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Lansing (517) 627-1141
Kalamazoo (269) 375-3824
Farmington Hills (248) 324-2090

BOREHOLE LOG

BORING/WELL ID: TW-19

TOTAL DEPTH (ft.): 215.5'

PROJECT: Pall Life Sciences Inc.

SITE LOCATION: Ann Arbor, Michigan

PROJECT NO.: F96502

PROJECT MANAGER: James W. Brode, Jr., C.P.G.

LOGGED BY: Todd Campbell, C.P.G.

START DATE: 10-31-05

END DATE: 12-05-05

TOC ELEV.: 911.80'

GROUND ELEV.: Approx. 913'

STATIC WATER LVL.: 47.2' BGS

DRILLING CO.: Stearns Drilling

DRILLER: Dennis/Roger, John; Dick/Ralph

RIG TYPE: CME 95, Schramm T450M II

METHOD OF DRILLING: Hollow Stem Auger/Mud Rotary

SAMPLING METHODS: Split Spoon, Simulprobe

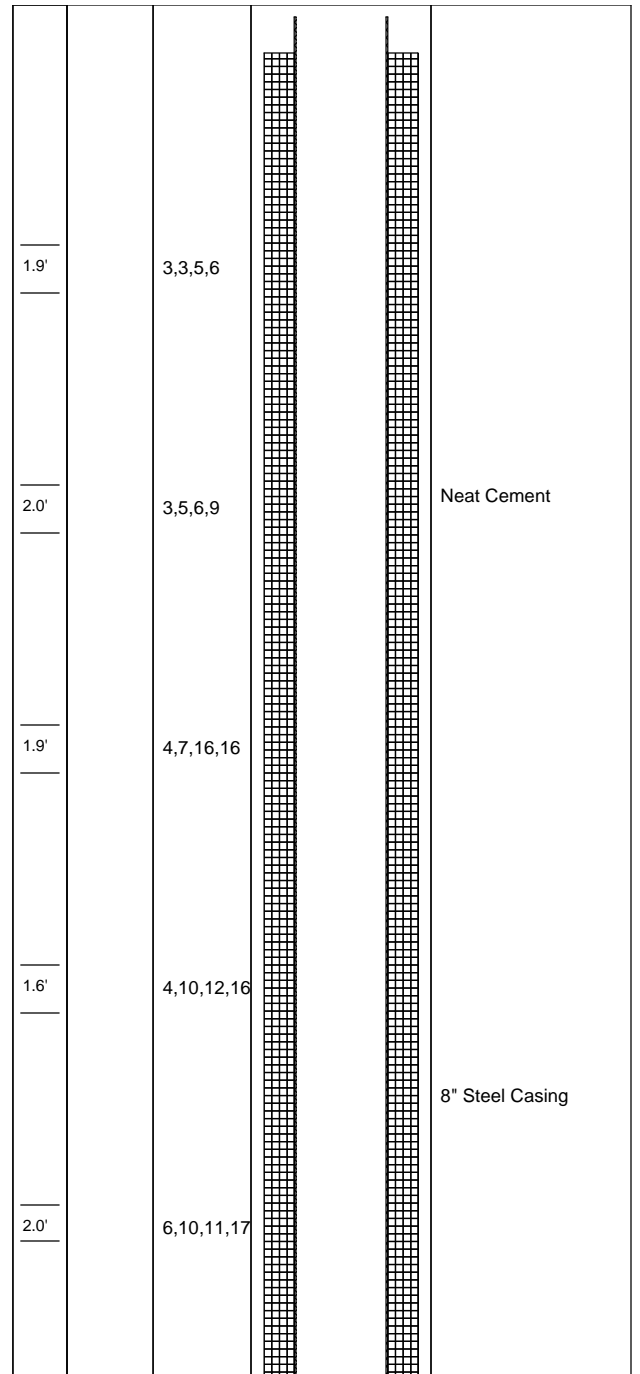
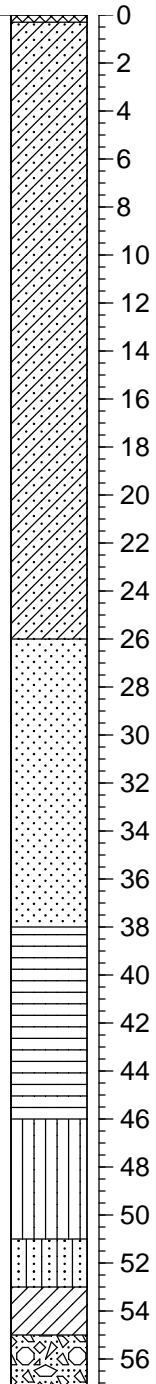
NOTES: Maple Village Shopping Center, Pilot Boring PLS-05-07
Field GPS Coordinates (N42.28315, W083.78113), Acc. 19'

Static Water Level

Page 1 of 4

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Recovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
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ASPHALT: Asphalt
CLAYEY SILT: Silt; Clay. Dark grayish brown, medium stiff, dry
Silt; Clay; trace Sand, fine grained; trace fine Gravel. Grayish brown, stiff, dry
SAND: Sand, fine to medium grained; trace fine Gravel. Grayish brown, well sorted, medium dense, dry
Sand, fine to medium grained; fine Gravel. Grayish brown, moderately sorted, medium dense, dry
DIAMICTON: Silt; Sand, fine grained; trace Clay; trace fine Gravel. Grayish brown, very stiff, dry
SILT: Silt; trace Clay. Grayish brown, moist
SILTY SAND: Sand, fine grained; Silt. Grayish brown, well sorted, medium dense, wet
CLAY: Driller notes Clay
SAND AND GRAVEL: Sand, coarse to fine grained; fine Gravel; trace Silt. Gray, moderately sorted, medium dense, wet





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NOTES: Maple Village Shopping Center, Pilot Boring PLS-05-07
Field GPS Coordinates (N42.28315, W083.78113), Acc. 19'

Static Water Level Page 2 of 4

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/Recovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
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			58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114	1.8'		0,5,7,8		Simulprobe sample 60-61.5' (<1 ug/L) Neat Cement Simulprobe sample 70-71.5' (<1 ug/L)
DIAMICTON: Clay; Silt; trace fine Sand, trace fine Gravel. Gray, medium stiff, dry				1.5'		9,10,12		
				1.2'		2,2,7,8		
				1.0'		NA		8" Steel Casing
SAND: Sand, fine grained; Silt. Grayish brown, well sorted, loose, wet				2.0'		4,4,4,5		Simulprobe sample 100-101.5' (<1 ug/L)
SILT: Silt; Sand, fine grained; fine Gravel. Grayish brown, moist				0.5'		11,19,35		Simulprobe sample 110-111.5' (<1 ug/L)



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BOREHOLE LOG

BORING/WELL ID: TW-19

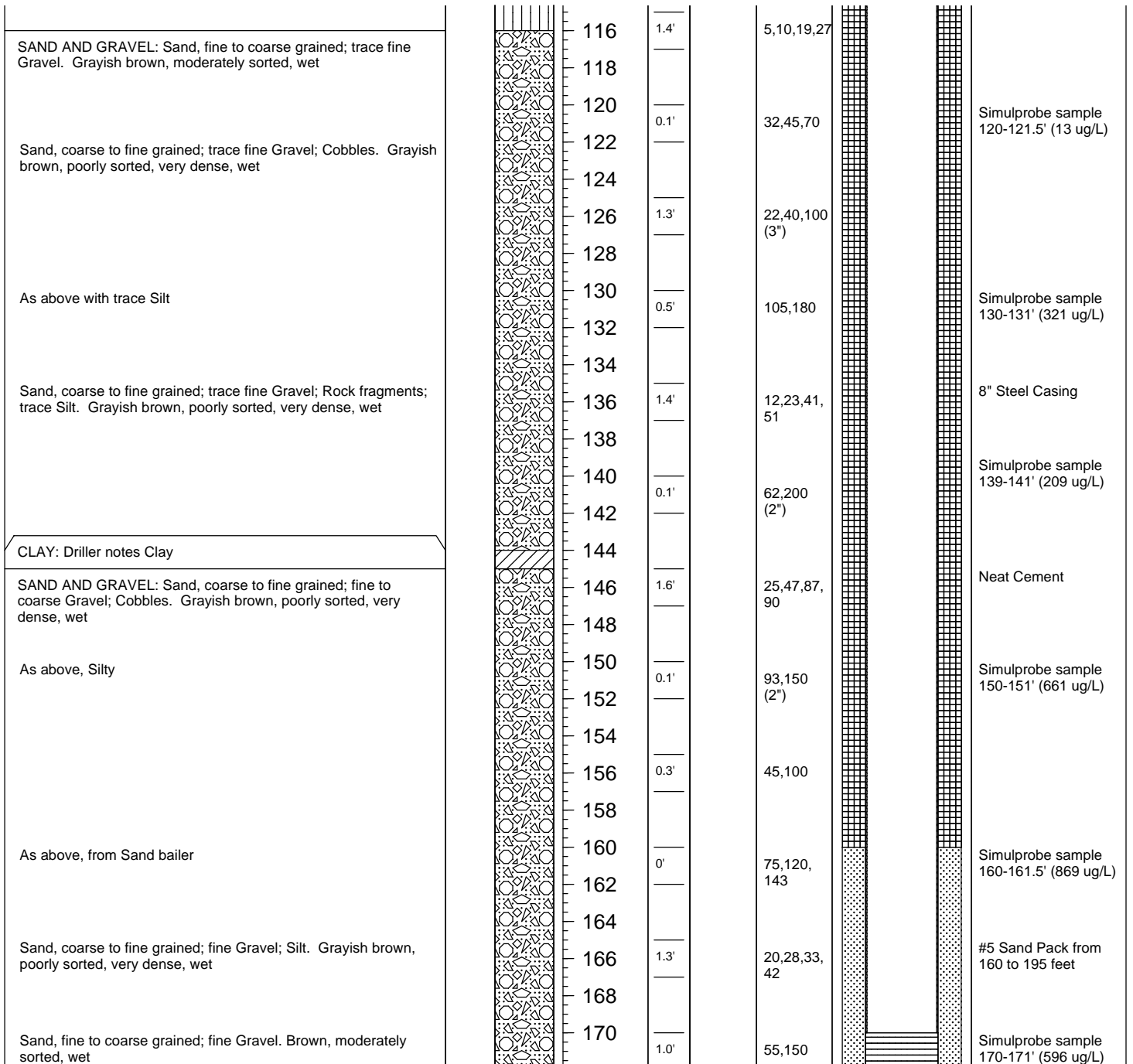
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NOTES: Maple Village Shopping Center, Pilot Boring PLS-05-07
Field GPS Coordinates (N42.28315, W083.78113), Acc. 19'

Static Water Level Page 3 of 4

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Static Water Level Page 4 of 4

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-------------	---------	-------------	-----------------	--------------------	-----------------	-----------	-------------	--------------------------

Sand, coarse to fine grained; trace fine Gravel. Brown, moderately sorted, very dense, wet			172	1.6'			30,42,85	8" Stainless Steel Screen (35 Slot) from 170 to 195 feet bgs
			174					
Sand, coarse to fine grained; fine Gravel. Grayish brown, moderately sorted, very dense, wet (from Sand bailer)			176	0'			37,145,117	Simulprobe sample 180-181.5' (484 ug/L)
			178					
Sand, coarse to fine grained; trace fine Gravel. Grayish brown, moderately sorted, dense, wet			180	1.8'			9,14,22,34	
			182					
CLAY: Driller notes Clay			184					
SAND AND GRAVEL: Sand, coarse to fine grained; Silt; fine Gravel. Grayish brown, poorly sorted, dense, wet			186	1.7'			11,38,110, Refusal	Simulprobe sample 190-191.5' (624 ug/L)
			188					
SAND: Sand, medium to fine grained. Grayish brown, well sorted, very dense, wet (from Sand bailer)			190	0.9'			5,9,23	8" Stainless Steel Screen (20 Slot) from 195 to 200 feet bgs
			192					
SAND: Sand, medium to fine grained. Grayish brown, well sorted, very dense, wet (from Sand bailer)			194	0'			112,100 (1')	Simulprobe sample 200-201' (621 ug/L)
			196					
Sand, fine to medium grained. Grayish brown, well sorted, very dense, wet			198	1.5'			17,53,125	
			200					
SAND AND GRAVEL: Sand, fine to medium grained; fine Gravel. Grayish brown, moderately sorted, very dense, wet			202	0'			30, 200 (4')	Simulprobe sample 210-211' (513 ug/L)
			204					
DIAMICTON: Silt; Sand, fine grained; trace fine Gravel. Grayish brown, hard, dry			206	0.2'			110 (6")	
			208					
			210					
			212					
			214					
			216					

Table 2 – Barometric Efficiency Summary

TW-19 Aquifer Test

Pall Life Sciences, Ann Arbor, Michigan

Date	Time	Drawdown (feet)						Date	Time	Station Pressure (ft-water)
		MW-72d	MW-79	MW-84s	MW-85	MW-88	TW-16			
12/16/2005	14:50	-0.029	0.006	-0.002	-0.056	-0.016	-0.008	12/16/2005	14:53	32.672705
12/18/2005	3:50	-0.58	-0.493	-0.169	-0.55	-0.497	-0.25	12/18/2005	3:53	33.418348
Change in Drawdown/Pressure		-0.551	-0.499	-0.167	-0.494	-0.481	-0.242			0.7456
Barometric Efficiency (%)		73.9	66.9	22.4	66.3	64.5	32.5			

Table 1 – Observation Well Information

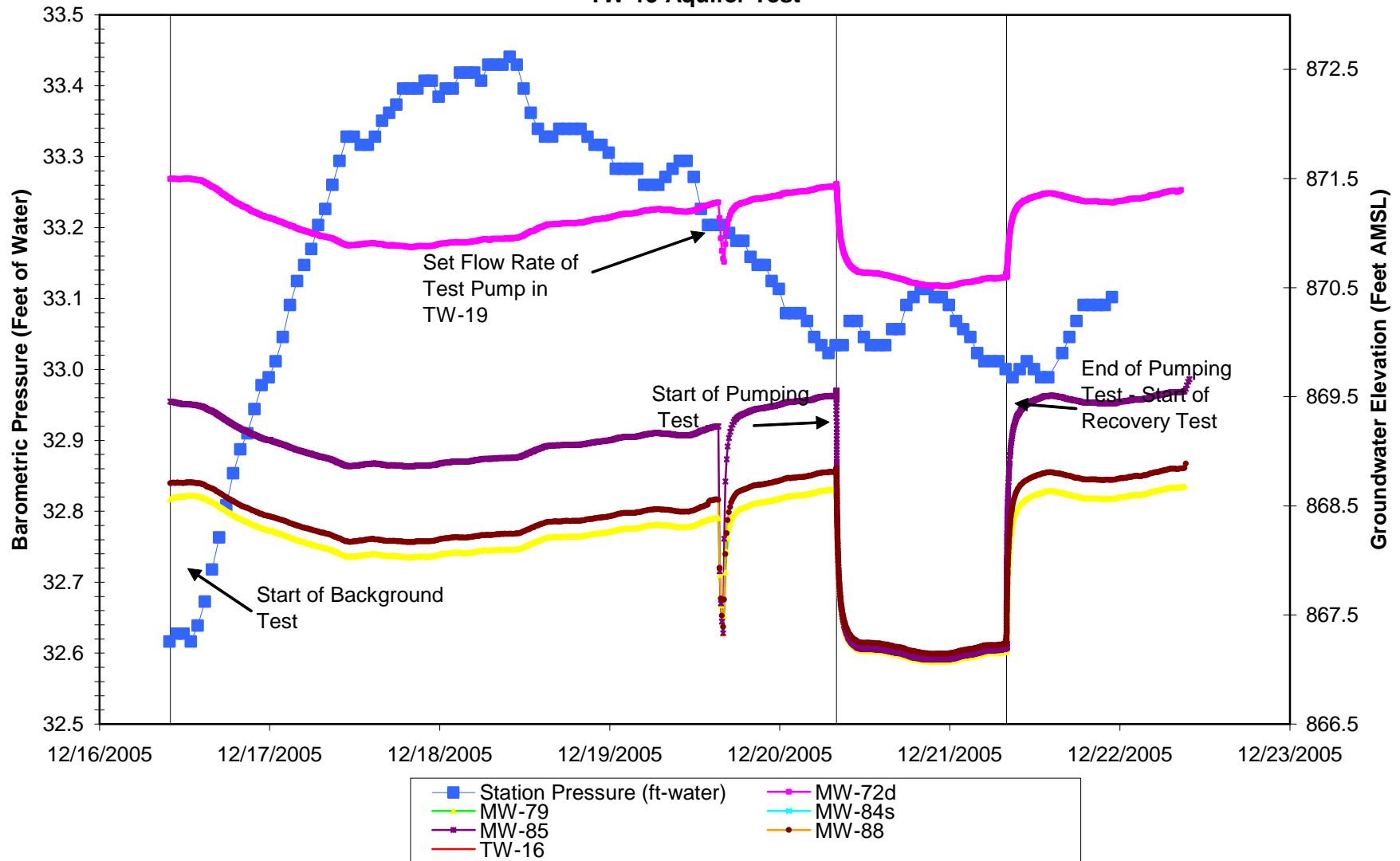
TW-19 Aquifer Test

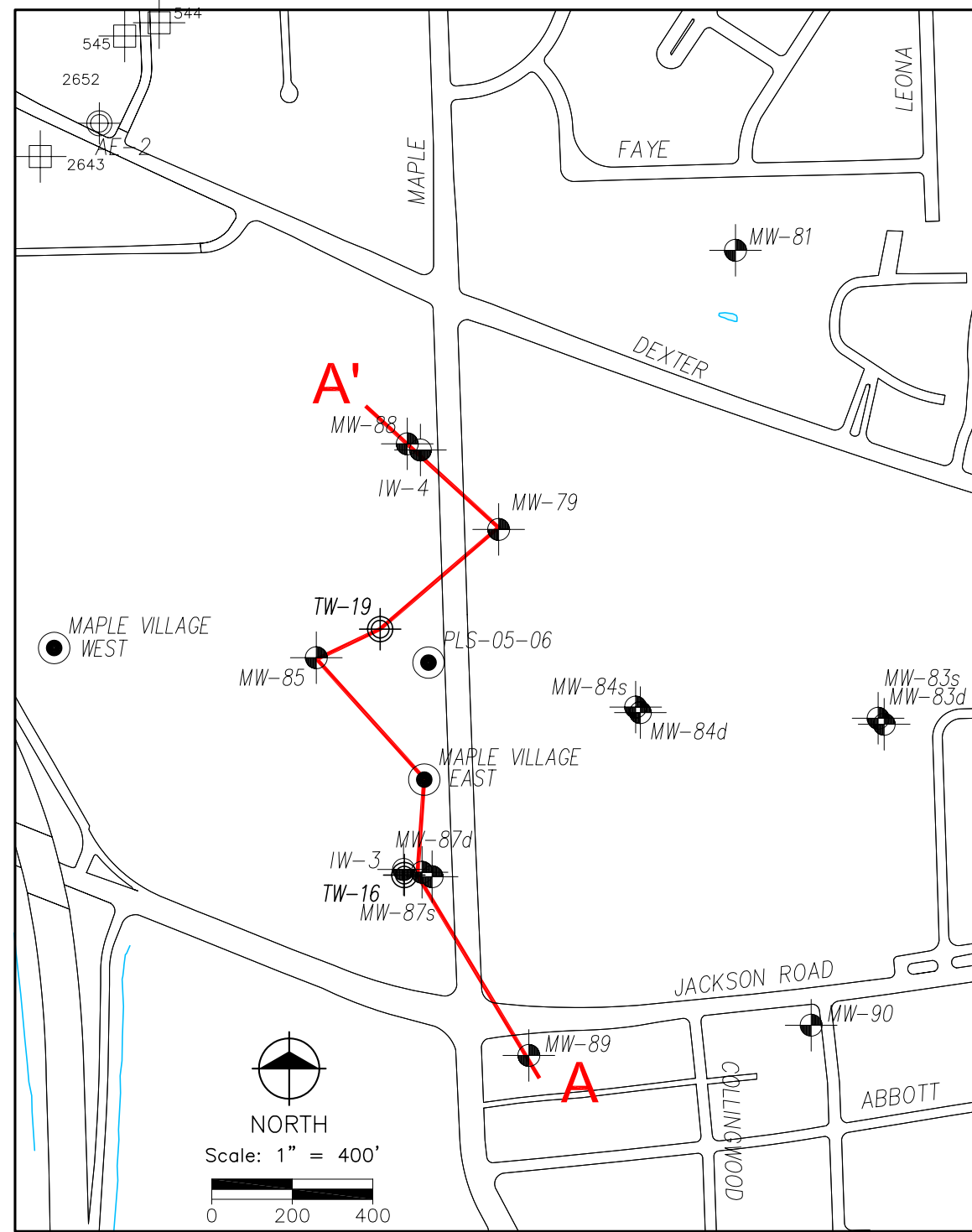
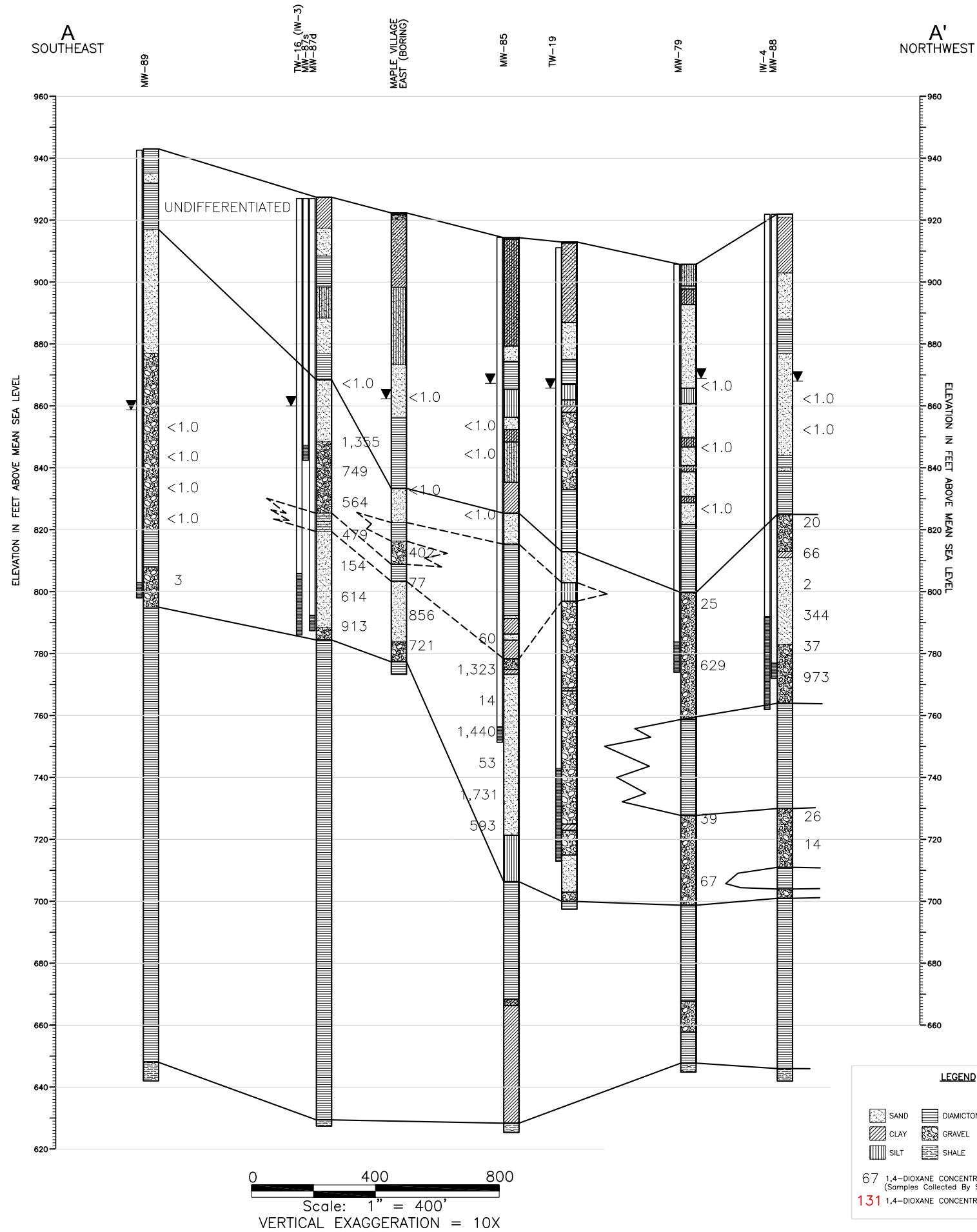
Pall Life Sciences, Ann Arbor, Michigan

Well Name	Date Installed	TOC Elevation (ft amsl)	Ground Elevation (ft amsl)	Depth from TOC to Top of Screen (ft)	Depth from TOC to bottom of screen (ft)	Screen Length (ft)	Aquifer Thickness* (ft)	Depth from Top of Aquifer to Top of Screen (ft)	X COORD	Y COORD
MW-72d	11/28/2001	942.52	943	190	200	10	33	4	13280561	285943
MW-72s	12/18/2002	942.95	943	118.5	124	5	60		13280451	285914
MW-79	7/16/2002	906.78	907.5	127	131	5	41 + 29	21	13282106	286212
MW-81	7/31/2002	920.63	921	153	158	5			13282695	286905
MW-84d	12/31/2002	905.47	906	235	240	5			13282430	285757
MW-84s	1/3/2003	905.52	906	108.9	114	5			13282419	285770
MW-85	2/20/2003	917.64	918	158	163	5	57	22	13281625	285893
MW-87d	4/22/2003	927.34	928	135	140	5	35	27	13281894	285353
MW-87s	8/18/2003	927.69	928	80	85	5	42	21	13281894	285353
MW-88	4/30/2003	920.74	921	145	150	5	61 + 19	48	13281851	286424
MW-89	5/6/2003	943.44	944	140	145	5	64	55	13282153	284905
MW-90	5/21/2003	951.72	952	125	130	5			13282855	284980
TW-16	8/15/2003	927.50	928	121	141	20	74	54	13281844	285353
TW-19	12/5/2005	911.80	913	168.8	198.8	30	97	54	13281784	285964

* At some locations, Unit E appears to be divided.

Figure 3 - Combined Hydrographs with Barometric Pressure
Pall Life Sciences, Inc.
TW-19 Aquifer Test





LEGEND

67 1,4-DIOXANE CONCENTRATION (ppb)
(Samples Collected By Similprobe During Installation)

131 1,4-DIOXANE CONCENTRATION (ppb)

**CROSS SECTION
A-A'**



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PALL LIFE SCIENCES
SCIO TWP., WASHTENAW COUNTY, MICHIGAN
TW-19 AQUIFER TEST REPORT

PROJECT NO.
F96502

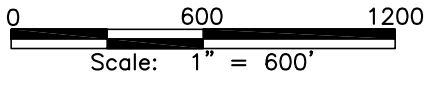
FIGURE NO.
2

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 M:\CUSTOM\ACAD2002\SYMBOLS\B11X17.DWG
 M:\CUSTOM\ACAD2002\SYMBOLS\B18X24.DWG
 M:\CUSTOM\ACAD2002\SYMBOLS\B24X36.DWG
 M:\CUSTOM\ACAD2002\SYMBOLS\B36X48.DWG
 N:\96502\REF\WC.DAT.DWG

PLOT INFO: F:\WORK\96502\DWG\BASEMAP 2004.DWG DATE: 2/3/2006 TIME: 10:41:10 AM USER: ACS



- LEGEND**
- ⊙ - MONITOR WELL
 - ⊠ - RESIDENTIAL WELL
 - ⊗ - PURGE WELL
 - ⊙ - HYDROGEOLOGIC TEST BORING
 - ⊠ - UV/OX. TREATMENT SYSTEM
 - ⊗ - TEMPORARY PURGE WELL



SITE MAP



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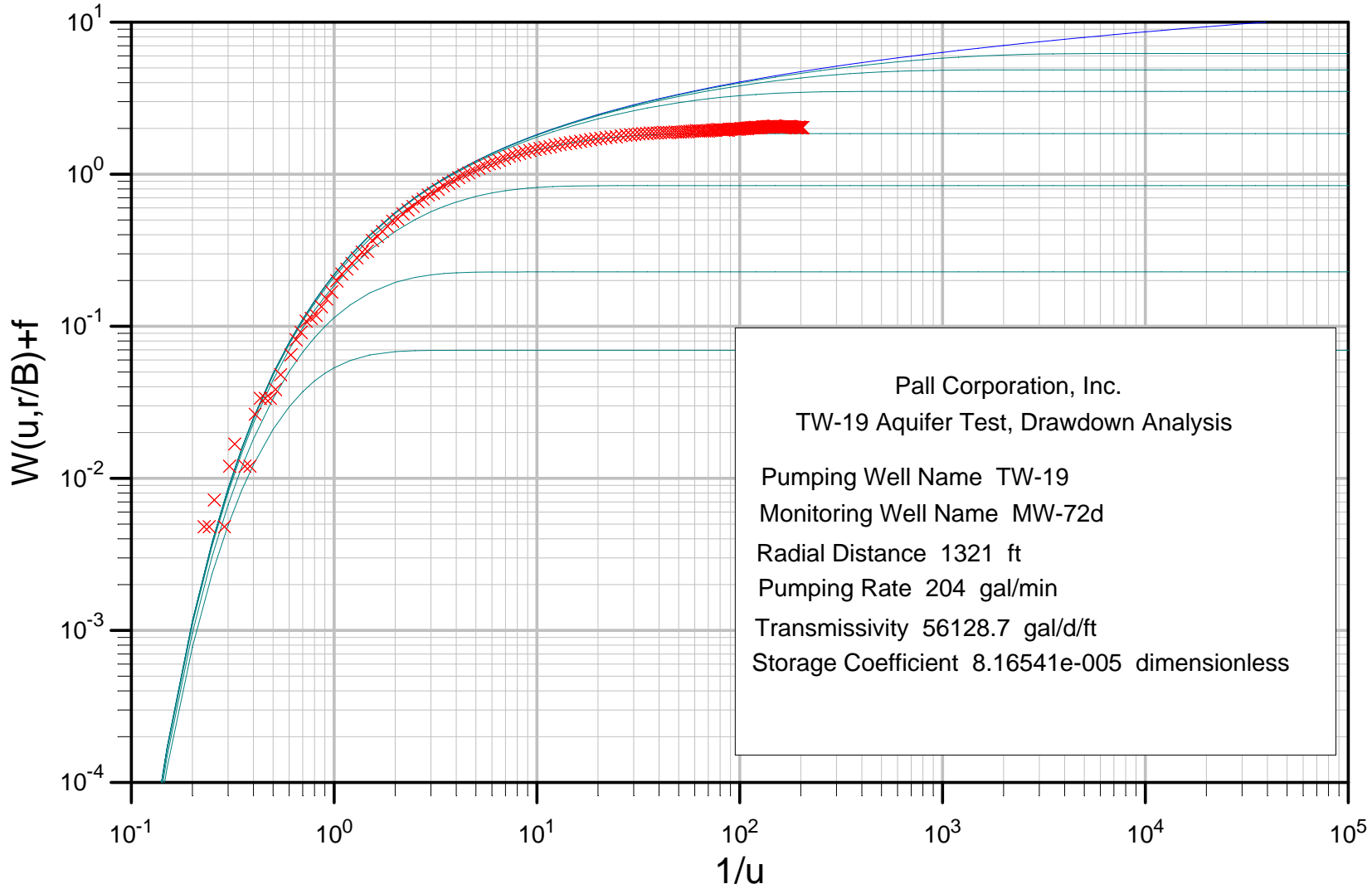
PALL LIFE SCIENCES
 SCIO TWP., WASHTENAW COUNTY, MICHIGAN
TW-19 AQUIFER TEST REPORT

PROJECT NO.
F96502

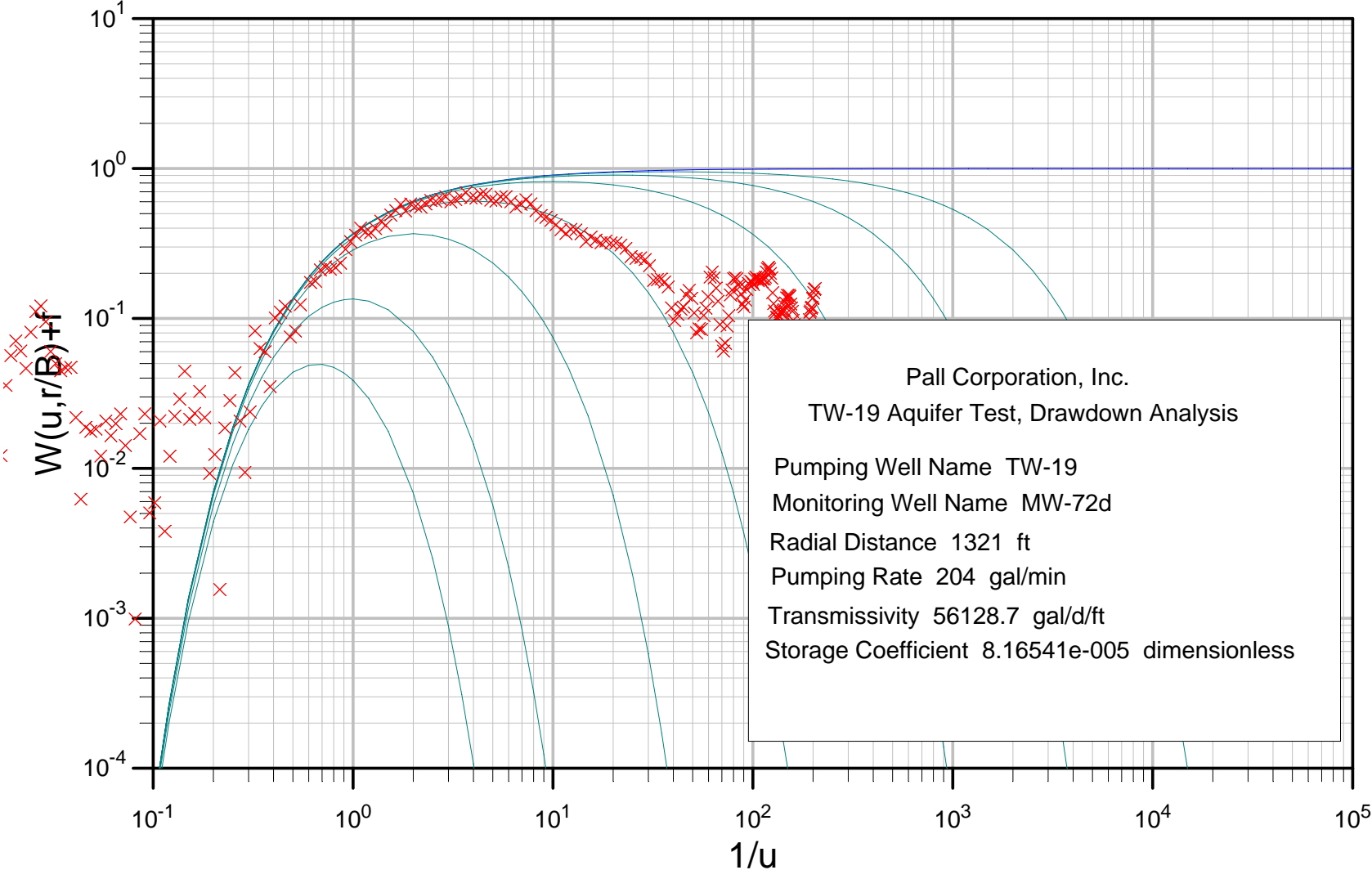
FIGURE NO.
1

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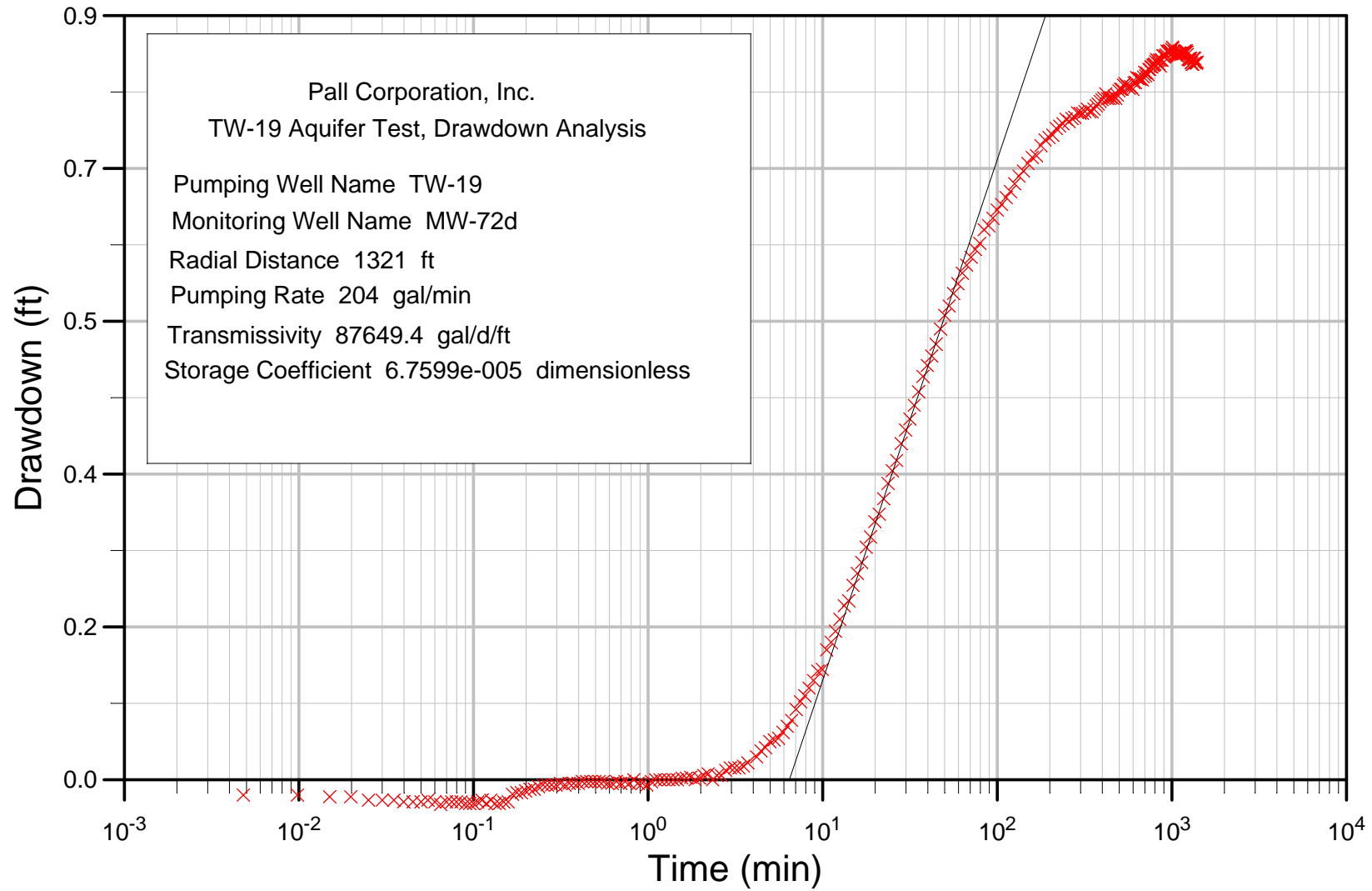
Hantush



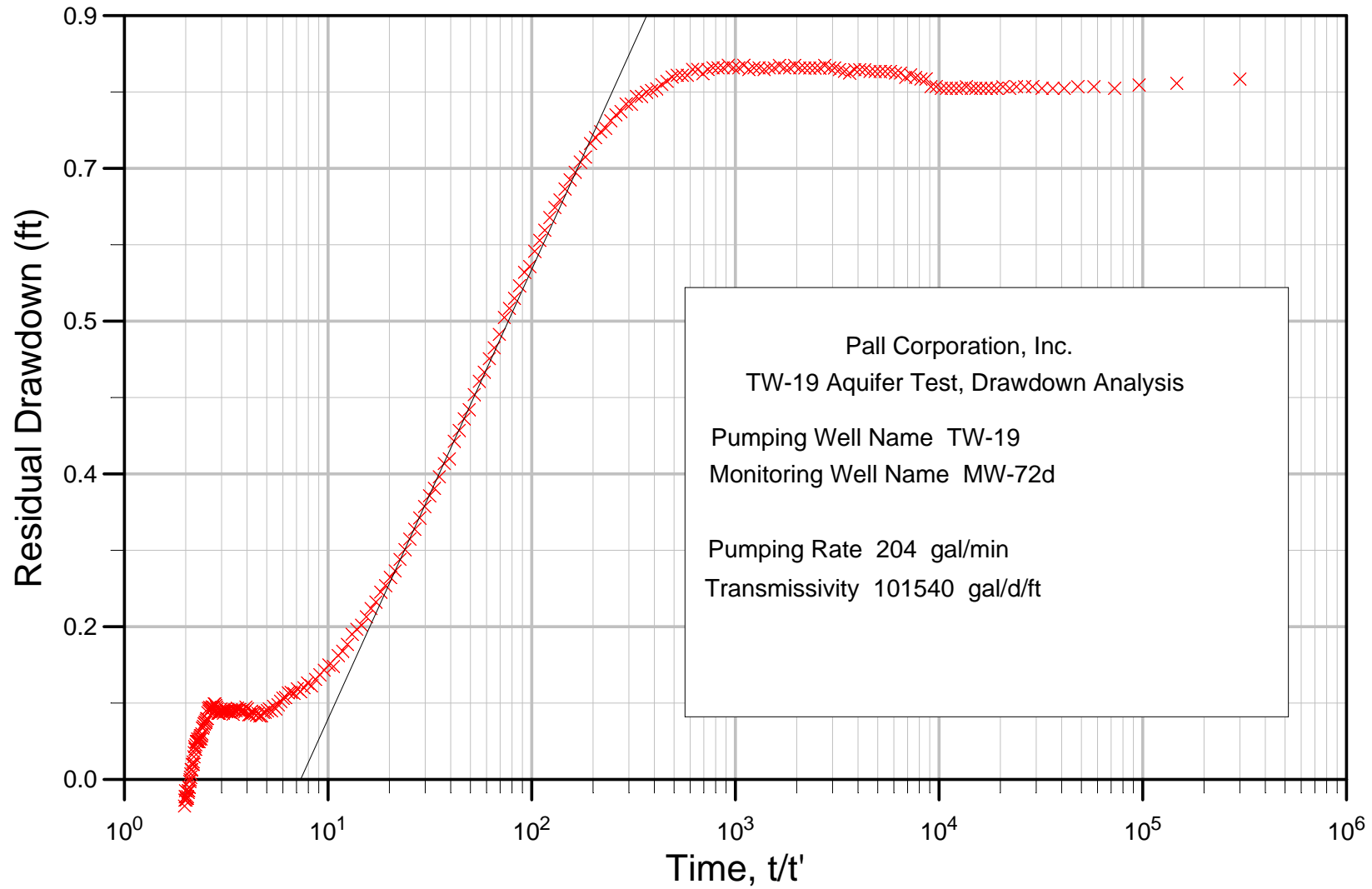
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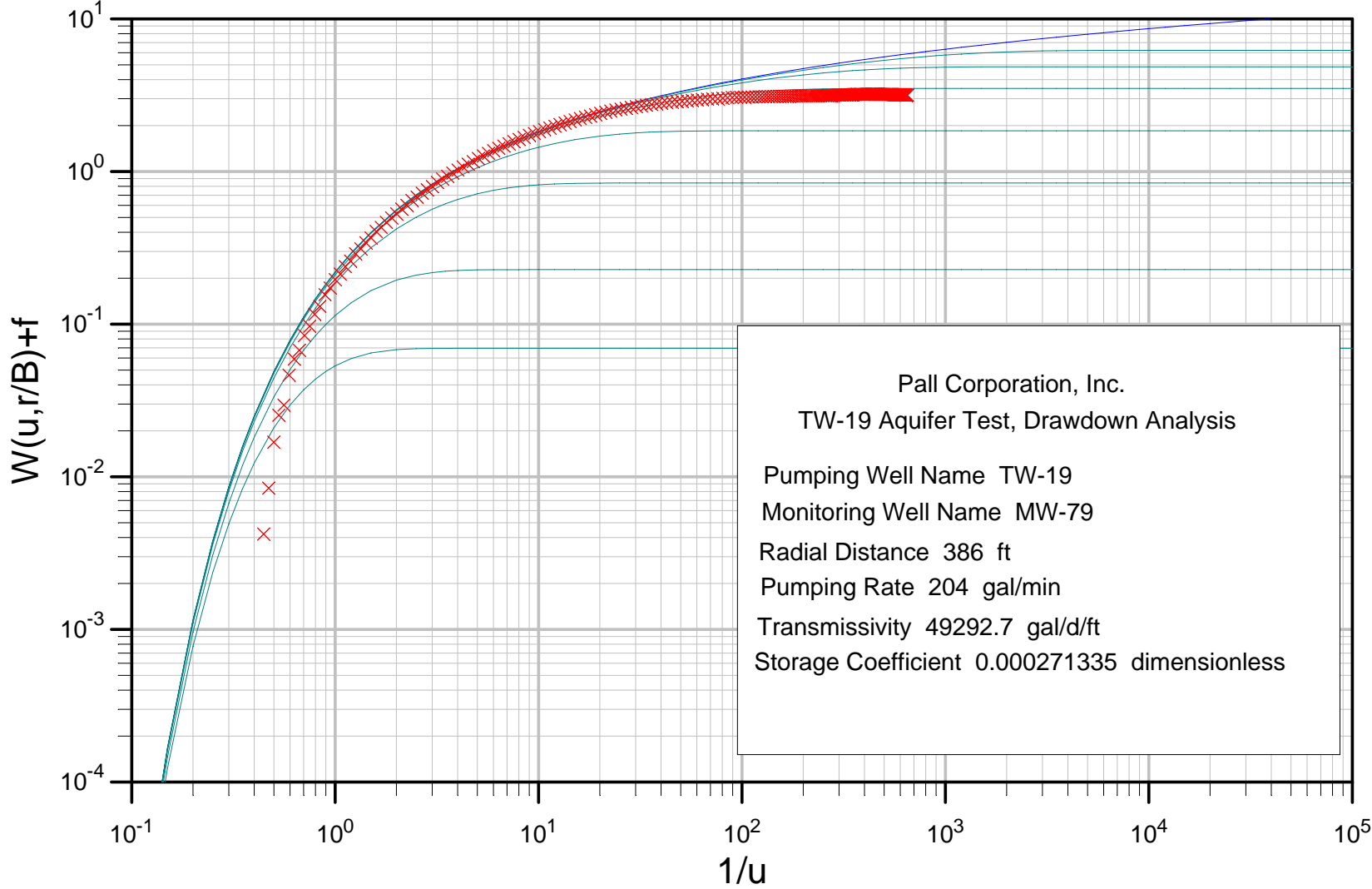
Cooper and Jacob



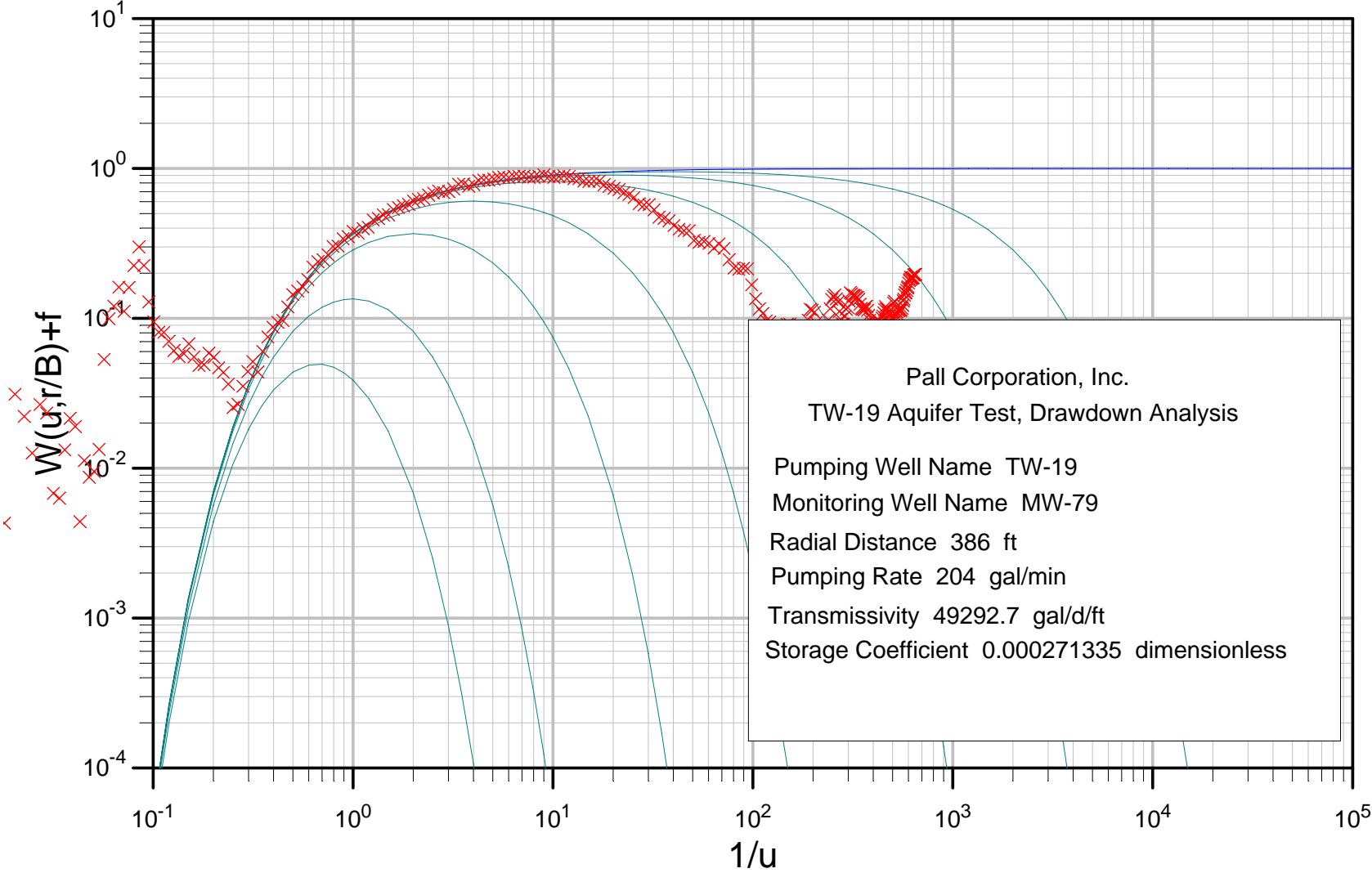
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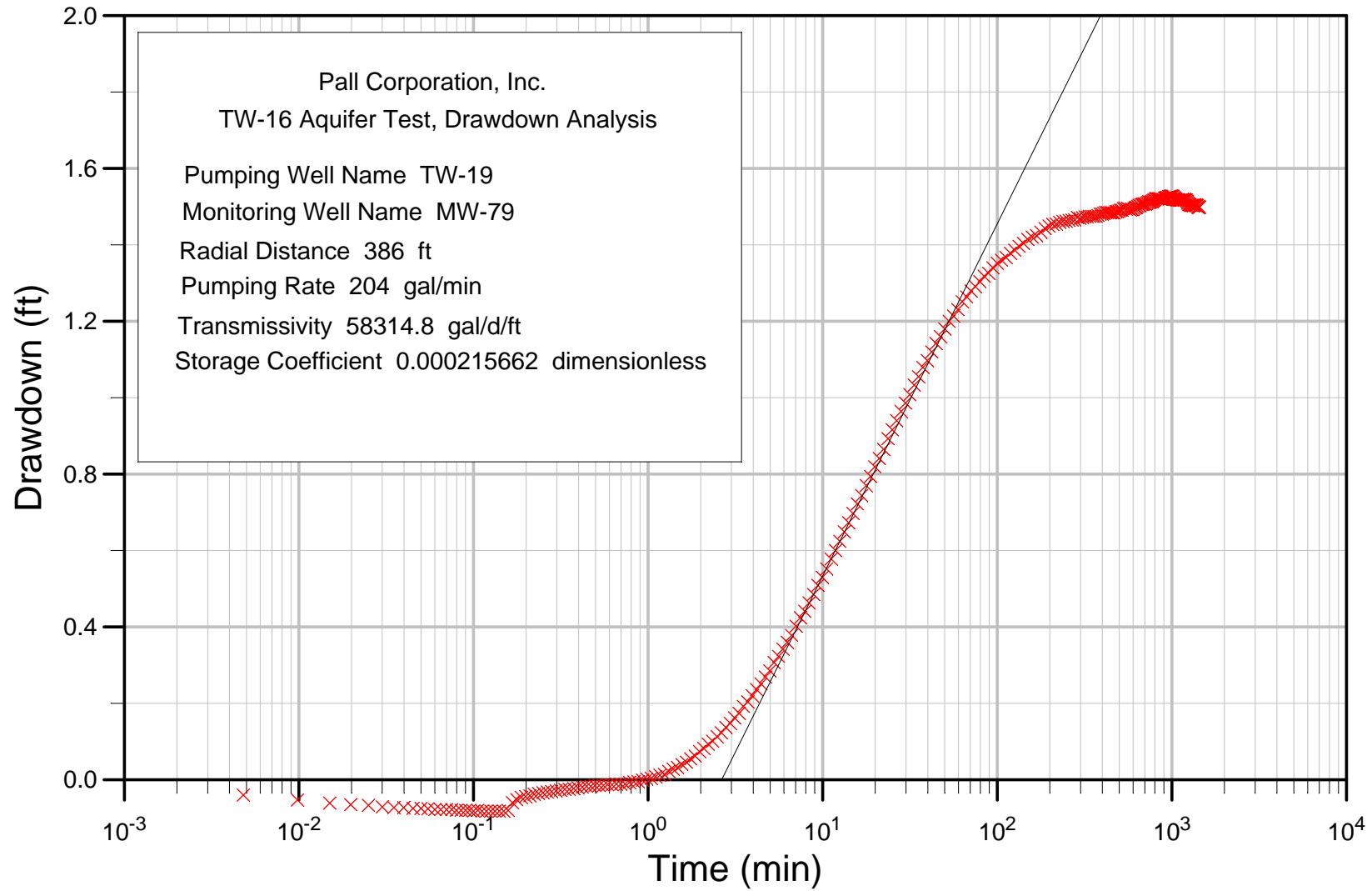
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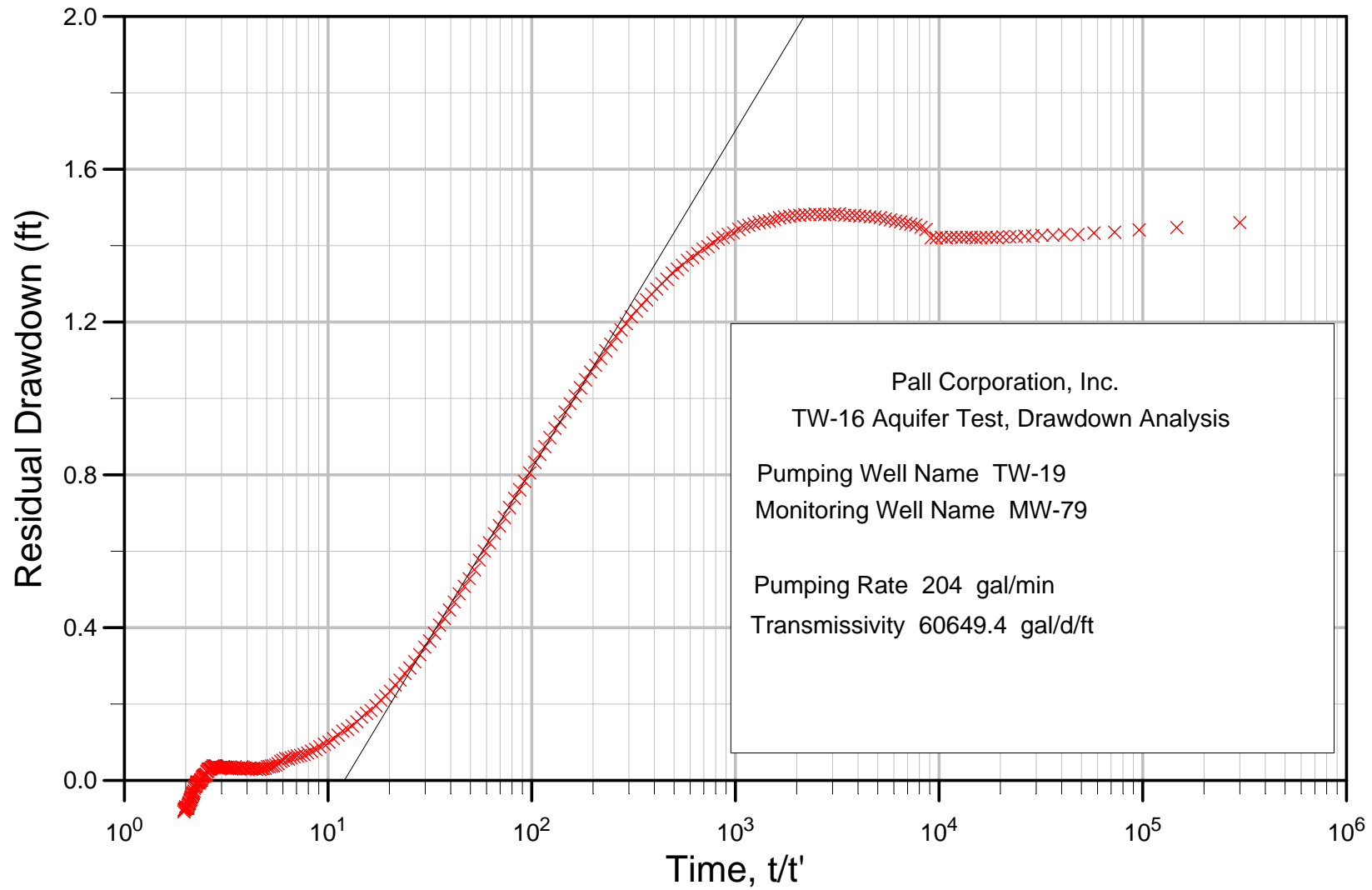
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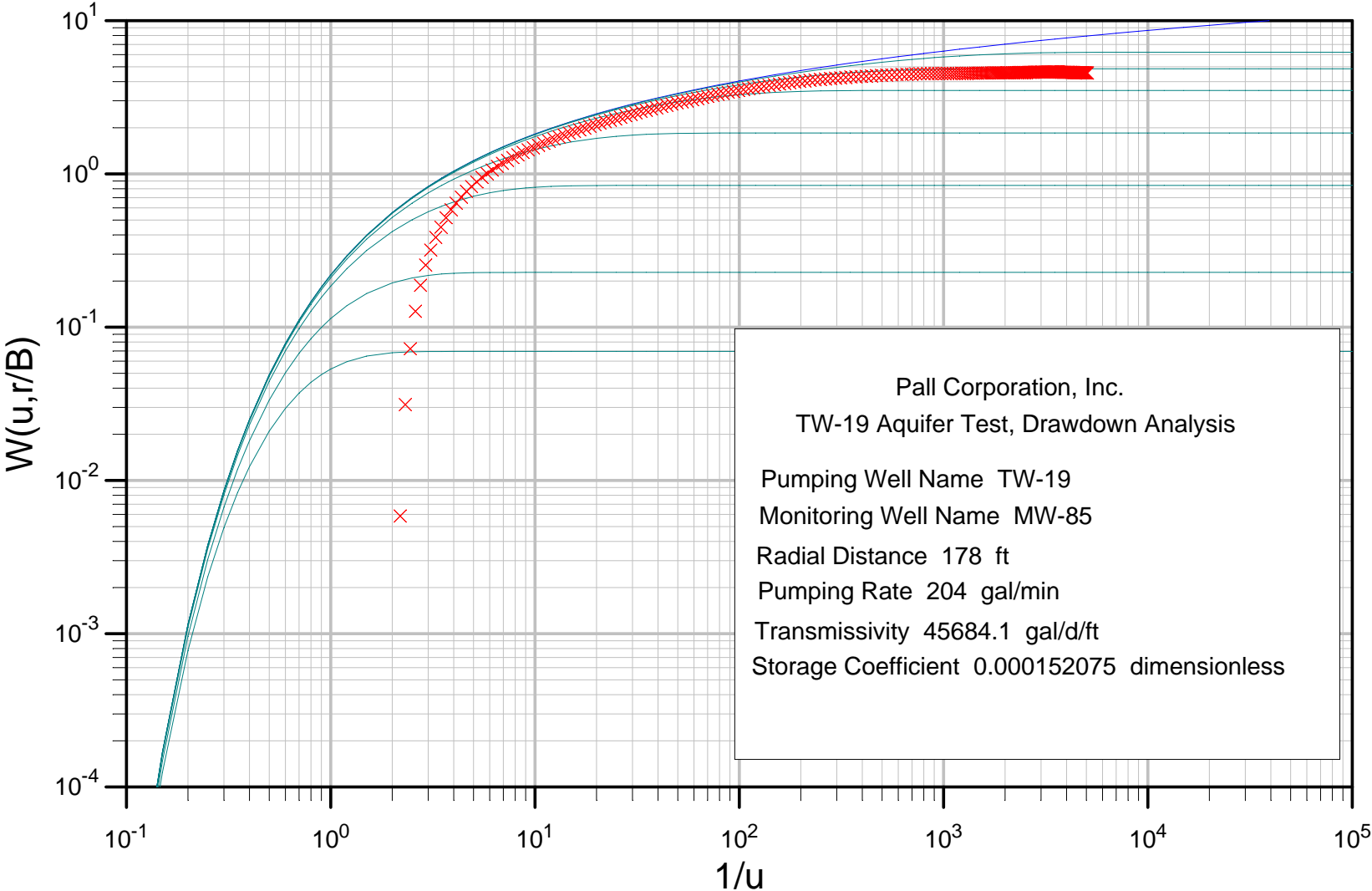
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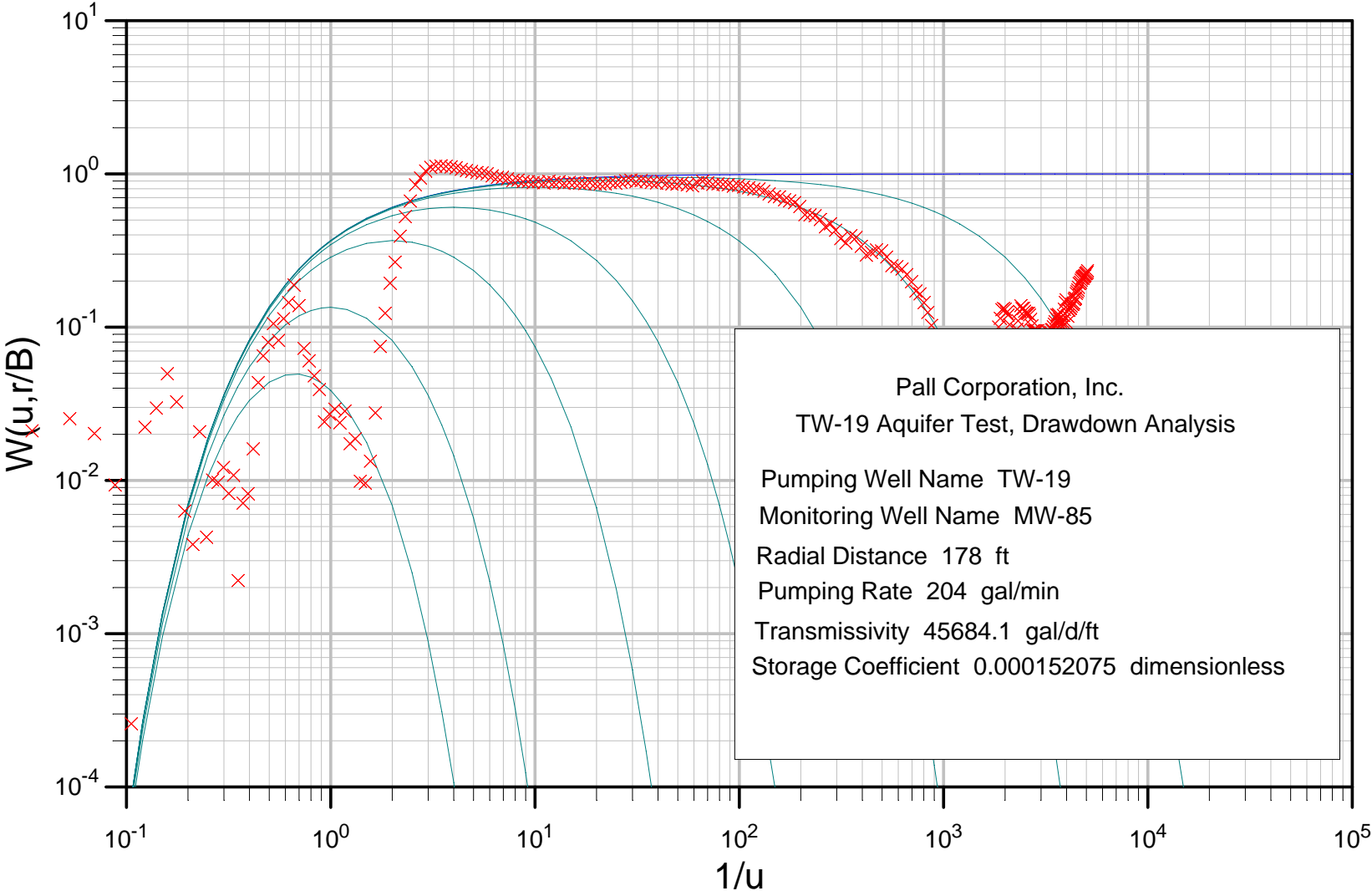
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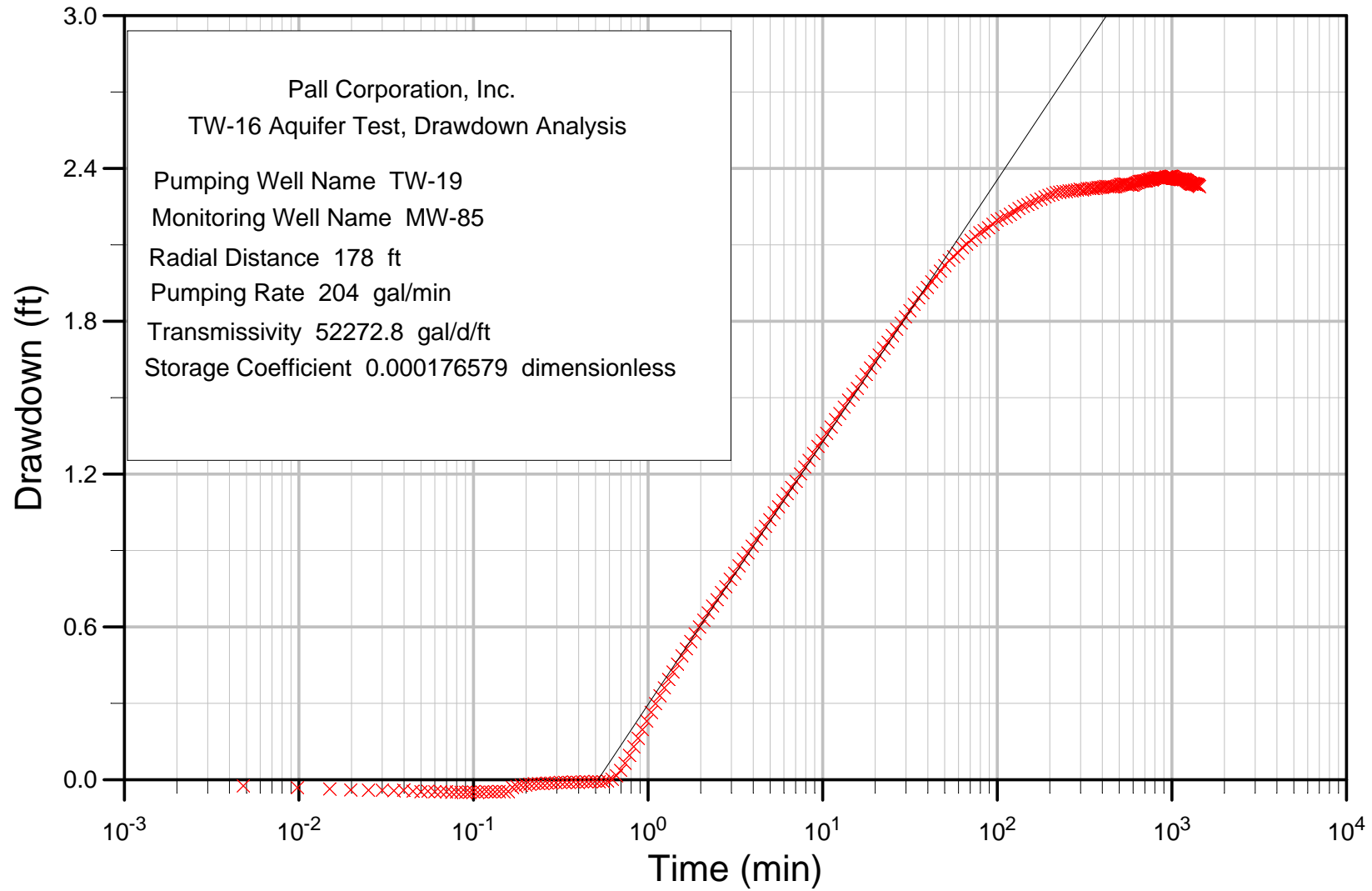
Hantush



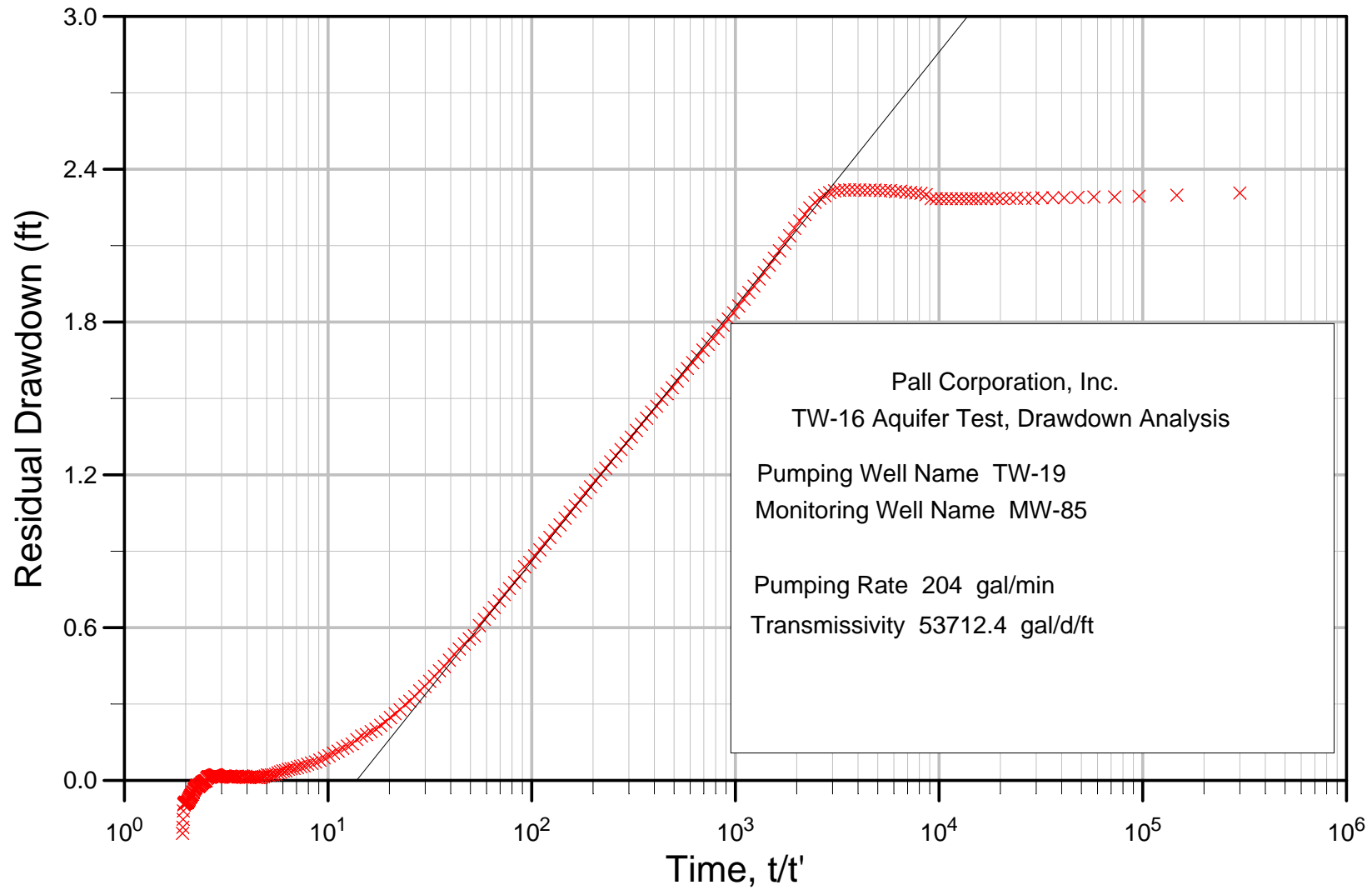
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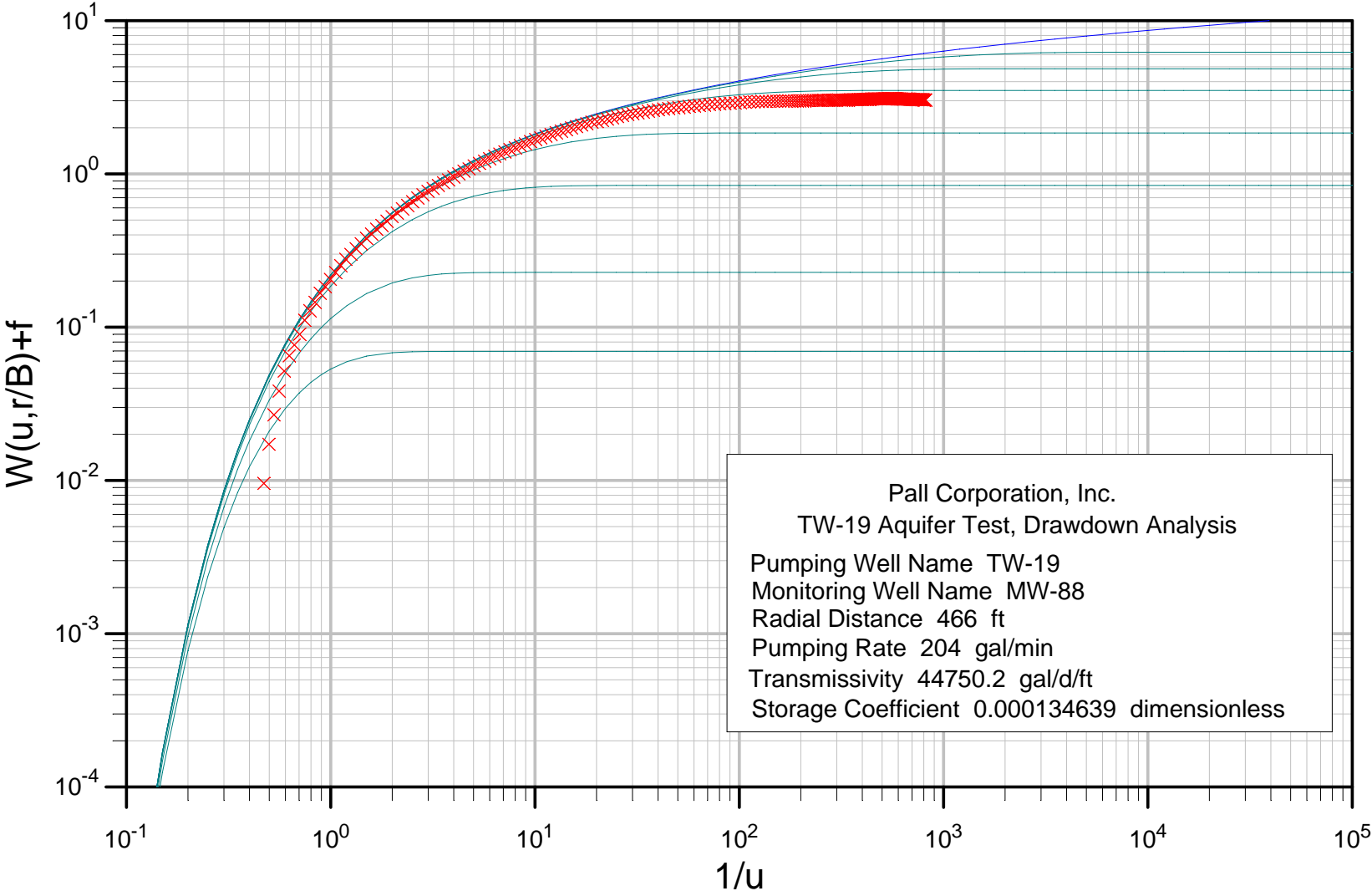
Cooper and Jacob



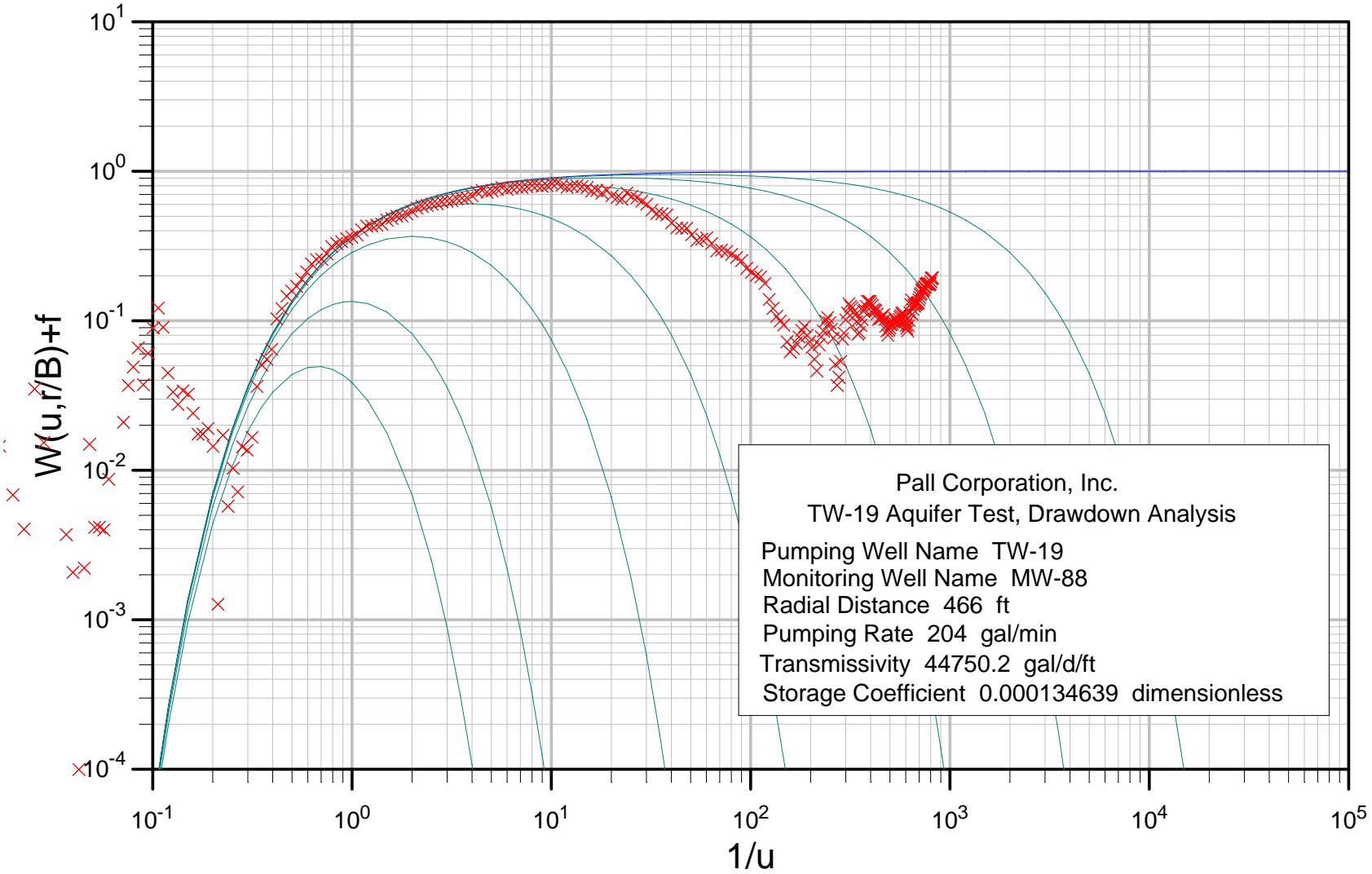
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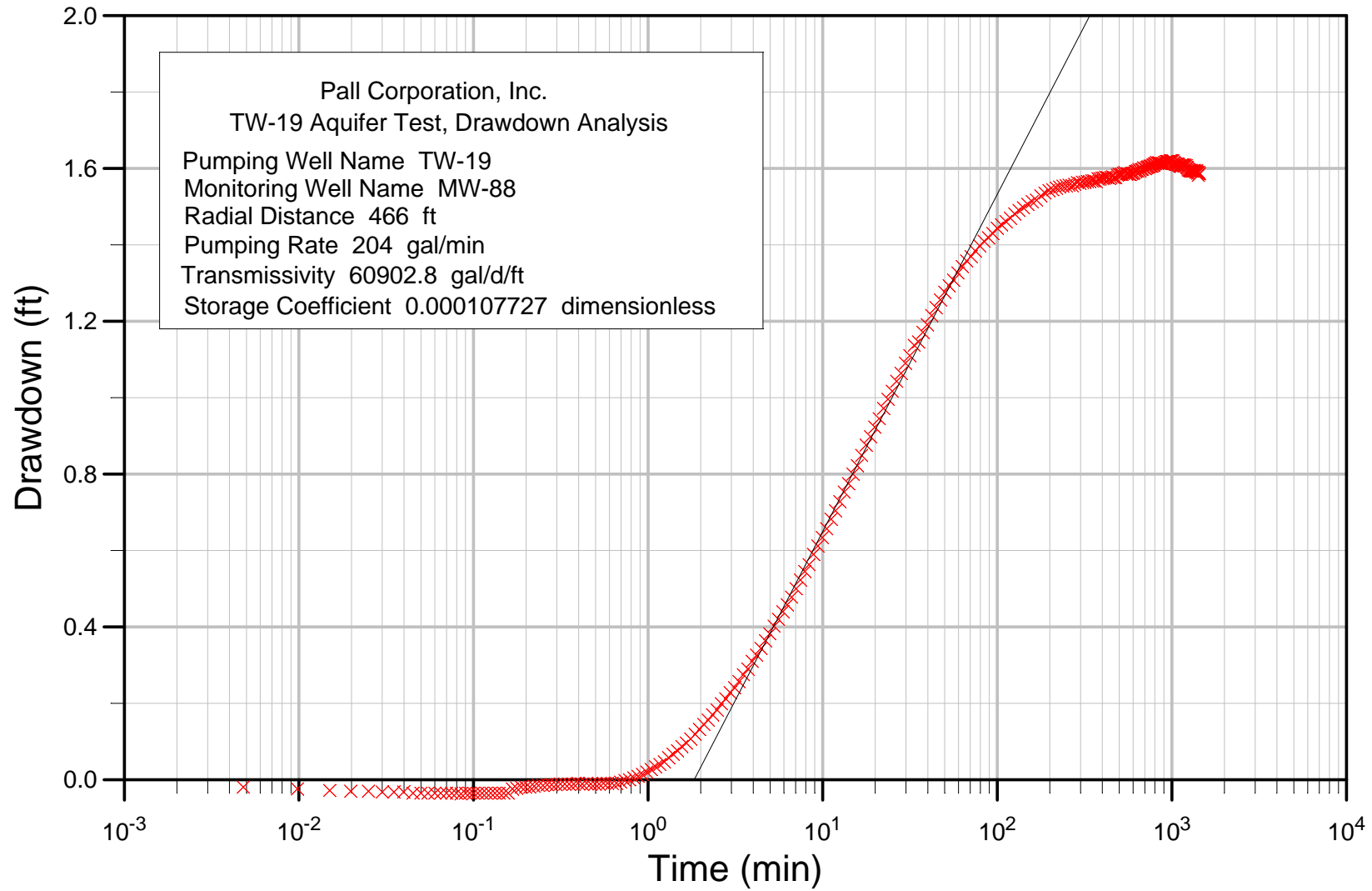
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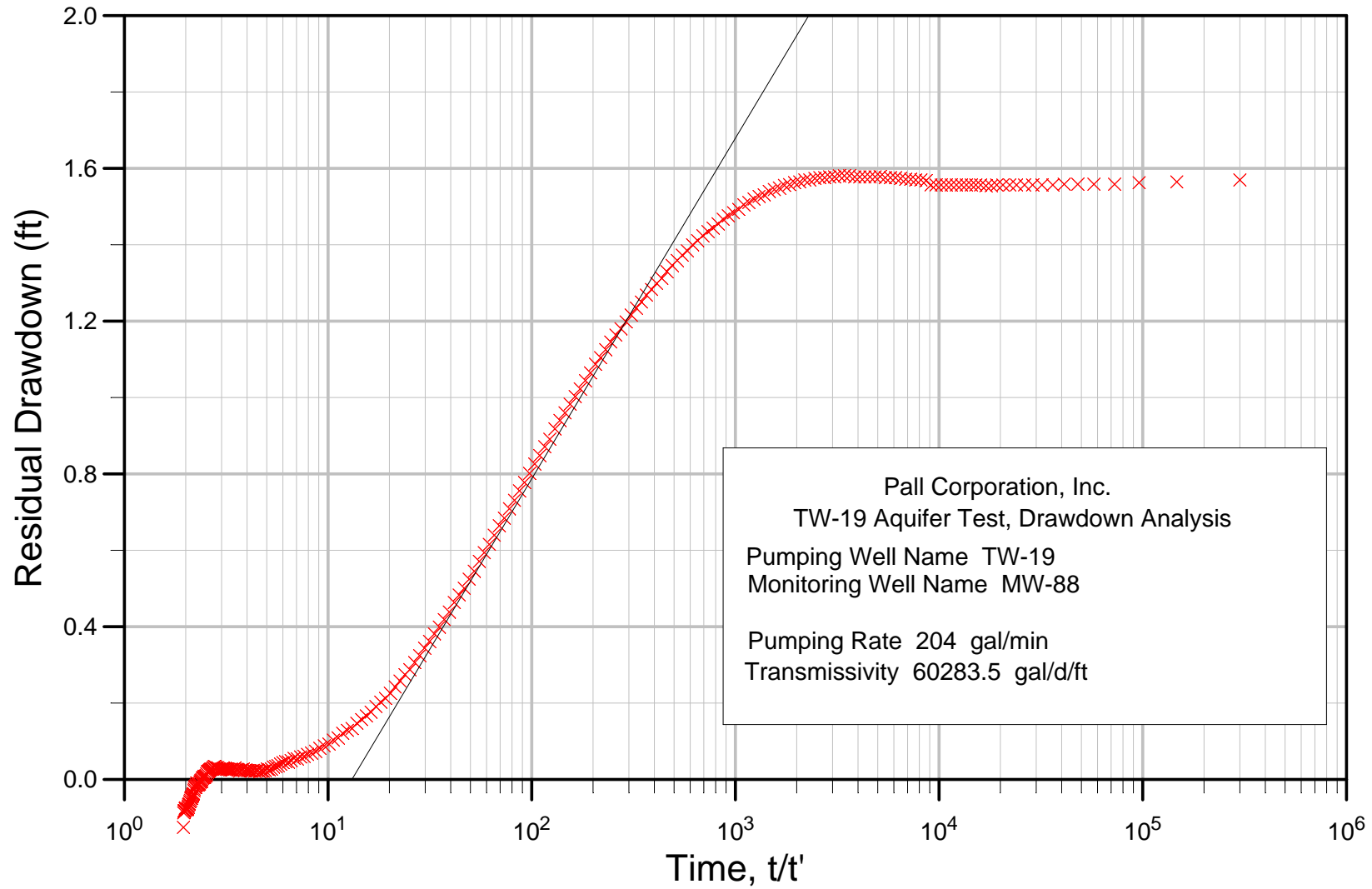
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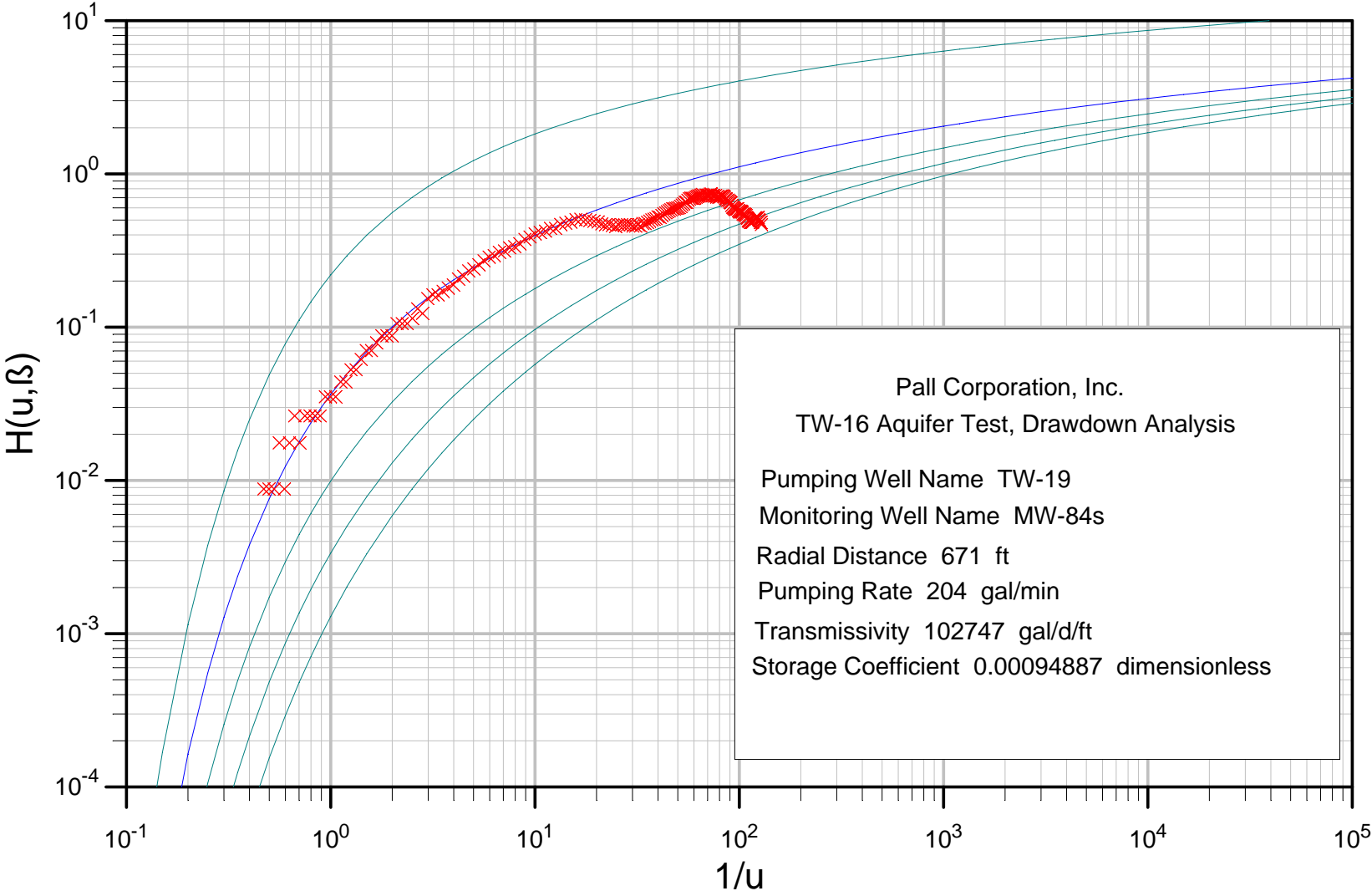
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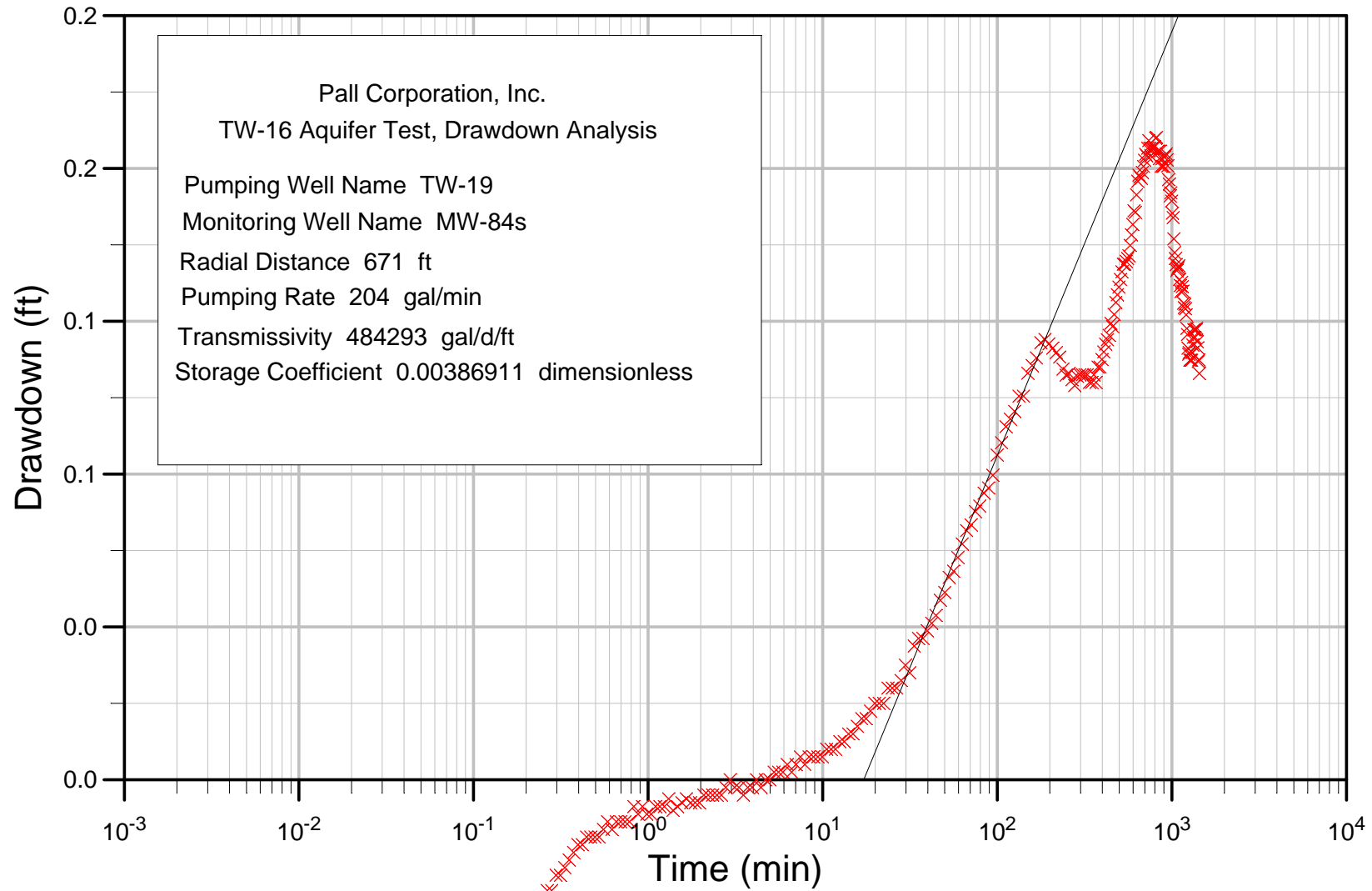
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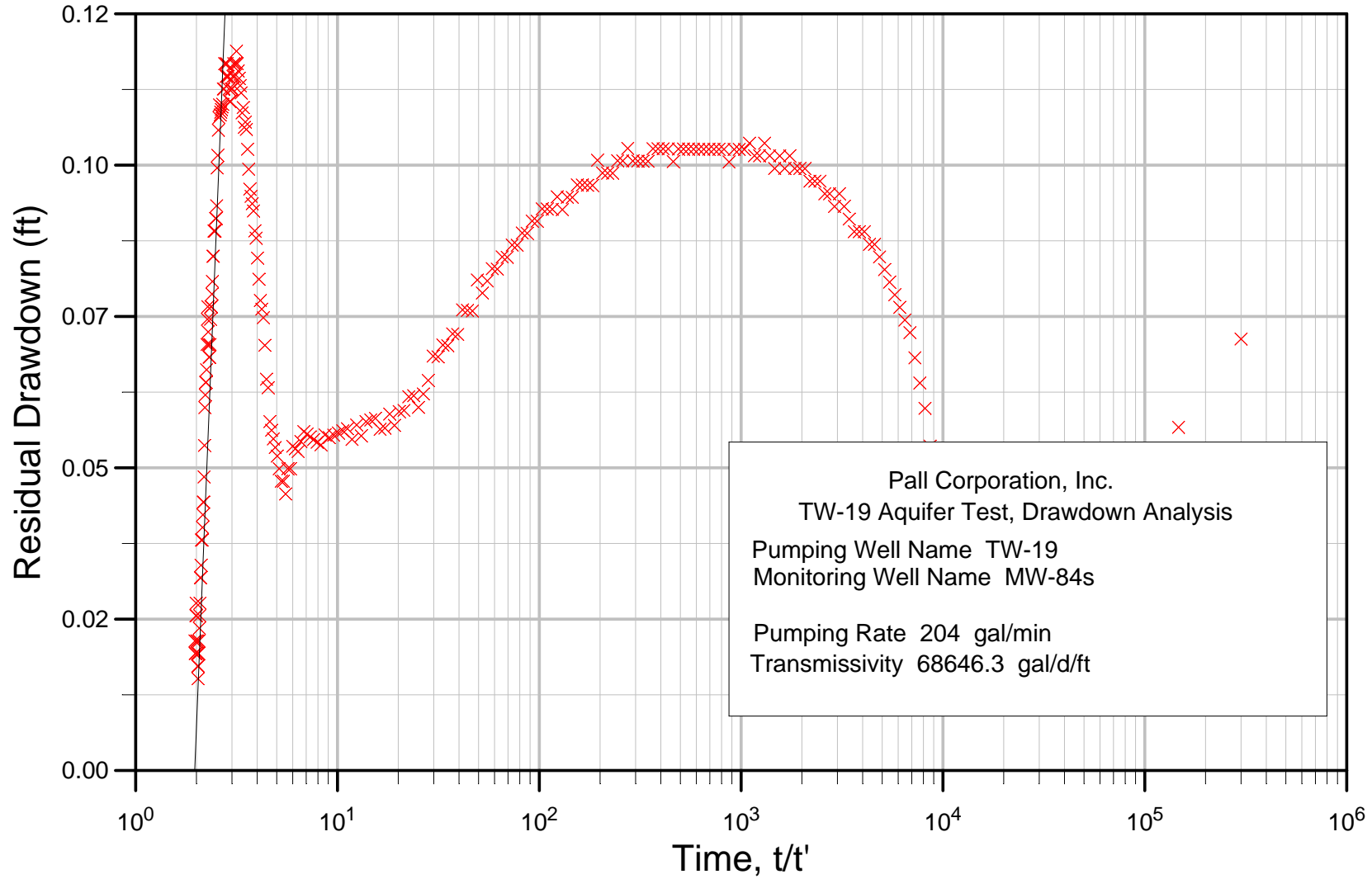
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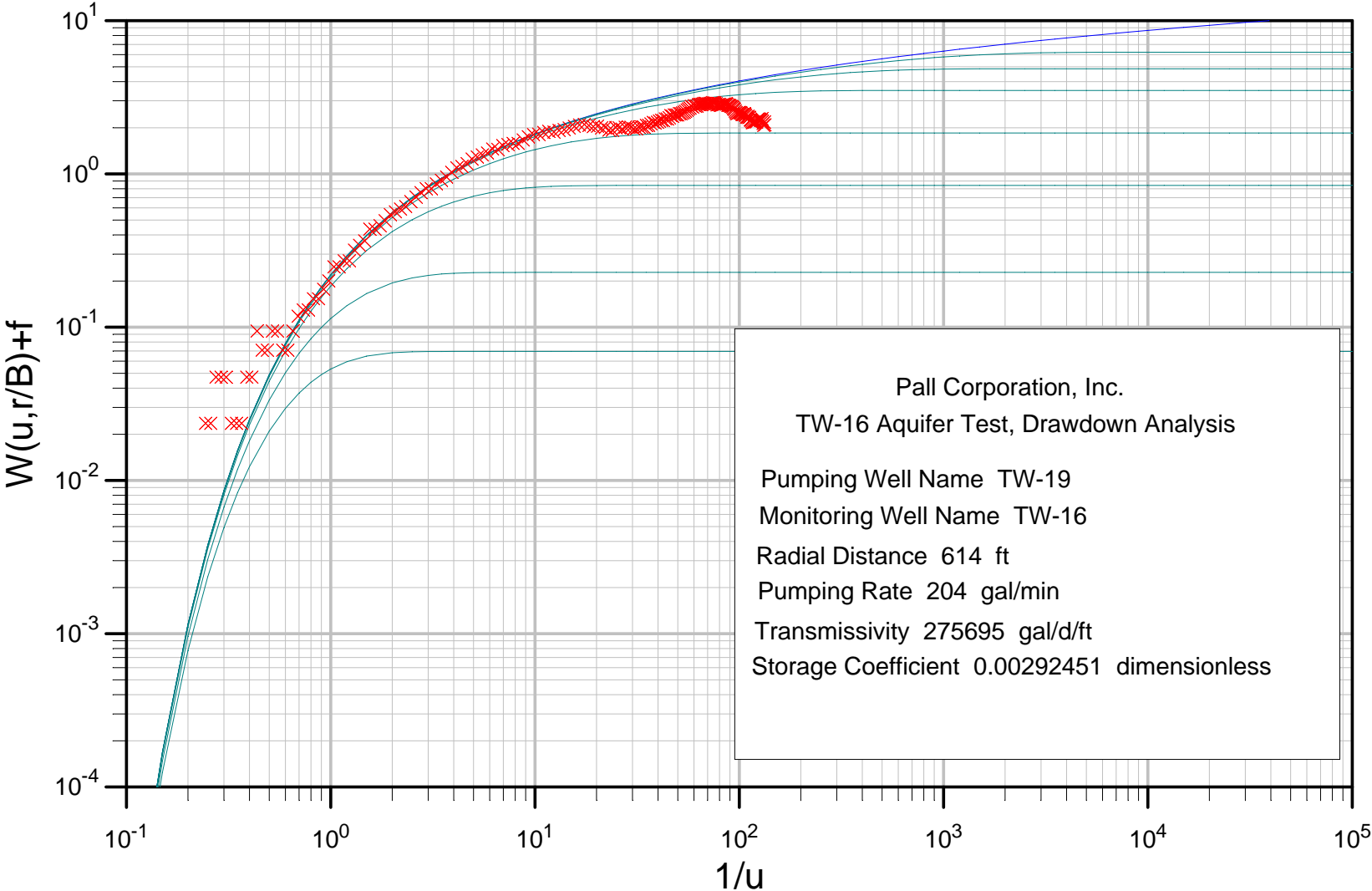
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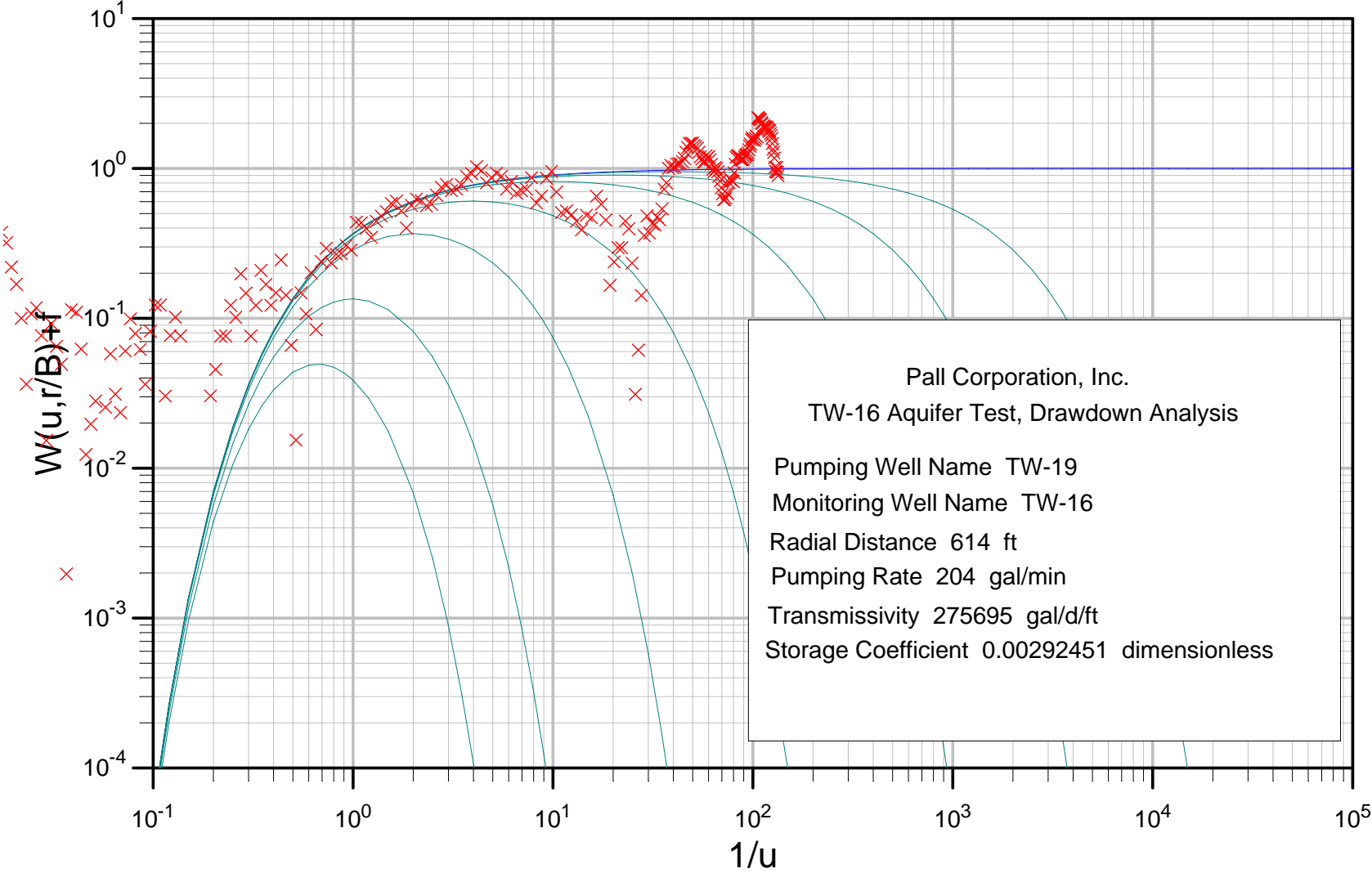
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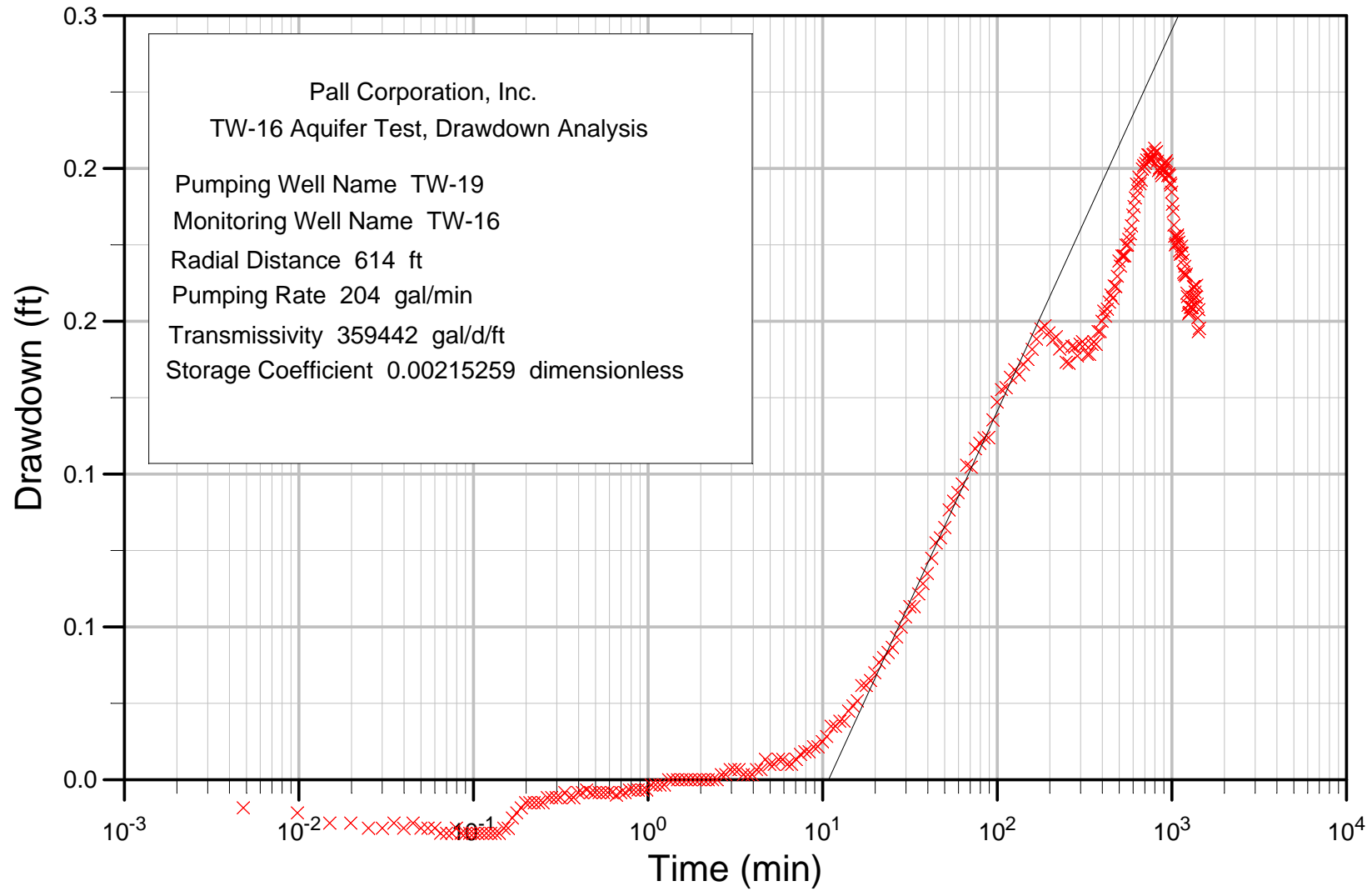
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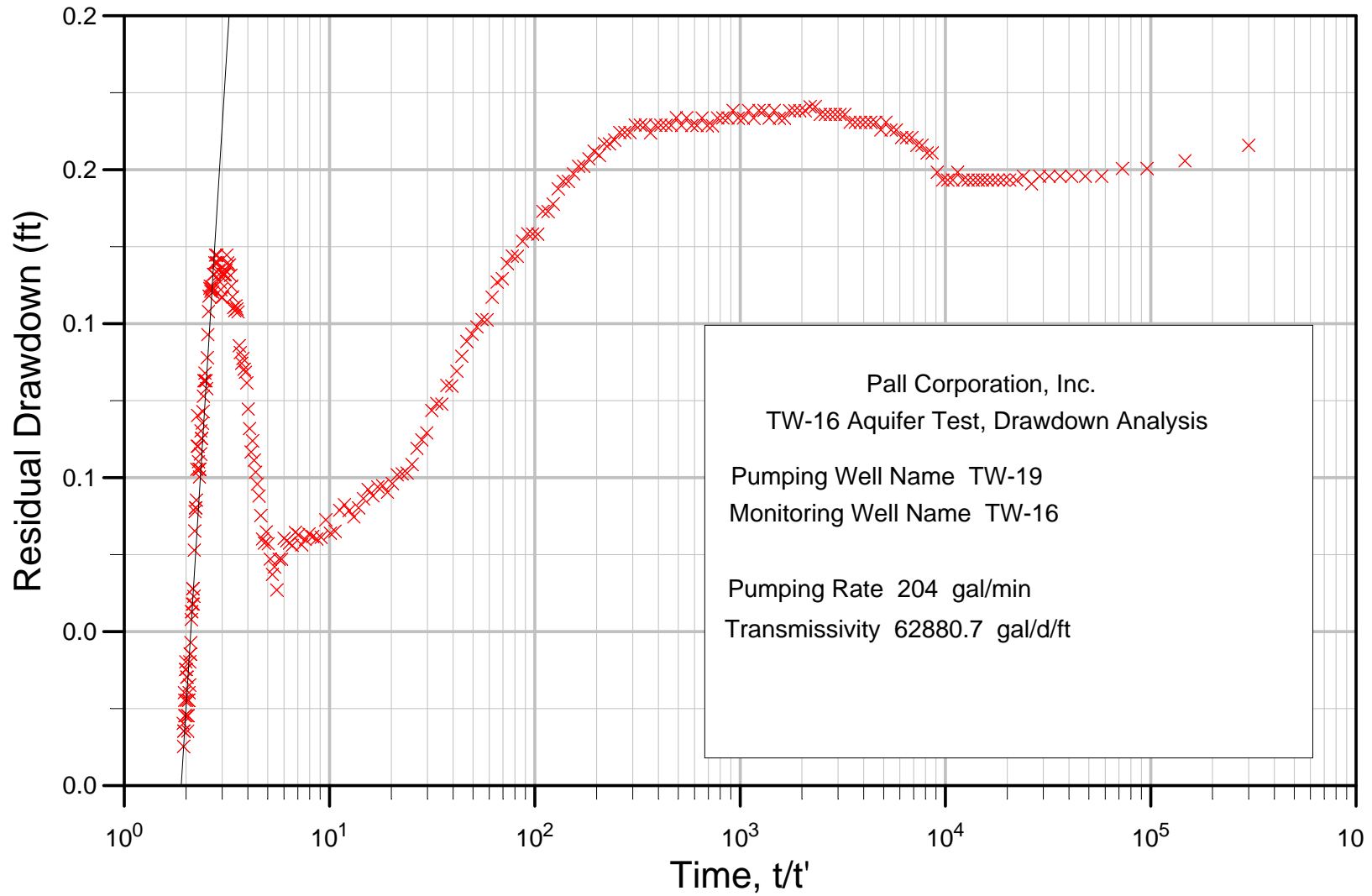
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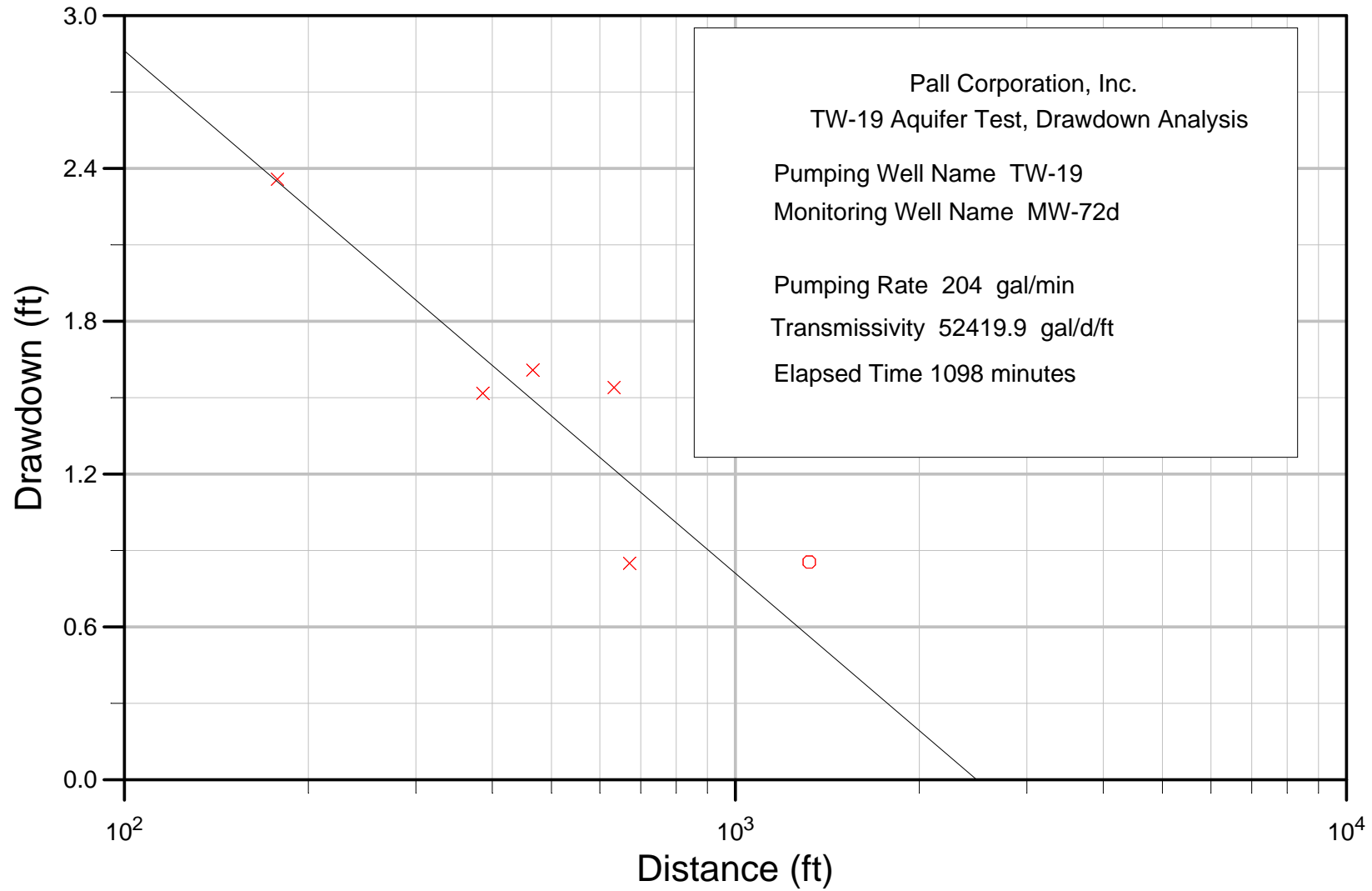
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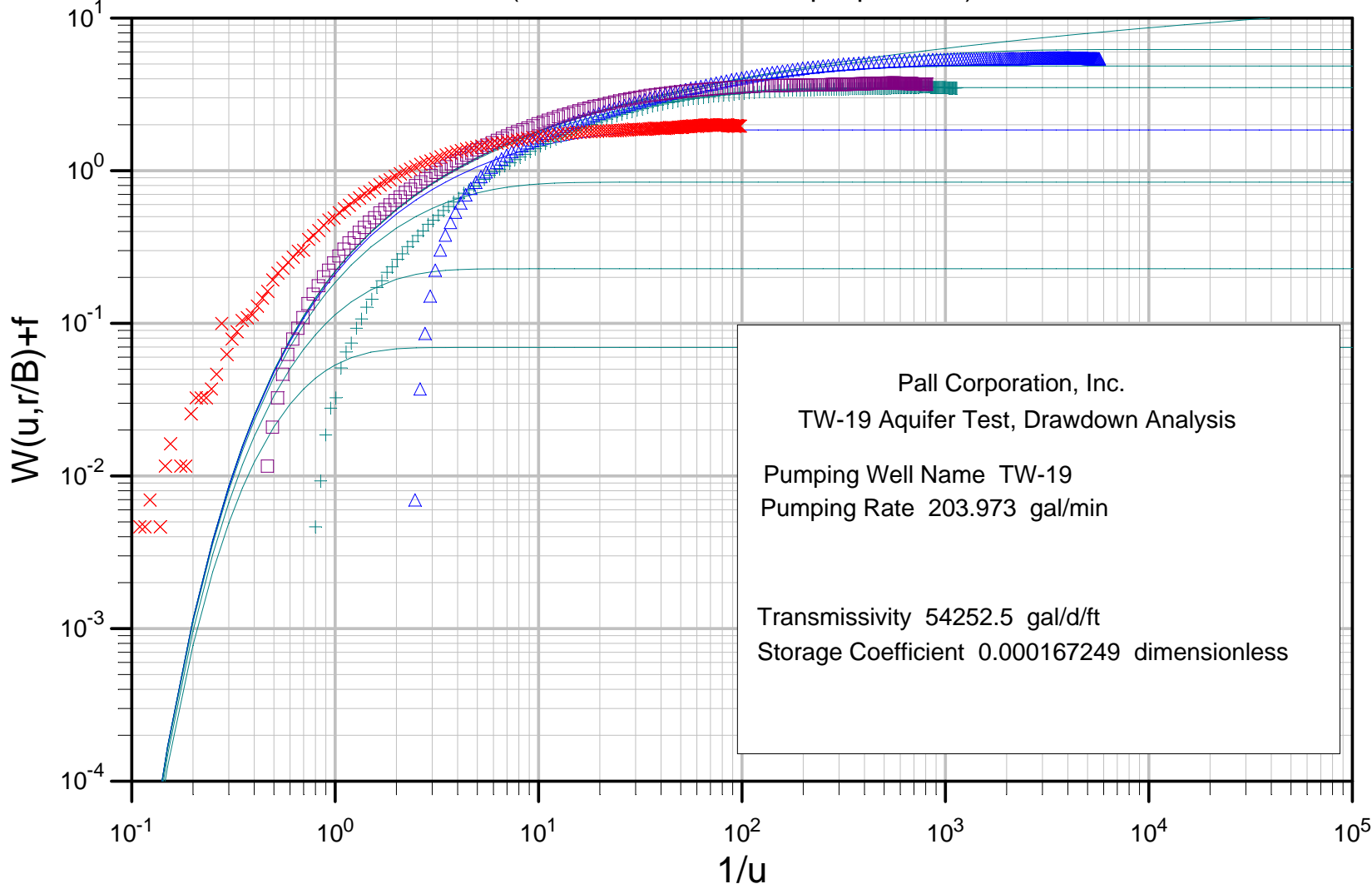
Theis Recovery



Thiem (Distance-Drawdown)

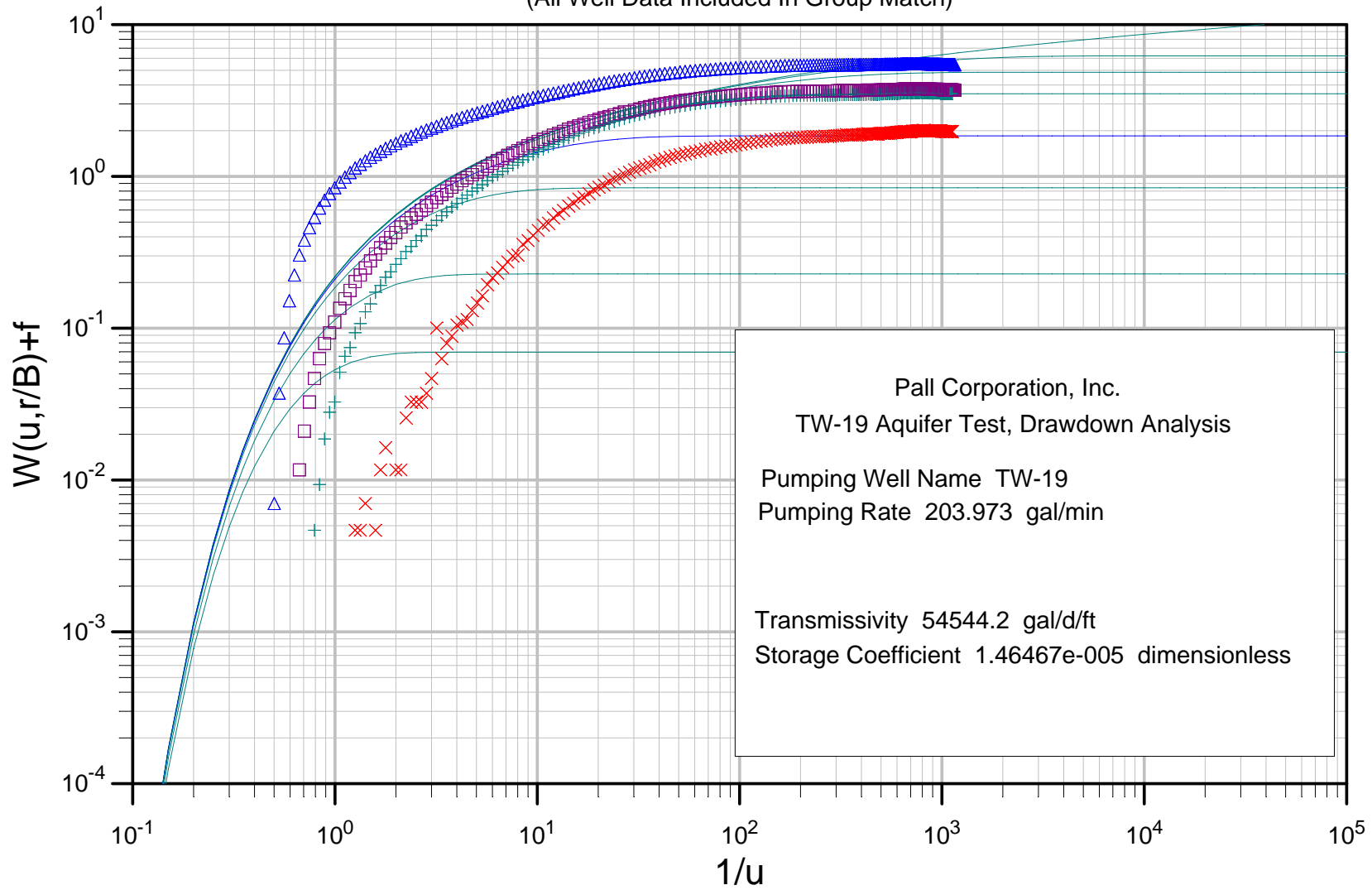


Hantush - Multiple Well Analysis (MW-72d, MW-79, MW-85, and MW-88)
(Individual Wells - Group Optimized)

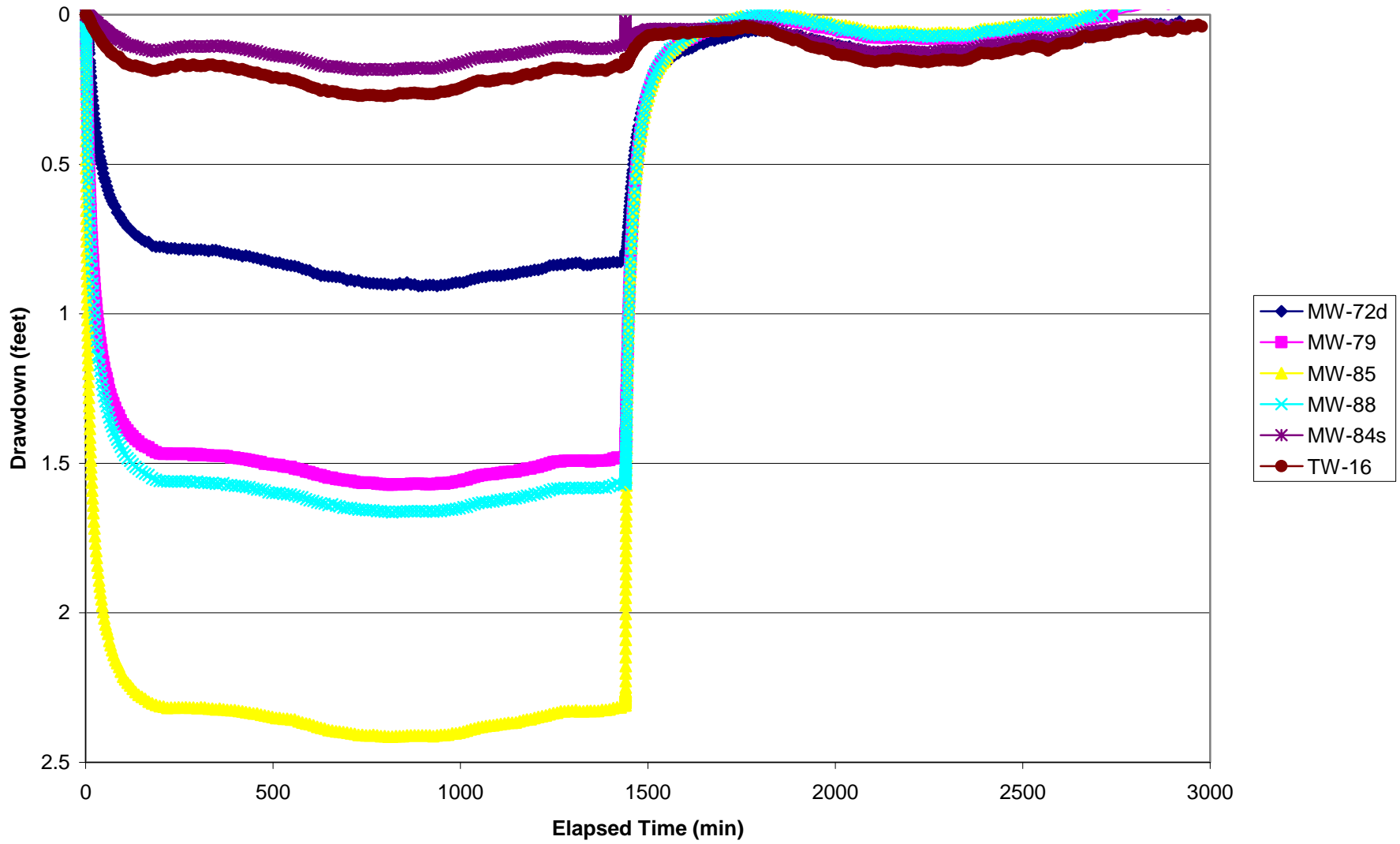


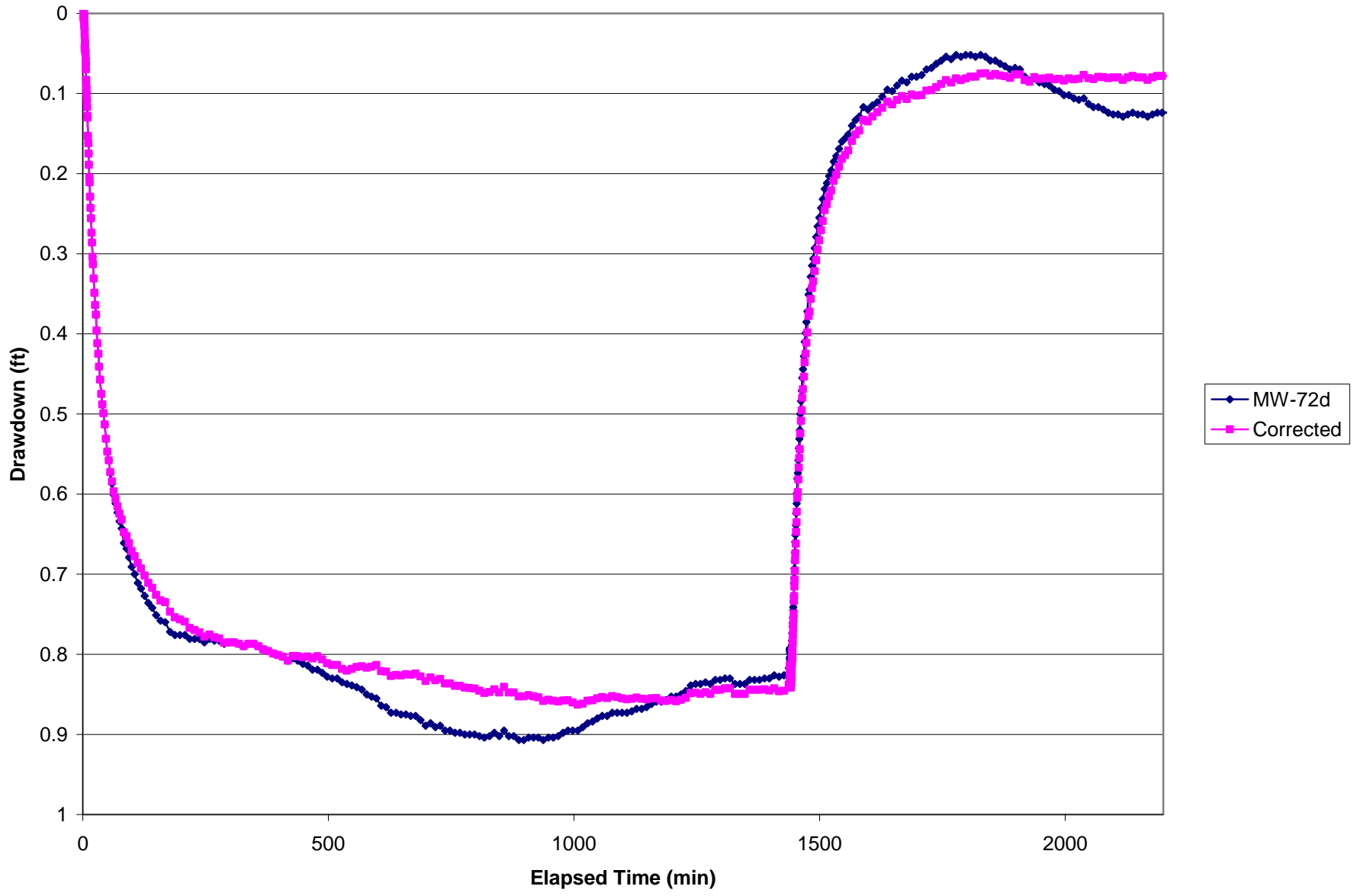
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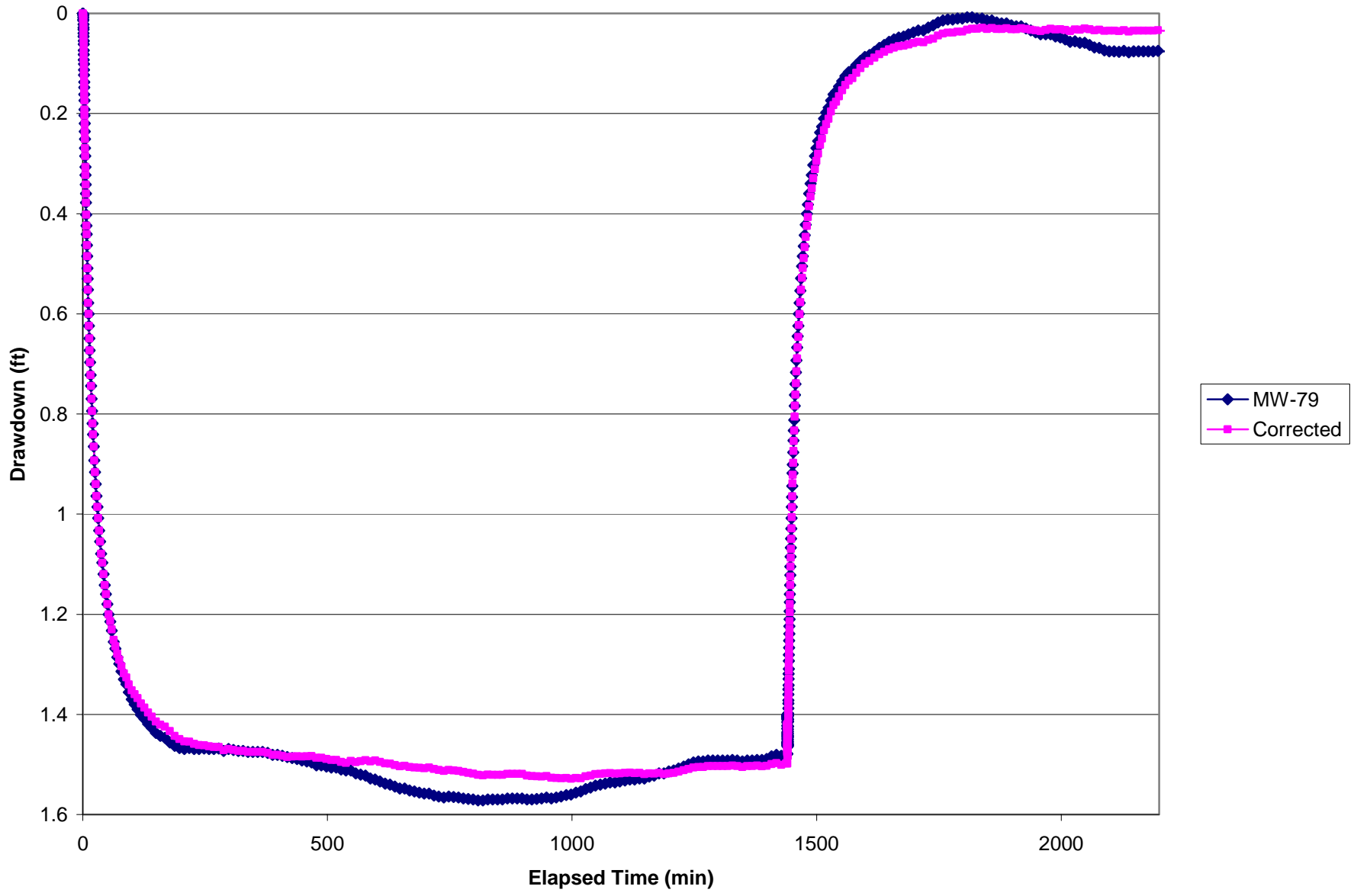
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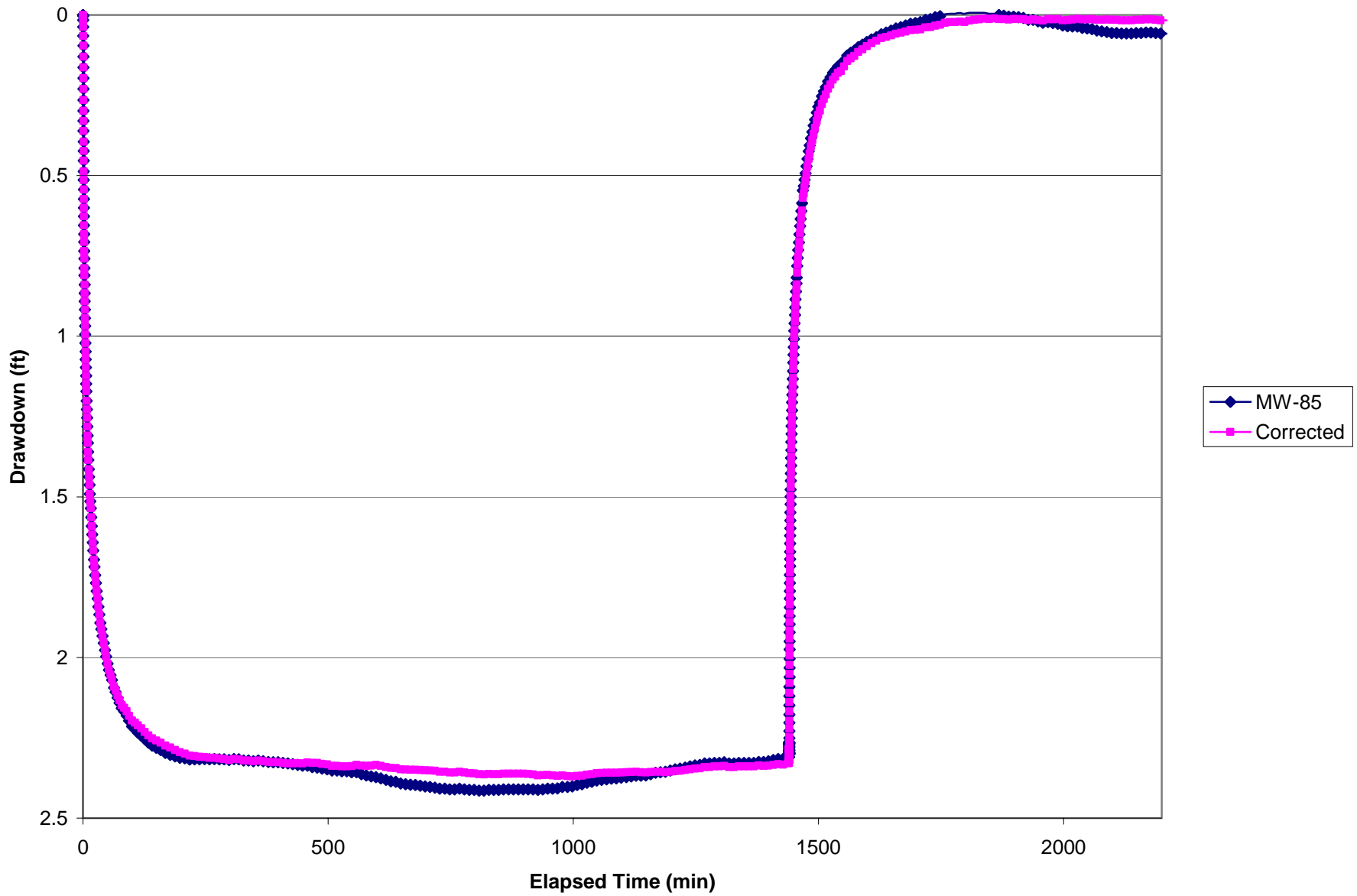


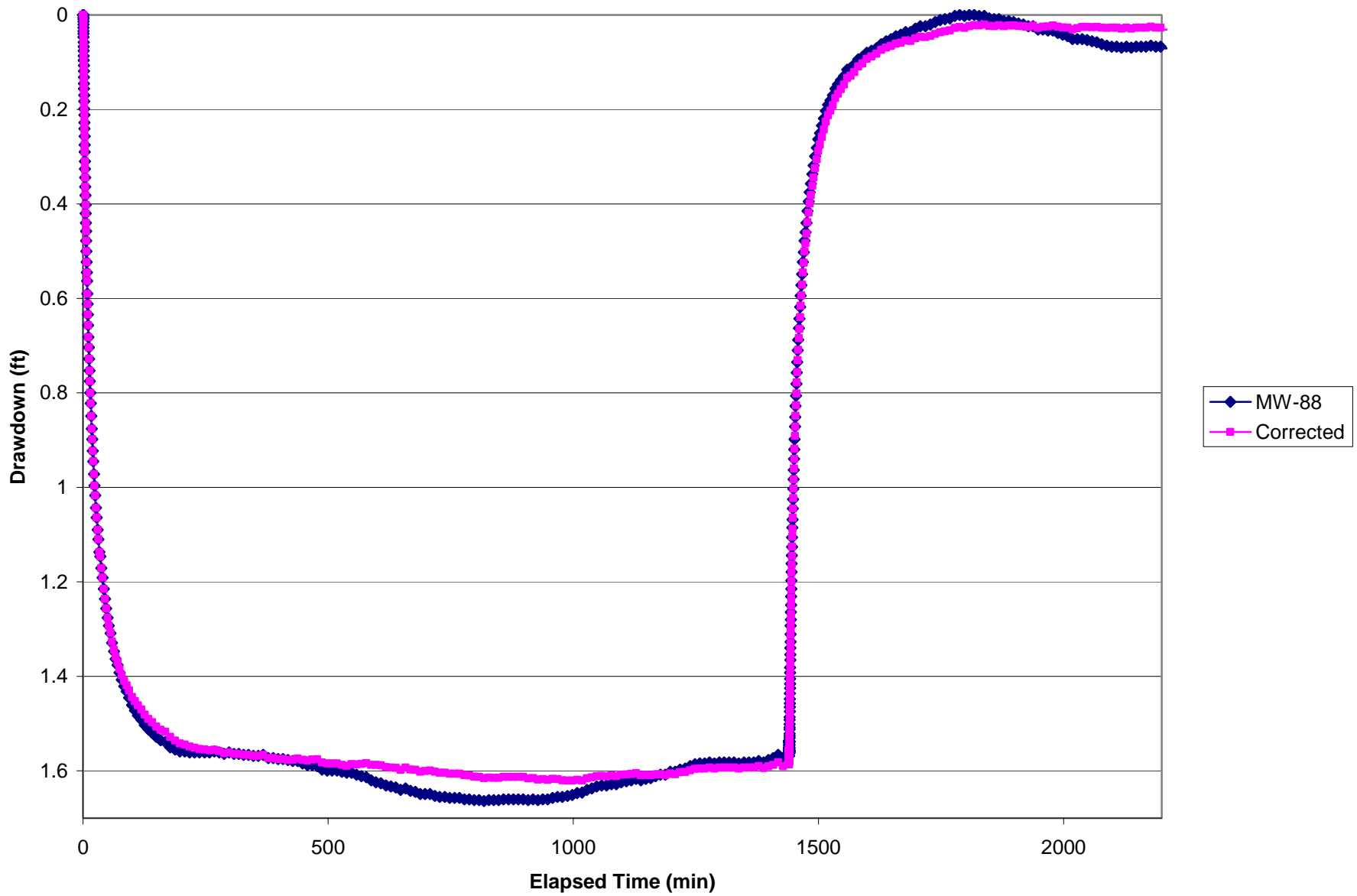
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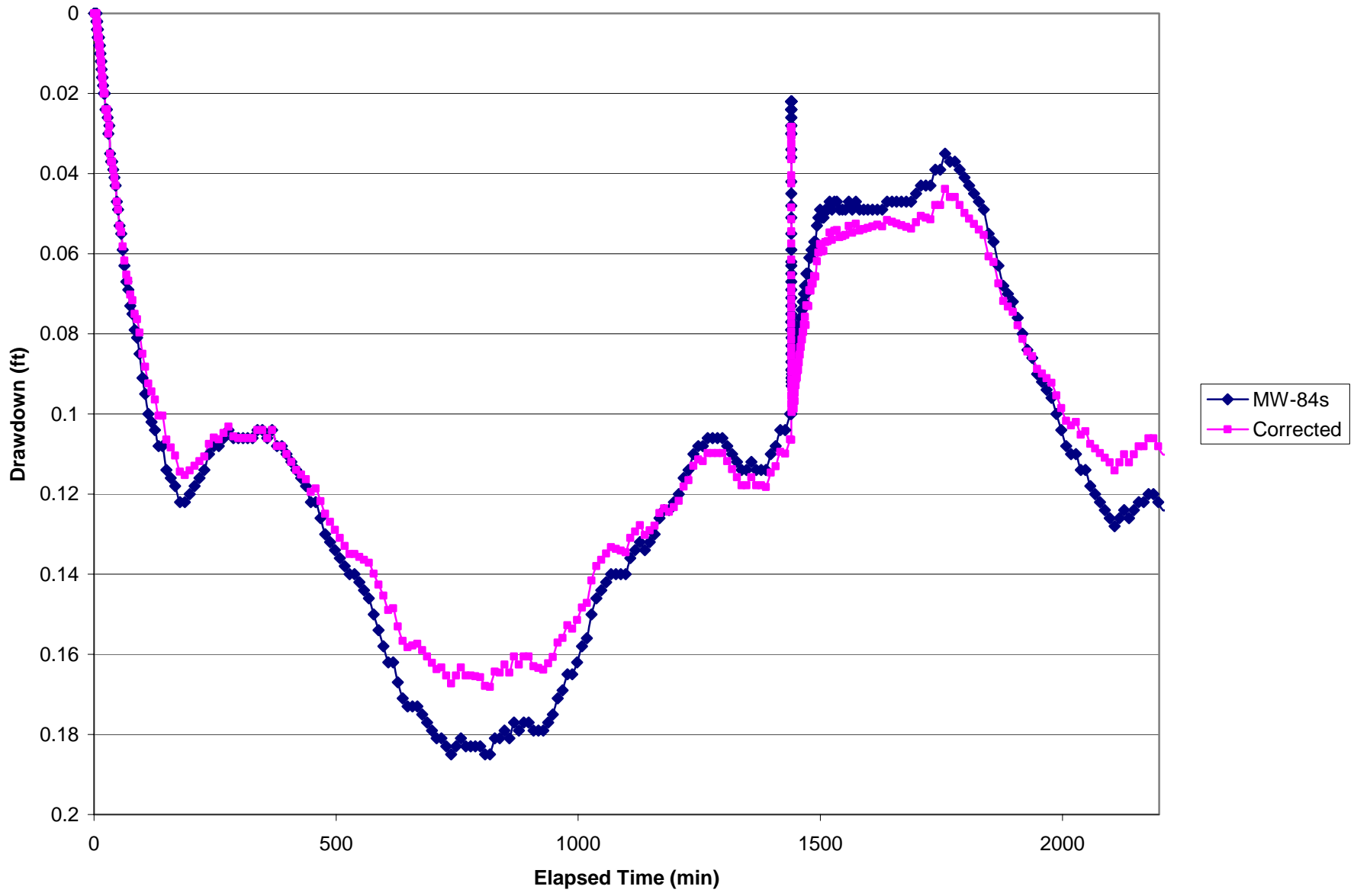












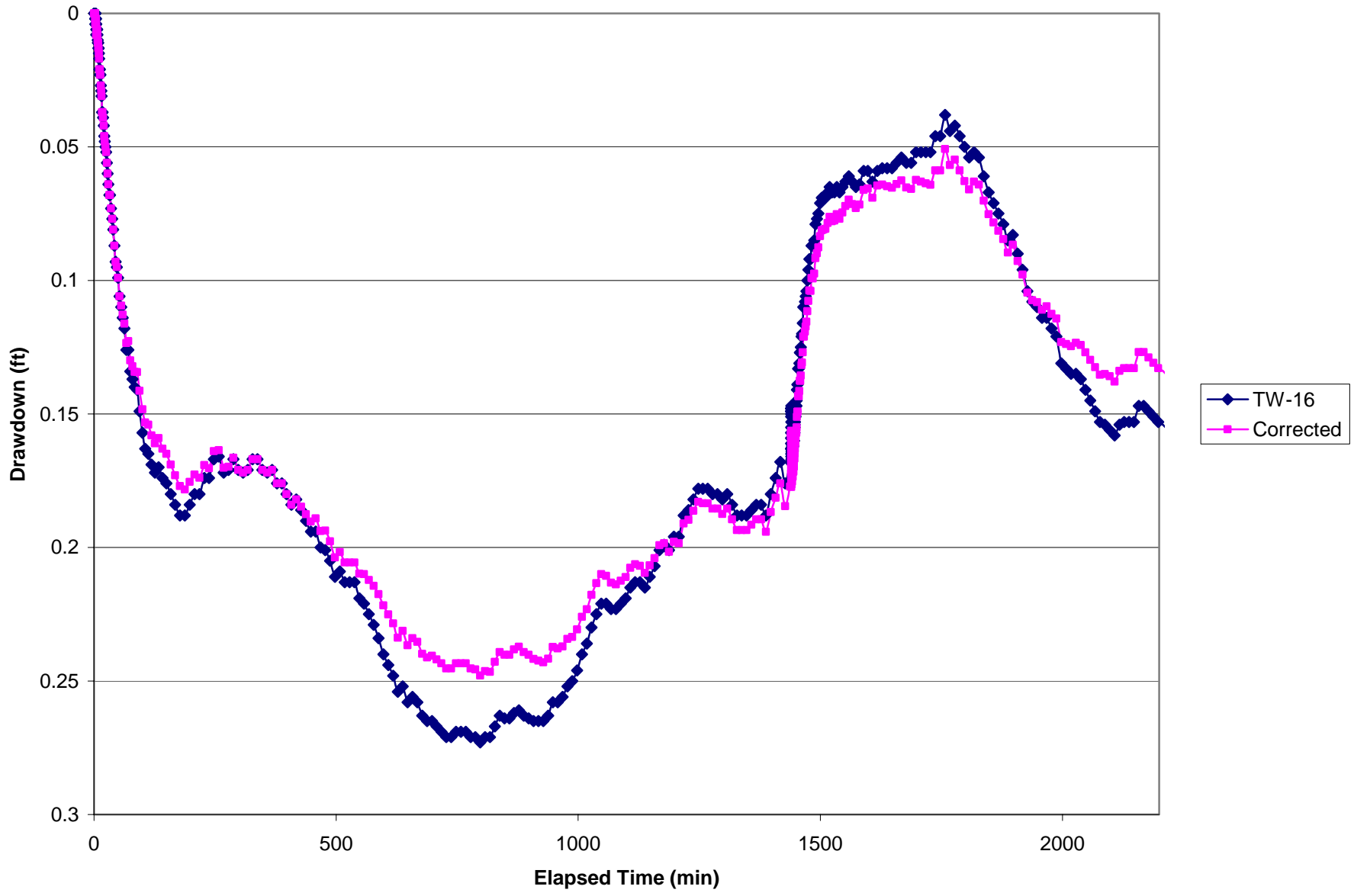


Table 4 – Summary of Aquifer Coefficients

TW-19 Aquifer Test

Pall Life Sciences, Ann Arbor, Michigan

<i>Method:</i>	Hantush Confined Partial Penetration		Cooper-Jacob Straight-Line Method		Theis Recovery	
	T	S	T	S	T	S
MW-72d	56,129	8.17E-05	87,649	6.76E-05	101,540	NA
MW-79	49,293	2.71E-04	58,315	2.16E-04	60,649	NA
MW-85	45,684	1.52E-04	52,273	1.77E-04	53,712	NA
MW-88	44,750	1.37E-04	60,903	1.08E-04	60,284	NA
MW-84s	102,747	9.49E-04	484,293	3.87E-03	68,646	NA
TW-16	275,695	2.92E-03	359,442	2.15E-03	62,881	NA
Multiple Well Analysis Using Group Match Data	54,544	1.46E-05				
Multiple Well Analysis with Individual Wells Group Optimized	54,253	1.60E-04				
Thiem Distance-Drawdown	52,420	NA				
Average	51,010	1.36E-04			58,215	

NA = Not Applicable

T = Transmissivity (gpd/ft)

S = Storativity (dimensionless)

Results are not considered valid since wells appear to be in different aquifer or the method assumptions are violated, but results are provided for comparison purposes.