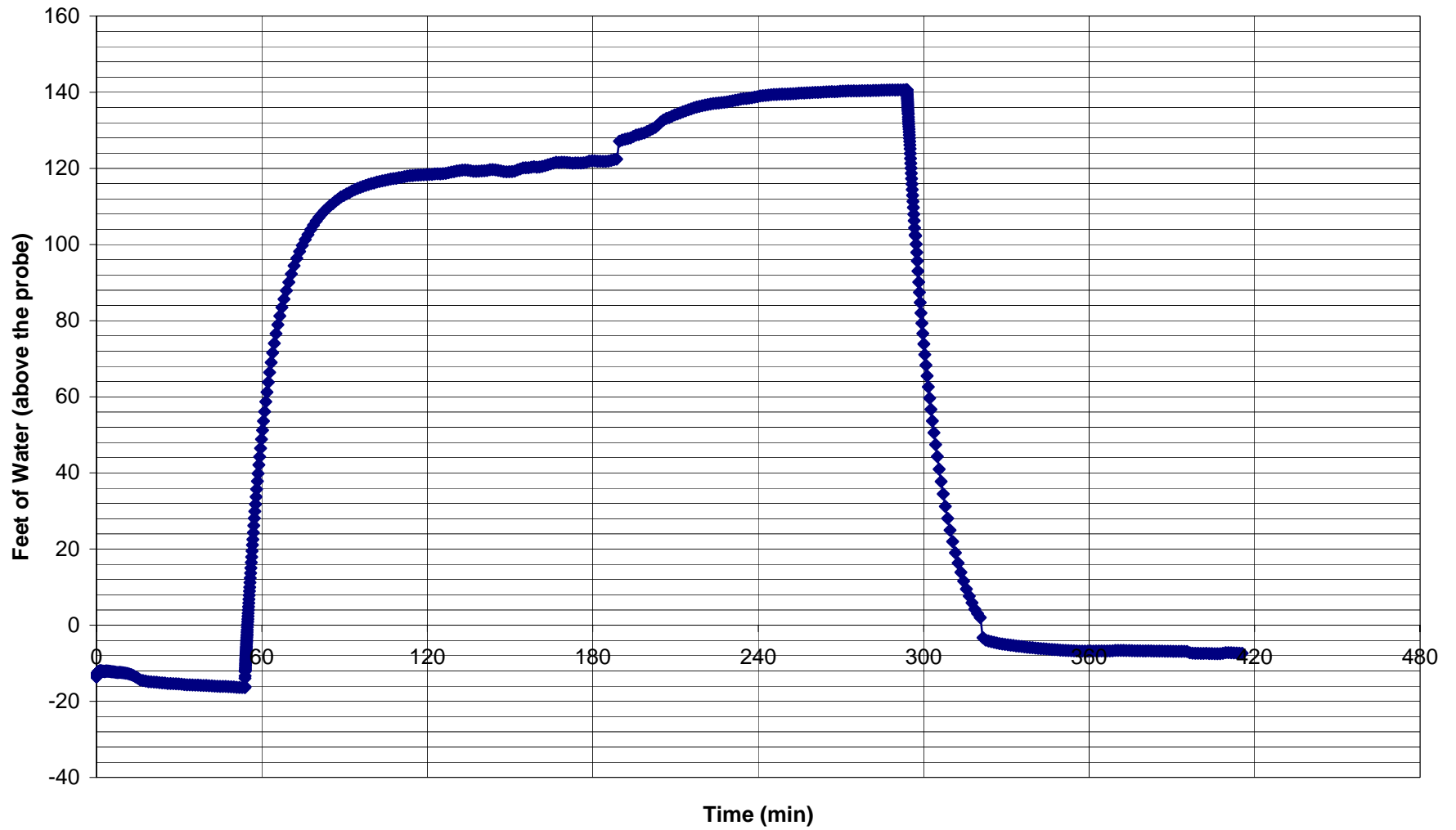
Lehigh Acres DIW Project
LZMW-1B
Packer Test 1- Full Test



Lehigh Acres DIW Project
LZMW-1B
Packer Test 1- Full Test



Lehigh Acres DIW Project
LZMW-1B
Packer Test 1- Full Test



APPENDIX S

LZMW-1A Data



Florida Governmental Utility Authority
Lehigh Acres WWTP Class I Deep Injection Well
Lower Zone Monitoring Well 1-A Airlift Samples Collected During Specific Capacity Tests

TABLE
WATER QUALITY ANALYTICAL RESULTS

LABORATORY RESULTS									
Site	Depth (ft)	Date	Time	Chloride (mg/L)	pH (s.u.)	Lab Qual	Specific Conductivity (µmhos/cm)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
LZMW-1214	1214	7/12/2007	1:05	55	12.13				
LZMW-1274	1274	7/12/2007	8:00	207	12.20	Q	7150	32	1770
LZMW-1334	1334	7/12/2007	11:15	207	12.14	Q	6720	83	1840
LZMW-1394	1394	7/12/2007	13:05	220	12.11	Q	6450	79	1770
LZMW-1454	1454	7/12/2007	14:46	210	12.16	Q	6130	91	1730
LZMW-1514	1514	7/12/2007	16:14	240	12.23	Q	7000	83	1940
LZMW-1574	1574	7/12/2007	17:40	315	12.22	Q	7190	72	1950
LZMW-1634	1634	7/12/2007	19:59	305	12.18	Q	7420	77	1960
LZMW-1694	1694	7/12/2007	23:05	310	12.15	Q	6790	92	1920
LZMW-1754	1754	7/13/2007	1:40	280	12.21	Q	6910	95	1980
LZMW-1814	1814	7/13/2007	4:00	280	12.13	Q	7260	95	2060
LZMW-1874	1874	7/13/2007	8:45	320	12.10	Q	7360	88	2020
							6590	104	1930

Notes:

The groundwater samples were analyzed by Sanders Laboratories, Inc.

Lab Qualifiers:

Q: Denotes that the sample was held beyond holding time.



Florida Governmental Utility Authority
 Lehigh Acres WWTP Class I Deep Injection Well
 Lower Zone Monitoring Well 1-A Airlift Samples Collected During Specific Capacity Tests

WATER QUALITY ANALYTICAL RESULTS

FIELD RESULTS

Date	Time	Depth (ft bls)	Drawdown (ft)	Volume Discharged (gal)	Rate (GPM)	Specific capacity (GPM/ft)	Conductivity (µs/cm)	TDS (mg/L)	Temp (°C)	Sal (‰)
7/12/2007	1:05	1214	29.90	2700.00	490.91	16.42	7170	3180	22.4	3.90
7/12/2007	8:00	1274	27.10	2250.00	438.60	16.18	6840	3620	28.5	3.70
7/12/2007	11:47	*1334	9.80	80.00	80.00	8.16	6710	3550	30.9	3.70
7/12/2007	13:05	*1394	9.10	84.00	84.00	9.23	6530	3460	30.0	3.60
7/12/2007	14:46	*1454	8.20	86.00	86.00	10.49	6770	3580	30.1	3.70
7/12/2007	16:14	*1514	8.50	91.00	91.00	10.71	6970	3690	30.0	3.80
7/12/2007	17:40	*1574	6.10	96.00	96.00	15.74	7070	3760	30.9	3.90
7/12/2007	19:59	1634	24.30	2250.00	409.09	16.84	7370	3930	31.0	4.10
7/12/2007	23:20	1694	15.85	2430.00	454.21	28.66	7040	3740	29.2	3.90
7/13/2007	1:40	1754	15.20	2700.00	490.91	32.30	7510	4010	29.2	4.10
7/13/2007	4:00	1814	16.70	2700.00	483.87	28.97	7540	4030	28.0	4.20
7/13/2007	10:12	1874	12.00	1800.00	360.00	30.00	7270	3870	29.9	4.00

*Specific capacity tested under artesian conditions, no airlift used

1 tenth of a foot = 900 gallons in the tank



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
0	10	LIMESTONE, moderately hard, fine grained, tan; some fossils.	MG
10	20	LIMESTONE, moderately hard, fine to medium grained, small vugs, light tan to light gray; some shell fragments;	MG
20	30	MARL, moderately friable, fine grained, gray to blue; trace limestone, moderately friable, tan to white; some shells	MG
30	40	SAME AS ABOVE; much shell fragments.	MG
40	50	MARL, moderately hard, gray, fine to medium grained; trace sandstone, phosphate, fossiliferous, moderately hard, medium grained, gray green; much shell fragments.	MG
50	60	SANDSTONE, moderately friable, fine to medium grained, gray green to light brown; some marl, moderately hard, light gray to dark gray, fine grained; some phosphate, trace shell fragments.	MG
60	70	SANDSTONE, moderately hard, medium grained, light tan to tan; some phosphate; trace marl; trace shell fragments.	MG
70	80	SANDSTONE, moderately hard, medium grained, gray to green; trace marl; some phosphate; trace shell fragments.	MG
80	90	SANDSTONE, moderately friable, fine to medium grained, gray green; some marl, friable, fine grained, gray; trace phosphate nodules; trace shell fragments.	MG
90	100	SANDSTONE, moderately hard, fine to medium grained, tan to gray-green; some marl, friable, fine grained, gray; trace calcareous sandstone; trace phosphate nodules; trace shell fragments; trace quartz gravel.	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
100	110	SANDSTONE, moderately hard, fine grained, tan to gray-green; some marl, moderately friable, fine to medium grained, gray; trace phosphate nodules; trace shell fragments; phosphate (specs).	MG
110	120	SANDSTONE, friable to moderately friable, fine grained, gray-green to buff; trace marl, moderately friable, fine grain, gray; trace phosphate nodules; trace quartz; phosphate (specs).	MG
120	130	LIMESTONE, moderately friable, fine to medium grained, tan to buff; trace sandstone, moderately hard, medium grained, gray to tan; some shell fragments and trace coquina.	MG
130	140	SAME AS ABOVE; trace shell fragments	MG
140	150	LIMESTONE, moderately friable, medium grained, tan to gray; trace sandstone, moderately hard, medium grained, tan to brown; trace shell fragments; trace marl; trace clay, loose, gray.	MG
150	160	CLAY, moderately firm, loose, silty, light gray; trace sandstone, phosphate, moderately hard, medium grained, tan; trace marl, moderately friable, gray; trace shell fragments; phosphate (specs).	MG
160	170	Clay, moderately firm, loose, silty, gray; trace sandstone, phosphate; trace shell fragments; phosphate (specs).	MG
170	180	CLAY, firm, sandy, light gray; trace sandstone, moderately hard, medium grained, tan; trace marl, trace shells and phosphate (specs).	MG
180	190	CLAY, fossiliferous, firm, light gray to green; some sandstone, medium grained, moderately friable, tan to gray-green; phosphate (specs).	MG
190	200	CLAY, fossiliferous; phosphate (specs).	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
200	210	CLAY, firm, smooth, gray to green; some limestone, moderately friable, medium grained, vuggy, light tan to gray; trace shell fragments; phosphate (specs).	MG
210	220	CLAY, firm, gray-green; some limestone, friable, medium grained, vuggy, tan to gray; some phosphate nodules; trace shell fragments; phosphate (specs).	MG
220	230	CLAY, soft, sandy, dark gray; some limestone, moderately friable, vuggy, tan; trace marl; trace shell fragments; trace phosphate (specs and nodules).	MG
230	240	CLAY, smooth, soft, dark gray; trace limestone, moderately friable, vuggy, tan; trace marl; trace phosphate (specs and nodules), trace shells.	MG
240	250	CLAY, soft, smooth, dark gray; phosphate (specs).	MG
250	260	SAME AS ABOVE	MG
260	270	CLAY, soft, sandy, gray-green; some limestone, fossiliferous, moderately friable, medium grained, vuggy, tan to buff; trace phosphate (specs and nodules), trace shells.	MG
270	280	CLAY, moderately firm, sandy, gray-green; some limestone, moderately friable, medium grained, vuggy, tan to buff; trace phosphate (specs and nodules); trace shells.	MG
280	290	LIMESTONE, friable, medium grained, tan to white; some clay, soft, light tan; some phosphate (specs); trace shells.	MG
290	300	CLAY, moderately firm, sandy, light gray to tan; some limestone, phosphate, friable, medium grained, vuggy, tan; trace phosphate nodules; trace shell fragments.	MG
300	310	CLAY, soft, smooth, tan; some clay, moderately firm, gray; some limestone, phosphate, friable, vuggy, tan.	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
310	320	CLAY, soft, smooth, tan; some limestone, friable, vuggy, tan; some phosphate (specs); trace shells.	MG
320	330	SAME AS ABOVE; trace phosphate nodules, trace shell fragments.	MG
330	340	CLAY, firm, smooth, primarily gray, trace tan.	MG
340	350	CLAY, firm, smooth, dark gray; trace limestone, friable, chalky, white; abundant phosphate (specs and nodules).	MG
350	360	SAME AS ABOVE; clay is tan to gray.	MG
360	370	CLAY, moderately firm, sandy, white to buff; some limestone, moderately friable, fine grained, white to buff; some phosphate (specs); trace shells.	MG
370	380	SAME AS ABOVE	MG
380	390	SAME AS ABOVE; clay is moderately soft.	MG
390	400	CLAY, moderately soft, smooth; trace limestone, friable, chalky white; trace marl; phosphate specs. (small sample size)	MG
400	410	SAME AS ABOVE; no marl.	MG
410	420	SAME AS ABOVE; clay is tan to light gray.	MG
420	430	CLAY, soft, smooth, light gray; some limestone, moderately friable, fine to medium grained, white; some phosphate (specs).	MG
430	440	CLAY, moderately firm, smooth, dark gray; trace limestone, moderately friable, fine grained, tan to buff; trace clay, firm, smooth, dry, dark gray; trace shells.	MG
440	450	CLAY, moderately firm, sandy, tan to light tan; trace clay, firm, dark gray; trace limestone, moderately friable to moderately firm, tan; some phosphate (specs and nodules); trace shells.	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
450	460	CLAY, soft, smooth, tan to light tan; trace limestone, moderately friable, light tan; much phosphate (specs), trace phosphate nodules.	MG
460	470	SAME AS ABOVE	
470	480	SAME AS ABOVE, trace dark gray clay, firm.	MG
480	490	SAME AS ABOVE; clay, firm, sandy, tan; less phosphate	MG
490	500	CLAY, moderately firm, sandy, tan; some limestone, moderately friable, medium grained, tan to gray; some phosphate (specs); trace shells.	MG
500	510	SAME AS ABOVE	MG
510	520	CLAY, soft, sandy, tan; some limestone, moderately friable, fine to medium grained, tan to gray; trace sandstone, moderately friable, medium grained, brown; trace phosphate (specs) and shells.	MG
520	530	CLAY, soft, sandy, tan; some limestone, micritic, moderately friable, fine to medium grained, tan; some phosphate (specs) and shells.	MG
530	540	CLAY, moderately soft, sandy, light gray; some limestone, moderately friable, tan to white; trace sandstone, hard, dark gray; trace clay, moderately soft, sticky, dark brown; trace phosphate (specs) and shells.	MG
540	550	LIMESTONE, micritic, moderately hard, medium grained, white to light gray; trace clay, soft, sandy tan; some phosphate (specs); trace shells.	MG
550	560	SAME AS ABOVE	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
560	570	LIMESTONE, micritic, hard, medium grained, white to tan; much clay, moderately firm, sandy, light gray; trace marl, fine grained, moderately friable, dark gray; some phosphate (specs) and shells.	MG
570	580	SAME AS ABOVE; trace shells; some clay.	MG
580	590	SAME AS ABOVE; trace shells.	MG
590	600	LIMESTONE, micritic, hard, fine to medium grained, tan; trace clay, moderately firm, white; no marl; some phosphate (specs) and shells.	MG
600	610	SAME AS ABOVE	
610	620	SAME AS ABOVE; no clay.	MG
620	630	SAME AS ABOVE; trace clay, soft, chalky, white; trace sandstone (calcareous), moderately hard, gray-green.	MG
630	640	LIMESTONE, micritic, moderately hard, fine to medium grained, tan; trace clay, soft, chalky, white; trace shells.	MG
640	650	SAME AS ABOVE; limestone is moderately friable; no sandstone.	MG
650	660	LIMESTONE, micritic, moderately hard, fine to medium grained, tan to buff; trace shells. Top of the Suwannee LS	MG
660	670	SAME AS ABOVE; limestone is phosphate, fine grained.	MG
670	680	LIMESTONE, fossiliferous, moderately hard, fine to medium grained, tan to buff; trace marl, moderately friable, fine grained, dark gray; phosphate (specs).	MG
680	690	SAME AS ABOVE	
690	700	SAME AS ABOVE; trace marl; trace clay, soft, chalky, white	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
700	710	LIMESTONE, moderately friable, medium grained, light tan to buff; trace marl, moderately friable, dark gray; trace clay, soft, dark gray; trace phosphate (specs) and shells.	MG
710	720	SAME AS ABOVE	MG
720	730	SAME AS ABOVE; fine to medium grained; trace clay, soft, chalky, white; no marl.	MG
730	740	LIMESTONE, moderately friable, fine to medium grained, tan to buff; trace limestone phosphate (specs); trace marl, fine grained, moderately friable, dark gray; trace shells.	MG
740	750	LIMESTONE, moderately hard, medium grained, tan to white; trace shells.	MG
750	760	LIMESTONE, moderately hard, fine grained, tan to white.	MG
760	770	LIMESTONE, moderately hard, fine to medium grained, tan; trace limestone phosphate (specs); trace clay, soft, chalky, white.	MG
770	780	LIMESTONE, moderately hard, medium grained, tan to buff; trace phosphate (specs); trace clay, soft, chalky, white; trace shells.	MG
780	790	SAND, quartz, fine grained, tan; trace limestone, moderately friable to moderately hard, fine grain, light tan; phosphate (specs).	MG
790	800	SAND, quartz, fine grained, tan; trace limestone, moderately friable, medium grained, tan; phosphate (specs), trace shells.	MG
800	810	SAND, quartz, fine grained, tan; trace limestone, medium grained; trace clay, soft, white; trace phosphate (specs) and shells.	MG



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
810	820	SAND, quartz, fine grained, tan; trace clay; moderately firm, white and gray-green; trace limestone, trace phosphate, fine to medium grained, tan; phosphate (specs).	MG
820	830	SAND, quartz, fine grained, tan; trace phosphate (specs).	MG
830	840	SAND, quartz, fine grained, tan; much phosphate, trace limestone, trace clay, moderately firm, gray and white.	MG
840	850	LIMESTONE, micritic, friable, tan to light gray; much phosphate (specs), trace fossils (shells and casts).	TF
850	860	SAME AS ABOVE	TF
860	870	LIMESTONE, micritic, friable to moderately hard, tan; trace phosphate (specs).	TF
870	880	LIMESTONE, fine to medium grained, moderately hard, tan; phosphate.	MG
880	890	LIMESTONE, fossiliferous, fine grained, tan; trace clay, moderately soft, gray; phosphate.	MG
890	900	LIMESTONE, micritic, moderately friable, fine grained, tan; some clay, moderately soft, tan; phosphate.	MG
900	910	LIMESTONE, micritic, soft, sandy, calcareous, tan; some phosphate (specs).	TF
910	920	SAME AS ABOVE; trace phosphate (specs).	TF
920	930	SAME AS ABOVE	TF
930	940	LIMESTONE, micritic, soft, tan; trace clay; trace fossil (casts); trace phosphate (specs).	TF
940	950	SAME AS ABOVE, no clay, no fossil.	TF
950	960	LIMESTONE, micritic, soft, light brown; trace fossils; trace phosphate (specs).	TF
960	970	SAME AS ABOVE, tan; trace fossils (shells).	TF



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
970	980	SAME AS ABOVE; some phosphate (specs).	TF
980	990	SAME AS ABOVE; trace phosphate (specs).	TF
990	1000	SAME AS ABOVE	TF
1000	1010	LIMESTONE, micritic, soft, tan to light brown; some phosphate (specs and nodules); trace fossils (shells).	TF
1010	1020	SAME AS ABOVE, tan; trace phosphate (specs).	TF
1020	1030	SAME AS ABOVE	TF
1030	1040	LIMESTONE, micritic, soft to friable, tan; trace phosphate (specs and nodules); trace fossils (shells).	TF
1040	1050	LIMESTONE, micritic, soft, tan; trace phosphate (specs and nodules); no visible fossils.	TF
1050	1060	SAME AS ABOVE	TF
1060	1070	LIMESTONE, micritic, soft to friable, tan; trace phosphate (specs and nodules), trace fossils (shells and casts); trace quartz sand, fine grained.	TF
1070	1080	SAND, quartz, fine to very fine grained, tan; much phosphate (specs); trace limestone.	TF
1080	1090	SAME AS ABOVE; trace clay, silty, nodule.	TF
1090	1100	LIMESTONE, micritic, soft to friable, tan; some sand, quartz, fine grained, tan; some phosphate.	TF
1100	1110	LIMESTONE, micritic, friable, tan; some phosphate (specs).	TF
1110	1120	LIMESTONE, micritic, soft, tan; no phosphate; no fossils. Top of Ocala LS	TF
1120	1130	SAME AS ABOVE	TF
1130	1140	LIMESTONE, micritic, soft to friable, tan to light tan.	TF
1140	1150	SAME AS ABOVE	TF
1150	1160	SAME AS ABOVE	TF



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
1160	1170	SAME AS ABOVE	
1170	1180	LIMESTONE, micritic, soft, light tan.	TF
1180	1190	LIMESTONE, micritic, friable; trace fossils (foraminifera).	TF
1190	1200	SAME AS ABOVE	TF
1200	1210	LIMESTONE, friable, gritty, light tan; some dolomite, moderately friable, fine grained, dark gray.	MR
1210	1220	LIMESTONE, very friable, medium grained, sandy/gritty, light tan; some dolomite, friable, fine grained, dark gray.	MR
1220	1230	SAME AS ABOVE, some disc fossils (foraminifera).	MR
1230	1240	DOLOMITE, moderately friable, fine grained, dark gray; some limestone, very friable, sandy, light tan; some shell fragments (? disc fossils).	MR
1240	1250	LIMESTONE, very friable, medium grained, sandy, light tan; much disc fossils (foraminifera) and shell fragments; some dolomite, fine grained, moderately friable, dark gray.	MR
1250	1260	DOLOMITE, fine grained, moderately friable, dark gray; much limestone, very friable, medium grained, sandy, light tan; some shell fragments (discs); trace phosphate.	MR
1260	1270	SAME AS ABOVE; dolomite is nodular; less limestone.	MR
1270	1280	SAME AS ABOVE; ? limestone.	MR
1280	1290	LIMESTONE, very friable, sandy/gritty, light tan; some shell fragments; some dolomite, fine grained, dark gray; trace phosphate.	MR
1290	1300	DOLOMITE, moderately friable, fine grained, dark gray; some limestone, moderately friable, medium grained, light tan; some shell fragments (few discs).	MR



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
1300	1310	Shell fragments (some discs), light buff; some limestone, very friable, medium grained, gritty, light tan; trace dolomite.	MR
1310	1320	SAME AS ABOVE	MR
1320	1330	LIMESTONE, very friable, medium grained, light tan; much shell fragments; trace dolomite.	MR
1330	1340	SAME AS ABOVE; trace phosphate.	MR
1340	1350	LIMESTONE, extremely friable, ? sized, gritty, light tan; much shell fragments; some dolomite; trace phosphate.	MR
1350	1360	DOLOMITE, moderately hard, fine grained, dark gray; some shell fragments; some limestone, very friable, gritty, light tan.	MR
1360	1370	LIMESTONE, extremely friable, medium grained, light tan; much shell fragments (few discs); trace dolomite; trace lignite.	MR
1370	1380	DOLOMITE, moderately hard, fine grained, dark gray; much shell fragments; some limestone, very friable, gritty, light tan.	MR
1380	1390	SAME AS ABOVE; less shell fragments.	MR
1390	1400	DOLOMITE, moderately hard, fine grained, dark gray; some limestone, very friable, gritty, light tan; some shell fragments.	MR
1400	1410	SAME AS ABOVE	MR
1410	1420	Shell fragments (disc), broken?, light buff; some limestone, very friable, gritty, light tan; trace dolomite.	MR
1420	1430	LIMESTONE, very friable, medium grained, gritty/sandy, light brown; trace shell fragments.	MR
1430	1440	SAME AS ABOVE; more shell fragments.	MR
1440	1450	LIMESTONE, very friable, medium grained, gritty, light tan; some dolomite, moderately friable, nodules, dark gray.	MR



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
1450	1460	LIMESTONE, very friable, medium grained, light tan; some dolomite, moderately hard, fine grained, dark gray; trace shell fragments; trace clay, firm, silty, light tan.	MR
1460	1470	DOLOMITE, moderately hard, fine grained, dark gray; trace limestone, micritic, moderately hard, light tan.	MR
1470	1480	LIMESTONE, very friable, medium grained, light tan (sandy); some dolomite, moderately hard, fine grained, dark gray; trace shell fragments; trace clay, moderately friable, silty, light tan.	MR
1480	1490	DOLOMITE, moderately friable, fine grained, dark gray; some limestone, extremely friable, sandy, light tan.	MR
1490	1500	LIMESTONE, friable, sandy/gritty, medium grained, light tan; trace shell fragments; trace dolomite.	MR
1500	1510	LIMESTONE, micritic, friable, gritty, tan; some shell fragments (discs); trace dolomite, gray.	MR
1510	1520	SAME AS ABOVE; limestone is more friable.	MR
1520	1530	SAME AS ABOVE; trace clay.	MR
1530	1540	SAME AS ABOVE	MR
1540	1550	DOLOMITE, moderately hard, fine grained, dark gray; some limestone, very friable, gritty, light tan; trace clay, white ?, firm; trace clay, silty, firm, light brown; trace shell fragments.	MR
1550	1560	LIMESTONE, micritic, very friable, medium grained, light tan; some dolomite, gray; trace shell fragments.	MR
1560	1570	SAME AS ABOVE	MR
1570	1580	DOLOMITE, large ? clast, moderately hard, medium grained, dark gray.	MR



Lehigh Acres Deep Injection Well

LITHOLOGIC LOG

Florida Government Utility Authority PBS&J Project No. 071200.90		WELL: LZMW-1A	
DEPTH INTERVAL (ft)		DESCRIPTION	BY
FROM	TO		
1580	1590	DOLOMITE, moderately hard, ?, fine grained ?, dark gray; some limestone, micritic, very friable, medium grained, light tan; trace shell fragments; trace clay, silty, moderately firm, white.	MR
1590	1600	LIMESTONE, micritic, very friable, medium grained, light tan; some dolomite, moderately hard, fine grained, dark gray; trace shell fragments; trace clay.	MR
1600	1610	LIMESTONE, micritic, very friable, medium grained, light tan; some dolomite, fine grained, dark gray; trace shell fragments.	MR
1610	1620	SAME AS ABOVE	
1620	1630	SAME AS ABOVE	MR
1630	1640	LIMESTONE, micritic, very friable, sandy, tan; some dolomite, moderately hard, fine grained, dark gray; trace shell fragments.	MR
1640	1650	SAME AS ABOVE	
1650	1660	SAME AS ABOVE; more shell fragments.	MR
1660	1670	SAME AS ABOVE; limestone is light brown.	MR
1670	1680	SAME AS ABOVE	MR



Florida Governmental Utility Authority
 Lehigh Acres WWTP Class I Deep Injection Well
 Lower Zone Monitoring Well Grout Placement Schedule

SCHEDULE OF GROUT PLACEMENT FOR PLUG AND ABANDONMENT OF LZMW-1A

Date	Stage No.	Interval Filled (feet)	Linear Fill (feet)	Volume Pumped (barrels) (sacks)		Cement Top Tag (feet)	Theoretical Lift (feet)	Theoretical Volume (sacks)	Method of Emplacement	Additive to Cement
7/26/2007	1	1700-1580 INSIDE THE ROD	120	5	22	1580	100	22	tremmie	0%
7/28/2007	2	1710-1337	373	117	521	1337	510	521	tremmie	12%
7/28/2007	3	1337-1120	217	107	477	1120	207	477	tremmie	12%
7/29/2007***	4	1120-1102	18	27	120	1102	-	120	pressure	12%
7/29/2007	5	1102-392	710	158	682	392	700	682	tremmie	12%
7/29/2007	6	392-LS	392	85	379	LS	392	379	tremmie	12%
Totals			1710	494	2179.2			2179		

*** Pressure grouted to facilitate cementing behind the casing, cement was pumped at constant 45 psi until the pressure began to rise indicating the zone was closed off by cement, once pressures reached 80 psi cementing activities were stopped and the casing was closed in to maintain pressure.

Theoretical lift is based on the results of the caliper geophysical log conducted on the borehole.



Florida Governmental Utility Authority
 Lehigh Acres WWTP Class I Deep Injection Well
 Lower Zone Monitoring Well Grout Placement Schedule

SCHEDULE OF GROUT PLACEMENT FOR LZMW-1A

Date	Stage No.	Interval Filled (feet)	Linear Fill (feet)	Volume Pumped (barrels) (sacks)		Cement Top Tag (feet)	Temp Cement Top (feet)	Theoretical Lift (feet)	Method of Emplacement	Additive to Cement
26" Pit Casing										
6/30/2007	1	116-0	116	120	535					
Total										
									pressure	0%
16" Intermediate Casing										
7/7/2007	1	1149.3 - 1000	149.3	79	352	1000	1048			
7/8/2007	2	1000 - 779	221	100	446	779	698	147		
7/8/2007	3	779 - 550	229	100	446	550	560	219	pressure	0%
7/9/2007	4	550 - 382	168	100	446	382	386	250	tremmie	4%
7/9/2007	5	382-212	170	105	468	212	219	200	tremmie	4%
7/10/2007	6	212-71	141	110	490	71	76	150	tremmie	6%
7/10/2007	7	71-10	61	17	76	10	-	70	tremmie	6%
Total										
				484	2157				tremmie	6%