

**PENNSYLVANIA-AMERICAN WATER COMPANY**

**2017 GENERAL BASE RATE CASE**

**R-2017-2595853**

**EXHIBITS NO. 11-G, 11-H, 11-I**

**DEPRECIATION STUDY**

**SCRANTON WASTEWATER OPERATIONS**

**AS OF DECEMBER 31, 2016, 2017, 2018**

Exhibit No. 11-G  
Witness: J. J. Spanos

**PENNSYLVANIA-AMERICAN WATER COMPANY**

**HERSHEY, PENNSYLVANIA**

**SCRANTON WASTEWATER OPERATIONS**

**2016 DEPRECIATION STUDY**

**CALCULATED ANNUAL DEPRECIATION ACCRUALS  
RELATED TO WASTEWATER PLANT  
AS OF DECEMBER 31, 2016**

*Prepared by:*



*Excellence Delivered As Promised*

Exhibit No. 11-G  
Witness: J. J. Spanos

PENNSYLVANIA-AMERICAN WATER COMPANY

Hershey, Pennsylvania

SCRANTON WASTEWATER OPERATIONS

2016 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS  
RELATED TO WASTEWATER PLANT  
AS OF DECEMBER 31, 2016

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania



*Excellence Delivered As Promised*

April 21, 2017

Pennsylvania-American Water Company  
800 West Hersheypark Drive  
Hershey, PA 17033

Attention Mr. John R. Cox  
Manager of Rates and Regulations

Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to wastewater plant as of December 31, 2016. Summaries of the original cost, annual accruals and the book depreciation reserve are presented in Tables 1 and 2, beginning on page I-3 of the attached report.

A description of the methods and procedures upon which the study was based, as well as support for the service life estimates, is set forth in a companion report "2017 Depreciation Study - Calculated Annual Depreciation Accruals Related to Wastewater Plant as of December 31, 2017".

Respectfully submitted,

GANNETT FLEMING VALUATION  
AND RATE CONSULTANTS, LLC

A handwritten signature in black ink that reads 'John J. Spanos'.

JOHN J. SPANOS  
Sr. Vice President

JJS:mlw

062027.400

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**PART I. RESULTS OF STUDY**

**PENNSYLVANIA-AMERICAN WATER COMPANY**

**SCRANTON WASTEWATER OPERATIONS**

**DEPRECIATION STUDY**

**PART I. RESULTS OF STUDY**

**SUMMARY OF RESULTS**

Table 1 presents the development of net original cost used in the study. The net original cost is the original cost of wastewater plant less advances and contributions. The results of the depreciation study are summarized in Table 2, which sets forth the book reserve and the calculated annual depreciation related to net original cost as of December 31, 2016, and the annual amortization of net negative salvage.

**DETAILED TABULATIONS OF DEPRECIATION CALCULATIONS**

The supporting data for the depreciation calculations are presented in account sequence in the section beginning on page II-2. The original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life and annual accrual are shown for each vintage of each account or subaccount.

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

TABLE 1. DEVELOPMENT OF NET ORIGINAL COST AS OF DECEMBER 31, 2016

DEPRECIABLE GROUP (1)	ORIGINAL COST AS OF DECEMBER 31, 2016 (2)	CUSTOMER ADVANCES (3)	CONTRIBUTIONS IN AID OF CONSTRUCTION (4)	EXCLUDED PROPERTY (5)	NET ORIGINAL COST AS OF DECEMBER 31, 2016 (6)
<b>DEPRECIABLE PLANT</b>					
354.30 STRUCTURES AND IMPROVEMENTS - SPP	3,907,437.35				3,907,437.35
354.40 STRUCTURES AND IMPROVEMENTS - TDP	50,981,238.73		2,500,000.00		48,481,238.73
360.10 COLLECTION SEWERS - FORCE MAINS	239,206.24				239,206.24
361.10 COLLECTION SEWERS - GRAVITY MAINS	64,071,670.62		8,113,082.47		55,958,588.15
361.20 MANHOLES	13,038,596.84				13,038,596.84
363.00 SERVICES	9,592,628.52		841,466.15		8,751,162.37
364.00 FLOW MEASURING DEVICES	401,003.88				401,003.88
371.00 PUMPING EQUIPMENT	2,569,862.70				2,569,862.70
380.00 TREATMENT EQUIPMENT	14,618,708.29				14,618,708.29
389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT	4,142,753.27				4,142,753.27
390.00 OFFICE FURNITURE AND EQUIPMENT	1,117,338.21				1,117,338.21
391.00 TRANSPORTATION EQUIPMENT	3,394,097.17				3,394,097.17
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	514,681.58				514,681.58
394.00 LABORATORY EQUIPMENT	108,802.28				108,802.28
395.00 POWER OPERATED EQUIPMENT	665,081.72				665,081.72
<b>TOTAL DEPRECIABLE PLANT</b>	<b>169,363,107.40</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>157,908,558.78</b>
<b>NONDEPRECIABLE PLANT</b>					
353.20 LAND AND LAND RIGHTS - COLLECTION	80,662.60				80,662.60
353.30 LAND AND LAND RIGHTS - SPP	43,570.00				43,570.00
353.40 LAND AND LAND RIGHTS - TDP	110,019.50				110,019.50
<b>TOTAL NONDEPRECIABLE PLANT</b>	<b>234,252.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>234,252.10</b>
<b>TOTAL WASTEWATER PLANT IN SERVICE</b>	<b>169,597,359.50</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>158,142,810.88</b>



PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 2. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK RESERVE, AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WASTEWATER PLANT AS OF DECEMBER 31, 2016

	(1) DEPRECIABLE GROUP	(2) SURVIVOR CURVE	(3) ORIGINAL COST AS OF DECEMBER 31, 2016	(4) BOOK RESERVE	(5) FUTURE ACCRUALS	(6) CALCULATED ANNUAL ACCRUAL		(8) COMPOSITE REMAINING LIFE
						AMOUNT	RATE (7)=(6)/(3)	
<b>DEPRECIABLE PLANT</b>								
354.30	STRUCTURES AND IMPROVEMENTS - SPP	50-R2.5	3,907,437.35	1,443,116	2,464,321	61,712	1.58	39.9
354.40	STRUCTURES AND IMPROVEMENTS - TDP	65-R2	48,481,238.74	10,929,899	37,551,340	675,582	1.39	55.6
360.10	COLLECTION SEWERS - FORCE MAINS	70-S2	239,206.24	150,952	88,254	2,847	1.19	31.0
361.10	COLLECTION SEWERS - GRAVITY MAINS	70-R2.5	55,958,588.15	24,199,271	31,759,317	691,294	1.24	45.9
361.20	MANHOLES	50-S1.5	13,038,596.84	7,154,174	5,884,423	217,971	1.67	27.0
363.00	SERVICES	38-R3	8,751,162.37	4,533,421	4,217,741	319,563	3.65	13.2
364.00	FLOW MEASURING DEVICES	20-L3	401,003.88	54,243	346,761	19,993	4.99	17.3
371.00	PUMPING EQUIPMENT	40-S0	2,569,862.70	574,319	1,995,544	55,240	2.15	36.1
380.00	TREATMENT EQUIPMENT	45-R2	14,618,708.29	4,964,183	9,654,525	272,521	1.86	35.4
389.10	OTHER PLANT AND MISCELLANEOUS EQUIPMENT	20-S2.5	4,142,753.27	579,985	3,562,768	215,795	5.21	16.5
390.00	OFFICE FURNITURE AND EQUIPMENT	20-SQ	1,117,338.21	136,653	980,685	55,617	4.98	17.6
391.00	TRANSPORTATION EQUIPMENT	15-L4	3,394,097.17	1,838,747	1,555,350	140,085	4.13	11.1
393.00	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	514,681.58	158,463	356,219	25,735	5.00	13.8
394.00	LABORATORY EQUIPMENT	15-SQ	108,802.28	46,412	62,390	7,253	6.67	8.6
395.00	POWER OPERATED EQUIPMENT	16-L2.5	665,081.72	415,322	249,760	21,988	3.31	11.4
	<b>TOTAL DEPRECIABLE PLANT</b>		<b>157,908,558.79</b>	<b>57,179,160</b>	<b>100,729,398</b>	<b>2,783,196</b>	<b>1.76</b>	
<b>NONDEPRECIABLE PLANT</b>								
353.20	LAND AND LAND RIGHTS - COLLECTION		80,662.60					
353.30	LAND AND LAND RIGHTS - SPP		43,570.00					
353.40	LAND AND LAND RIGHTS - TDP		110,019.50					
	<b>TOTAL NONDEPRECIABLE PLANT</b>		<b>234,252.10</b>					
	<b>TOTAL WASTEWATER PLANT IN SERVICE</b>		<b>158,142,810.89</b>	<b>57,179,160</b>	<b>100,729,398</b>	<b>2,783,196</b>		

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**PART II. DETAILED DEPRECIATION CALCULATIONS**

**CUMULATIVE DEPRECIATED ORIGINAL COST**

**PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS**

**CUMULATIVE DEPRECIATED ORIGINAL COST BY YEAR INSTALLED  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016**

<b>YEAR INST (1)</b>	<b>ORIGINAL COST (2)</b>	<b>ACCRUED DEPRECIATION (3)</b>	<b>AMOUNT (2)-(3) (4)</b>	<b>CUMULATIVE AMOUNT (5)</b>	<b>PCT OF COL 4 TOTAL (6)</b>
1918	3,748,247	3,719,625	28,622	28,622	0.03
1938	1,297,908	1,210,779	87,129	115,750	0.11
1945	294,748	260,355	34,393	150,144	0.14
1950	1,164,281	976,859	187,422	337,565	0.31
1955	602,612	480,984	121,628	459,193	0.43
1960	1,142,663	856,809	285,854	745,047	0.69
1965	851,845	602,409	249,436	994,483	0.92
1970	1,006,555	661,388	345,167	1,339,649	1.24
1972	31,179,759	20,433,694	10,746,065	12,085,714	11.22
1973	943,170	616,668	326,502	12,412,217	11.53
1974	748,753	474,247	274,506	12,686,723	11.78
1975	2,923,115	1,771,075	1,152,040	13,838,763	12.85
1977	561,119	340,961	220,158	14,058,921	13.06
1978	1,486,622	886,865	599,757	14,658,678	13.61
1979	1,554,018	908,833	645,185	15,303,862	14.21
1980	1,723,106	966,526	756,580	16,060,442	14.92
1981	1,211,707	680,820	530,887	16,591,329	15.41
1982	933,875	515,506	418,369	17,009,698	15.80
1983	669,743	359,813	309,930	17,319,628	16.08
1984	1,824,375	1,220,611	603,764	17,923,392	16.65
1985	3,609,716	1,801,856	1,807,860	19,731,251	18.32
1986	1,471,816	751,717	720,099	20,451,350	18.99
1987	2,811,471	1,734,710	1,076,761	21,528,111	19.99
1988	1,365,080	843,222	521,858	22,049,969	20.48
1989	4,136,774	1,861,730	2,275,044	24,325,013	22.59
1990	4,740,184	2,058,481	2,681,703	27,006,716	25.08
1991	1,989,164	847,845	1,141,319	28,148,035	26.14
1992	3,106,631	1,226,702	1,879,929	30,027,964	27.89
1993	469,067	173,267	295,800	30,323,764	28.16
1994	547,179	254,292	292,887	30,616,651	28.43
1995	290,757	143,647	147,110	30,763,761	28.57
1996	488,141	200,009	288,132	31,051,893	28.84
1997	535,815	220,062	315,753	31,367,646	29.13
1998	2,848,204	967,662	1,880,542	33,248,189	30.88
1999	1,101,043	322,136	778,907	34,027,096	31.60
2000	315,888	77,636	238,252	34,265,348	31.82
2001	7,500	7,500	0	34,265,348	31.82
2002	209,592	119,459	90,133	34,355,481	31.91
2003	2,532,877	588,476	1,944,401	36,299,882	33.71
2004	7,824,134	2,306,605	5,517,529	41,817,410	38.84
2005	2,497,265	528,511	1,968,754	43,786,164	40.66
2006	6,108,827	1,804,300	4,304,527	48,090,691	44.66
2007	1,314,252	310,775	1,003,477	49,094,168	45.59
2008	799,792	363,220	436,572	49,530,740	46.00
2009	1,310,576	734,077	576,499	50,107,239	46.54
2010	10,245,978	1,498,566	8,747,412	58,854,651	54.66
2011	1,181,846	161,252	1,020,594	59,875,245	55.61
2012	1,056,949	263,393	793,556	60,668,801	56.34
2013	5,434,067	892,830	4,541,237	65,210,038	60.56
2014	918,240	67,801	850,439	66,060,477	61.35
2015	6,307,981	249,333	6,058,648	72,119,125	66.98
2016	35,918,083	361,286	35,556,797	107,675,922	100.00
SUBTOTAL	169,363,107	61,687,185	107,675,922		
UNDATED	(11,454,549)	(4,508,025)	(6,946,524)		
NONDEPRECIABLE	234,252	0	234,252		
TOTAL	158,142,811	57,179,160	100,963,651		

**NET UTILITY PLANT IN SERVICE**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.30 STRUCTURES AND IMPROVEMENTS - SPP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1972	575,666.97	406,075	559,612	16,055	14.73	1,090
2006	3,300,035.38	640,207	882,271	2,417,764	40.30	59,994
2015	31,735.00	895	1,233	30,502	48.59	628
	3,907,437.35	1,047,177	1,443,116	2,464,321		61,712
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						39.9 1.58

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.40 STRUCTURES AND IMPROVEMENTS - TDP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R2						
NET SALVAGE PERCENT.. 0						
1972	12,952,506.78	7,052,122	8,930,118	4,022,389	29.61	135,846
1985	1,267,451.78	512,051	648,411	619,041	38.74	15,979
2003	2,501,831.45	456,884	578,553	1,923,278	53.13	36,199
2004	240,403.35	40,720	51,564	188,839	53.99	3,498
2009	7,215.00	743	941	6,274	58.31	108
2010	8,406,838.33	751,403	951,503	7,455,335	59.19	125,956
2011	9,525.00	722	914	8,611	60.07	143
2012	23,690.00	1,472	1,864	21,826	60.96	358
2013	8,325.00	403	510	7,815	61.85	126
2014	188,545.95	6,527	8,265	180,281	62.75	2,873
2015	5,556,898.70	116,250	147,208	5,409,691	63.64	85,005
2016	19,818,007.40	137,141	173,663	19,644,344	64.55	304,328
9999	2,500,000.00-	445,087-	563,615-	1,936,385-		34,837-
	48,481,238.74	8,631,351	10,929,899	37,551,340		675,582
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						55.6 1.39

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 360.10 COLLECTION SEWERS - FORCE MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2						
NET SALVAGE PERCENT.. 0						
1972	234,615.90	131,652	148,989	85,627	30.72	2,787
1989	4,590.34	1,735	1,963	2,627	43.54	60
	239,206.24	133,387	150,952	88,254		2,847

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 31.0 1.19



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
1918	3,528,728.52	3,139,051	3,500,106	28,623	7.73	3,703
1938	890,094.71	721,359	804,330	85,765	13.27	6,463
1945	231,061.60	178,081	198,564	32,498	16.05	2,025
1950	1,007,565.18	742,576	827,987	179,578	18.41	9,754
1955	470,969.16	329,207	367,073	103,896	21.07	4,931
1960	941,673.30	618,548	689,694	251,979	24.02	10,490
1965	657,579.26	401,873	448,097	209,482	27.22	7,696
1970	768,240.18	431,974	481,660	286,580	30.64	9,353
1972	15,431,062.10	8,363,636	9,325,625	6,105,437	32.06	190,438
1973	525,768.41	279,483	311,629	214,139	32.79	6,531
1974	463,886.33	241,750	269,556	194,330	33.52	5,797
1975	2,161,305.40	1,103,498	1,230,423	930,882	34.26	27,171
1977	318,370.33	155,728	173,640	144,730	35.76	4,047
1978	839,485.42	401,517	447,700	391,785	36.52	10,728
1979	876,680.05	409,664	456,784	419,896	37.29	11,260
1980	1,112,373.45	507,565	565,945	546,428	38.06	14,357
1981	673,076.97	299,519	333,970	339,107	38.85	8,729
1982	502,620.38	218,067	243,149	259,471	39.63	6,547
1983	369,740.90	156,190	174,155	195,586	40.43	4,838
1984	418,254.64	171,903	191,675	226,580	41.23	5,496
1985	1,592,194.90	636,193	709,368	882,827	42.03	21,005
1986	749,889.52	290,852	324,306	425,584	42.85	9,932
1987	695,420.29	261,575	291,662	403,758	43.67	9,246
1988	278,437.01	101,471	113,142	165,295	44.49	3,715
1989	2,461,326.67	867,790	967,604	1,493,723	45.32	32,959
1990	2,878,035.49	980,173	1,092,913	1,785,122	46.16	38,672
1991	1,115,283.75	366,449	408,598	706,686	47.00	15,036
1992	2,127,972.51	673,354	750,804	1,377,169	47.85	28,781
1993	362,246.78	110,228	122,906	239,341	48.70	4,915
1994	161,692.28	47,214	52,645	109,047	49.56	2,200
1995	44,510.94	12,450	13,882	30,629	50.42	607
1996	175,003.17	46,777	52,157	122,846	51.29	2,395
1997	222,510.56	56,709	63,232	159,279	52.16	3,054
1998	1,433,061.84	347,217	387,154	1,045,908	53.04	19,719
1999	727,422.31	166,994	186,202	541,220	53.93	10,036
2000	303,806.51	65,926	73,509	230,298	54.81	4,202
2002	114,591.98	21,936	24,459	90,133	56.60	1,592
2003	6,750.00	1,205	1,344	5,406	57.50	94
2004	1,752,380.47	290,142	323,514	1,428,866	58.41	24,463
2005	1,351,223.10	206,345	230,079	1,121,144	59.31	18,903
2006	1,135,635.89	158,501	176,732	958,904	60.23	15,921

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
2007	631,416.88	79,918	89,110	542,307	61.14	8,870
2008	185,816.56	21,077	23,501	162,316	62.06	2,615
2010	199,971.97	17,398	19,399	180,573	63.91	2,825
2011	633,959.14	46,729	52,104	581,855	64.84	8,974
2012	206,007.47	12,449	13,881	192,126	65.77	2,921
2013	341,037.44	16,029	17,873	323,164	66.71	4,844
2014	295,644.25	9,966	11,112	284,532	67.64	4,207
2015	16,178.80	328	366	15,813	68.58	231
2016	9,683,705.85	64,978	72,451	9,611,255	69.53	138,232
9999	8,113,082.47-	3,146,579-	3,508,500-	4,604,582-		100,226-
	55,958,588.15	21,702,983	24,199,271	31,759,317		691,294
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						45.9 1.24

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
1918	192,002.76	190,352	192,003			
1938	263,057.70	234,016	261,694	1,364	5.52	247
1945	40,698.28	34,699	38,803	1,895	7.37	257
1950	100,436.85	82,800	92,593	7,844	8.78	893
1955	82,962.76	65,889	73,682	9,281	10.29	902
1960	124,835.20	95,000	106,236	18,599	11.95	1,556
1965	115,835.77	83,911	93,835	22,001	13.78	1,597
1970	131,490.13	89,913	100,547	30,943	15.81	1,957
1972	1,406,333.16	936,899	1,047,708	358,625	16.69	21,487
1973	300,514.18	197,498	220,856	79,658	17.14	4,647
1974	145,131.67	94,016	105,135	39,997	17.61	2,271
1975	428,835.35	273,768	306,147	122,688	18.08	6,786
1977	135,672.33	83,927	93,853	41,819	19.07	2,193
1978	365,240.42	222,212	248,493	116,747	19.58	5,963
1979	376,391.09	225,007	251,619	124,772	20.11	6,204
1980	344,640.29	202,373	226,308	118,332	20.64	5,733
1981	303,876.29	175,094	195,803	108,073	21.19	5,100
1982	241,192.22	136,225	152,337	88,855	21.76	4,083
1983	167,201.76	92,529	103,473	63,729	22.33	2,854
1984	193,153.85	104,612	116,985	76,169	22.92	3,323
1985	425,383.15	225,198	251,833	173,550	23.53	7,376
1986	362,362.31	187,341	209,498	152,864	24.15	6,330
1987	251,003.20	126,606	141,580	109,423	24.78	4,416
1988	96,404.18	47,373	52,976	43,428	25.43	1,708
1989	924,058.02	441,700	493,941	430,117	26.10	16,480
1990	1,029,539.70	478,118	534,666	494,874	26.78	18,479
1991	480,597.06	216,461	242,062	238,535	27.48	8,680
1992	446,706.85	194,854	217,900	228,807	28.19	8,117
1993	106,820.01	45,035	50,361	56,459	28.92	1,952
1994	78,794.97	32,054	35,845	42,950	29.66	1,448
1995	19,032.40	7,453	8,334	10,698	30.42	352
1996	77,786.29	29,248	32,707	45,079	31.20	1,445
1997	99,518.88	35,847	40,087	59,432	31.99	1,858
1998	667,600.22	229,654	256,816	410,784	32.80	12,524
1999	208,276.23	68,231	76,301	131,975	33.62	3,925
2004	334,058.14	80,441	89,955	244,103	37.96	6,431
2005	622,671.32	138,607	155,000	467,671	38.87	12,032
2006	485,376.83	99,114	110,836	374,541	39.79	9,413
2007	261,475.47	48,530	54,270	207,205	40.72	5,089
2008	80,960.76	13,504	15,101	65,860	41.66	1,581
2010	100,531.28	12,908	14,435	86,096	43.58	1,976

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
2011	201,873.88	22,004	24,606	177,268	44.55	3,979
2012	100,205.47	8,958	10,017	90,188	45.53	1,981
2013	16,187.94	1,130	1,264	14,924	46.51	321
2014	101,870.22	5,073	5,673	96,197	47.51	2,025
	13,038,596.84	6,416,182	7,154,174	5,884,423		217,971
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 27.0						1.67

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
1918	27,515.60	27,516	27,516			
1938	144,755.10	144,755	144,755			
1945	22,988.29	22,988	22,988			
1950	56,278.80	56,279	56,279			
1955	48,679.71	47,847	40,229	8,451	0.65	8,451
1960	76,154.48	72,407	60,879	15,275	1.87	8,168
1965	78,429.72	71,929	60,477	17,953	3.15	5,699
1970	106,824.27	94,174	79,181	27,643	4.50	6,143
1972	579,573.92	501,482	421,642	157,932	5.12	30,846
1973	116,887.81	100,124	84,183	32,705	5.45	6,001
1974	139,735.00	118,407	99,556	40,179	5.80	6,927
1975	332,974.60	278,910	234,505	98,470	6.17	15,959
1977	107,076.26	87,380	73,468	33,608	6.99	4,808
1978	281,896.00	226,777	190,672	91,224	7.43	12,278
1979	300,946.68	238,383	200,430	100,517	7.90	12,724
1980	266,091.96	207,272	174,273	91,819	8.40	10,931
1981	234,753.75	179,648	151,047	83,707	8.92	9,384
1982	190,062.15	142,746	120,020	70,042	9.46	7,404
1983	132,799.92	97,747	82,185	50,615	10.03	5,046
1984	157,785.94	113,690	95,590	62,196	10.62	5,856
1985	324,685.98	228,647	192,244	132,442	11.24	11,783
1986	295,474.98	203,177	170,829	124,646	11.87	10,501
1987	205,043.94	137,433	115,552	89,492	12.53	7,142
1988	70,509.94	45,999	38,676	31,834	13.21	2,410
1989	746,798.97	473,627	398,222	348,577	13.90	25,077
1990	832,608.91	512,496	430,902	401,707	14.61	27,495
1991	393,283.11	234,523	197,185	196,098	15.34	12,783
1992	531,951.61	306,851	257,998	273,954	16.08	17,037
1994	66,342.64	35,581	29,916	36,427	17.62	2,067
1995	17,159.15	8,846	7,438	9,721	18.41	528
1996	69,426.23	34,329	28,863	40,563	19.21	2,112
1997	87,126.12	41,201	34,641	52,485	20.03	2,620
1998	573,379.95	258,623	217,448	355,932	20.86	17,063
1999	165,344.70	70,925	59,633	105,712	21.70	4,872
2000	12,081.20	4,909	4,127	7,954	22.56	353
2004	187,388.21	58,731	49,381	138,007	26.09	5,290
2005	502,155.36	145,359	122,217	379,938	27.00	14,072
2006	406,003.36	107,696	90,550	315,453	27.92	11,298
2007	228,819.60	55,097	46,325	182,495	28.85	6,326
2008	64,952.16	14,033	11,799	53,153	29.79	1,784
2009	79,573.30	15,224	12,800	66,773	30.73	2,173

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
2011	170,969.39	24,115	20,276	150,693	32.64	4,617
2012	79,926.00	9,255	7,781	72,145	33.60	2,147
2013	16,092.23	1,452	1,221	14,871	34.57	430
2014	63,321.52	4,082	3,432	59,890	35.55	1,685
9999	841,466.15-	514,274-	435,910-	405,556-		30,727-
	8,751,162.37	5,348,398	4,533,421	4,217,741		319,563
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						13.2 3.65

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 364.00 FLOW MEASURING DEVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-L3						
NET SALVAGE PERCENT.. 0						
2009	19,181.61	7,011	7,116	12,066	12.69	951
2010	104,719.11	33,458	33,960	70,759	13.61	5,199
2011	9,728.50	2,646	2,686	7,042	14.56	484
2012	12,254.13	2,745	2,786	9,468	15.52	610
2013	5,882.00	1,026	1,041	4,841	16.51	293
2014	3,236.17	405	411	2,825	17.50	161
2016	246,002.36	6,150	6,243	239,759	19.50	12,295
	401,003.88	53,441	54,243	346,761		19,993

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.3 4.99

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 371.00 PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-S0						
NET SALVAGE PERCENT.. 0						
1997	74,241.00	25,780	51,236	23,005	26.11	881
1998	126,283.62	42,052	83,576	42,708	26.68	1,601
2006	346,984.97	72,520	144,129	202,856	31.64	6,411
2008	62,260.00	10,849	21,562	40,698	33.03	1,232
2009	44,215.81	6,909	13,731	30,485	33.75	903
2010	786,048.51	108,278	215,197	570,852	34.49	16,551
2012	53,890.00	5,335	10,603	43,287	36.04	1,201
2013	27,499.94	2,166	4,305	23,195	36.85	629
2014	21,950.00	1,262	2,508	19,442	37.70	516
2015	53,680.00	1,906	3,788	49,892	38.58	1,293
2016	972,808.85	11,917	23,684	949,125	39.51	24,022
	2,569,862.70	288,974	574,319	1,995,544		55,240
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						36.1 2.15



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 380.00 TREATMENT EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R2						
NET SALVAGE PERCENT.. 0						
1984	1,055,180.71	600,050	816,361	238,820	19.41	12,304
1986	64,089.04	34,608	47,084	17,005	20.70	821
1987	1,660,003.55	871,684	1,185,916	474,088	21.37	22,185
1988	919,728.60	469,264	638,428	281,301	22.04	12,763
1994	240,349.45	99,880	135,886	104,463	26.30	3,972
1995	210,054.10	83,788	113,993	96,061	27.05	3,551
1996	165,925.39	63,420	86,282	79,643	27.80	2,865
1997	42,322.23	15,452	21,022	21,300	28.57	746
1998	47,878.66	16,662	22,668	25,211	29.34	859
2003	24,295.90	6,306	8,579	15,717	33.32	472
2004	5,234,903.35	1,262,188	1,717,191	3,517,712	34.15	103,008
2006	11,772.93	2,404	3,271	8,502	35.81	237
2009	260,012.20	38,367	52,198	207,814	38.36	5,417
2010	248,635.18	31,880	43,372	205,263	39.23	5,232
2011	17,809.00	1,939	2,638	15,171	40.10	378
2012	48,330.00	4,317	5,873	42,457	40.98	1,036
2014	73,530.88	3,677	5,003	68,528	42.75	1,603
2016	4,293,887.12	42,939	58,418	4,235,469	44.55	95,072
	14,618,708.29	3,648,825	4,964,183	9,654,525		272,521
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						35.4 1.86

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-S2.5						
NET SALVAGE PERCENT.. 0						
2013	4,142,753.27	722,910	579,985	3,562,768	16.51	215,795
	4,142,753.27	722,910	579,985	3,562,768		215,795
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.5						5.21

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 390.00 OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
1997	10,096.70	9,844	9,844	253	0.50	253
2007	34,229.60	16,259	16,259	17,971	10.50	1,712
2008	54,626.00	23,216	23,216	31,410	11.50	2,731
2009	13,014.19	4,880	4,880	8,134	12.50	651
2010	74,451.51	24,197	24,197	50,255	13.50	3,723
2011	31,757.95	8,733	8,733	23,025	14.50	1,588
2012	81,649.54	18,371	18,371	63,279	15.50	4,083
2013	22,813.81	3,992	3,992	18,822	16.50	1,141
2014	65,694.99	8,212	8,212	57,483	17.50	3,285
2015	14,460.77	1,085	1,085	13,376	18.50	723
2016	714,543.15	17,864	17,864	696,679	19.50	35,727
	1,117,338.21	136,653	136,653	980,685		55,617
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						17.6 4.98

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 391.00 TRANSPORTATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 15-L4						
NET SALVAGE PERCENT.. 0						
2001	7,500.00	6,060	7,500			
2002	95,000.00	75,684	95,000			
2004	75,000.00	56,250	75,000			
2005	21,215.00	15,063	21,215			
2006	274,132.58	181,476	274,133			
2007	46,030.00	28,047	42,469	3,561	5.86	608
2008	225,283.34	124,656	188,755	36,528	6.70	5,452
2009	648,949.00	320,581	485,425	163,524	7.59	21,545
2010	245,374.89	105,838	160,260	85,115	8.53	9,978
2011	69,519.00	25,444	38,527	30,992	9.51	3,259
2012	283,568.72	85,071	128,815	154,754	10.50	14,738
2013	569,531.08	132,889	201,222	368,309	11.50	32,027
2014	74,011.10	12,335	18,678	55,333	12.50	4,427
2015	628,453.46	62,845	95,160	533,293	13.50	39,503
2016	130,529.00	4,351	6,588	123,941	14.50	8,548
	3,394,097.17	1,236,590	1,838,747	1,555,350		140,085
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						11.1 4.13

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 393.00 TOOLS, SHOP AND GARAGE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	44,148.67	23,178	23,178	20,971	9.50	2,207
2007	88,820.75	42,190	42,190	46,631	10.50	4,441
2008	32,994.25	14,023	14,023	18,971	11.50	1,650
2009	57,515.11	21,568	21,568	35,947	12.50	2,876
2010	42,200.18	13,715	13,715	28,485	13.50	2,110
2011	29,347.68	8,071	8,071	21,277	14.50	1,467
2012	55,529.53	12,494	12,494	43,036	15.50	2,777
2013	116,235.29	20,341	20,340	95,895	16.50	5,812
2014	13,575.00	1,697	1,697	11,878	17.50	679
2015	6,574.00	493	493	6,081	18.50	329
2016	27,741.12	694	694	27,047	19.50	1,387
	514,681.58	158,464	158,463	356,219		25,735
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						13.8 5.00

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 394.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	4,744.41	3,321	3,321	1,423	4.50	316
2007	3,524.28	2,232	2,232	1,292	5.50	235
2008	44,629.31	25,290	25,291	19,338	6.50	2,975
2010	9,256.54	4,011	4,011	5,246	8.50	617
2011	7,356.65	2,697	2,697	4,660	9.50	491
2012	12,243.36	3,673	3,673	8,570	10.50	816
2013	10,187.71	2,377	2,377	7,811	11.50	679
2014	16,860.02	2,810	2,810	14,050	12.50	1,124
	108,802.28	46,411	46,412	62,390		7,253

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 8.6 6.67

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 395.00 POWER OPERATED EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2016

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 16-L2.5						
NET SALVAGE PERCENT.. 0						
2006	99,992.04	54,996	95,879	4,113	7.20	571
2007	19,935.00	10,279	17,920	2,015	7.75	260
2008	48,270.00	22,928	39,972	8,298	8.40	988
2009	180,900.00	77,675	135,418	45,482	9.13	4,982
2010	27,950.00	10,621	18,517	9,433	9.92	951
2012	99,654.42	27,094	47,235	52,419	11.65	4,499
2013	157,521.76	33,670	58,700	98,822	12.58	7,855
2016	30,858.50	964	1,681	29,178	15.50	1,882
	665,081.72	238,227	415,322	249,760		21,988
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						11.4 3.31

Exhibit No. 11-H  
Witness: J. J. Spanos

PENNSYLVANIA-AMERICAN WATER COMPANY  
HERSHEY, PENNSYLVANIA

SCRANTON WASTEWATER OPERATIONS

2017 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS  
RELATED TO WASTEWATER PLANT  
AS OF DECEMBER 31, 2017

*Prepared by:*



*Excellence Delivered As Promised*



PENNSYLVANIA-AMERICAN WATER COMPANY

Hershey, Pennsylvania

SCRANTON WASTEWATER OPERATIONS

2017 DEPRECIATION STUDY  
CALCULATED ANNUAL DEPRECIATION ACCRUALS  
RELATED TO WASTEWATER PLANT  
AS OF DECEMBER 31, 2017

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania



**Gannett Fleming**

*Excellence Delivered As Promised*

April 25, 2017

Pennsylvania-American Water Company  
800 West Hersheypark Drive  
Hershey, PA 17033

Attention Mr. John R. Cox  
Manager of Rates and Regulations

Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to water plant. The results of our study as of December 31, 2017, are presented in the attached report. The results of our study as of December 31, 2016, are presented in our report, "2016 Depreciation Study - Calculated Annual Depreciation Accruals Related to Wastewater Plant as of December 31, 2016." The same methods, procedures and estimates are used in both studies.

The attached report sets forth a description of the methods and procedures upon which the studies were based, the estimates of survivor curves, and the calculated annual depreciation as of December 31, 2017.

Respectfully submitted,

GANNETT FLEMING VALUATION  
AND RATE CONSULTANTS, LLC

JOHN J. SPANOS  
Senior Vice President

JJS:mlw

062027.400

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**PART I. INTRODUCTION**

# **PENNSYLVANIA-AMERICAN WATER COMPANY**

## **DEPRECIATION STUDY**

### **PART I. INTRODUCTION**

#### **SCOPE**

This report sets forth the results of the depreciation study for Pennsylvania-American Water Company to determine the annual depreciation accrual rates and amounts applicable to the original cost of wastewater plant as of December 31, 2017. The rates and amounts are based on the straight line remaining life method of depreciation. This report also describes the concepts, methods and judgments which underlie the recommended annual depreciation accrual rates related to wastewater plant in service as of December 31, 2017.

Part I, Introduction, contains statements with respect to the basis of the study and the development of net original cost. Part II, Estimation of Survivor Curves, presents descriptions of the considerations and methods used in the service life study. Part III, Service Life Considerations, presents the results of the average service life analysis. Part IV, Calculation of Annual and Accrued Depreciation, describes the procedures used in the calculation of group depreciation. Part V, Results of Study, presents summaries by depreciable group of annual depreciation accrual rates and amounts, as well as composite remaining lives. Part VI, Service Life Statistics presents the statistical analysis of service life estimates, Part VII, Detailed Depreciation Calculations presents the detailed tabulations of annual depreciation and Part VIII, Experienced and Estimated Net Salvage presents the cost of removal and gross salvage recorded for the period 2013-2017.

## **BASIS OF THE STUDY**

The purpose of the depreciation study was to determine the annual depreciation accruals applicable to the original cost of wastewater plant in service as of December 31, 2017. For most accounts, the straight line remaining life method using attained ages, the book depreciation reserve and estimated survivor curves, was the basis for the calculation of annual depreciation. For certain accounts, the annual and accrued amortization amounts were based on the age of the property and the selected amortization period.

The survivor curve estimates were based on judgment which incorporated (1) analyses of historical data related to wastewater property for the Scranton Operations; (2) consideration of the character, use and location of the property; (3) probable future events and management plans; and (4) a general knowledge of wastewater property lives. The use of Iowa type survivor curves is a generally-accepted method of estimating average service life when the actual lives of individual property units are dispersed.

## **DEVELOPMENT OF NET ORIGINAL COST**

The original cost data used in this study were obtained from the Company's continuing property records and work order system which show in detail the original cost of the property including descriptions, locations and years of installation of property units. The net original cost was developed from the original cost data by deducting contributions in aid of construction. The development of net original cost by plant account is set forth in Table 1 on page V-4.

---

## **PART II. ESTIMATION OF SURVIVOR CURVES**



## PART II. ESTIMATION OF SURVIVOR CURVES

The calculation of annual depreciation based on the straight line method requires the estimation of survivor curves and the selection of group depreciation procedures. The estimation of survivor curves is discussed below and the development of net salvage is discussed in later sections of this report.

### SURVIVOR CURVES

The use of an average service life for a property group implies that the various units in the group have different lives. Thus, the average life may be obtained by determining the separate lives of each of the units, or by constructing a survivor curve by plotting the number of units which survive at successive ages.

The survivor curve graphically depicts the amount of property existing at each age throughout the life of an original group. From the survivor curve, the average life of the group, the remaining life expectancy, the probable life, and the frequency curve can be calculated. In Figure 1, a typical smooth survivor curve and the derived curves are illustrated. The average life is obtained by calculating the area under the survivor curve, from age zero to the maximum age, and dividing this area by the ordinate at age zero. The remaining life expectancy at any age can be calculated by obtaining the area under the curve, from the observation age to the maximum age, and dividing this area by the percent surviving at the observation age. For example, in Figure 1, the remaining life at age 30 is equal to the crosshatched area under the survivor curve divided by 29.5 percent surviving at age 30. The probable life at any age is developed by adding the age and remaining life. If the probable life of the property is calculated for each year of age, the probable life curve shown in the chart can be developed. The frequency curve presents the number of units retired in each age interval. It is derived by obtaining the differences between the amount of property surviving at the beginning and at the end of each interval.

This study has incorporated the use of Iowa curves developed from a retirement rate analysis of historical retirement history. A discussion of the concepts of survivor curves and of the development of survivor curves using the retirement rate method is presented below.

### **Iowa Type Curves**

The range of survivor characteristics usually experienced by utility and industrial properties is encompassed by a system of generalized survivor curves known as the Iowa type curves. There are four families in the Iowa system, labeled in accordance with the location of the modes of the retirements (or the portion of the frequency curve with the highest level of retirements) in relationship to the average life and the relative height of the modes. The left moded curves, presented in Figure 2, are those in which the greatest frequency of retirement occurs to the left of, or prior to, average service life. The symmetrical moded curves, presented in Figure 3, are those in which the greatest frequency of retirement occurs at average service life. The right moded curves, presented in Figure 4, are those in which the greatest frequency occurs to the right of, or after, average service life. The origin moded curves, presented in Figure 5, are those in which the greatest frequency of retirement occurs at the origin, or immediately after age zero. The letter designation of each family of curves (L, S, R or O) represents the location of the mode of the associated frequency curve with respect to the average service life. The numbers represent the relative heights of the modes of the frequency curves within each family. A higher number designates a higher mode curve.

The Iowa curves were developed at the Iowa State College Engineering Experiment Station through an extensive process of observation and classification of the ages at which industrial property had been retired. A report of the study which resulted in the classification of property survivor characteristics into 18 type curves, which constitute three of the four families, was published in 1935 in the form of the Experiment Station's Bulletin 125. These curve types have also been presented in subsequent

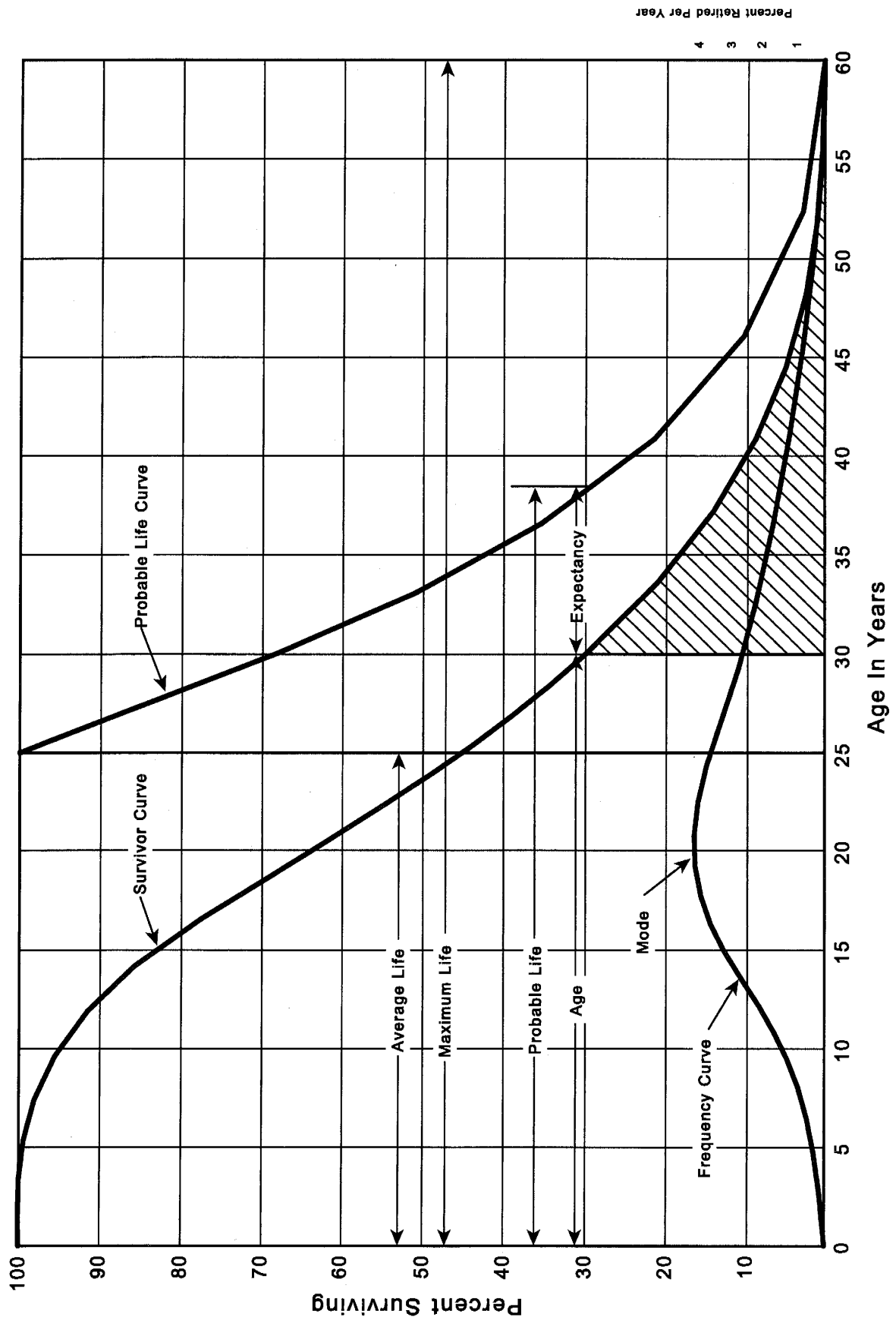


Figure 1. A Typical Survivor Curve and Derived Curves

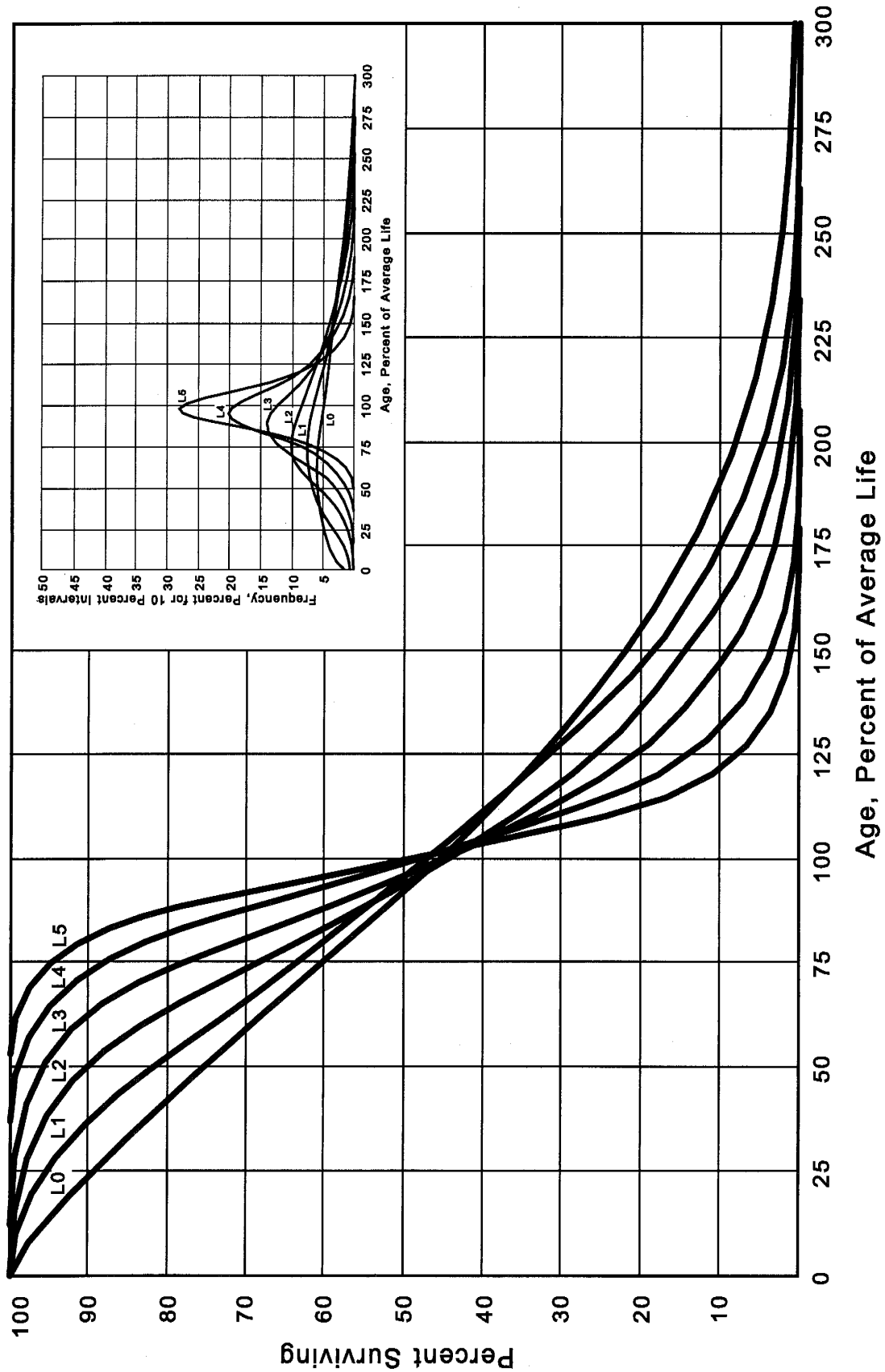


Figure 2. Left Modal or "L" Iowa Type Survivor Curves

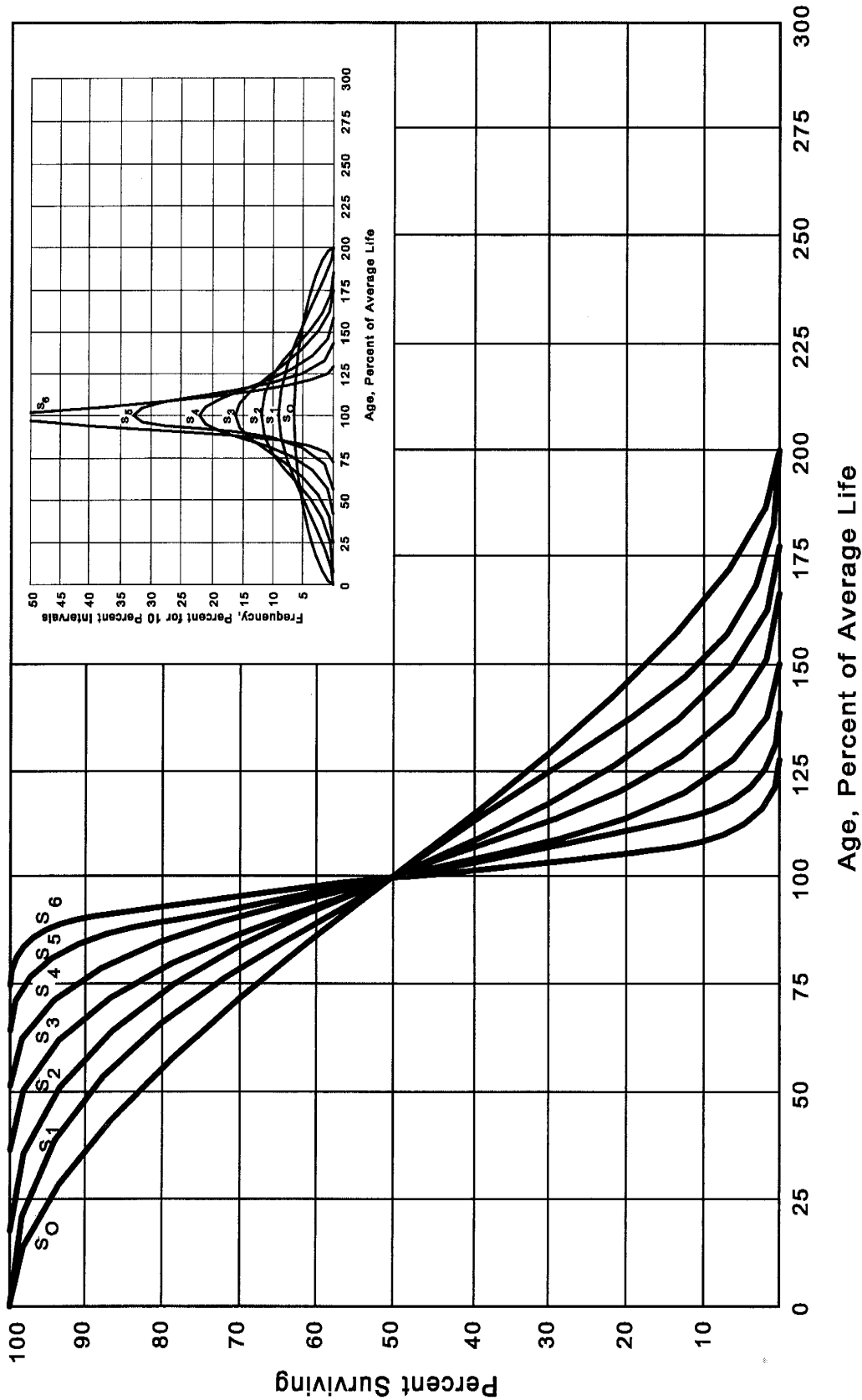


Figure 3. Symmetrical or "S" lowa Type Survivor Curves

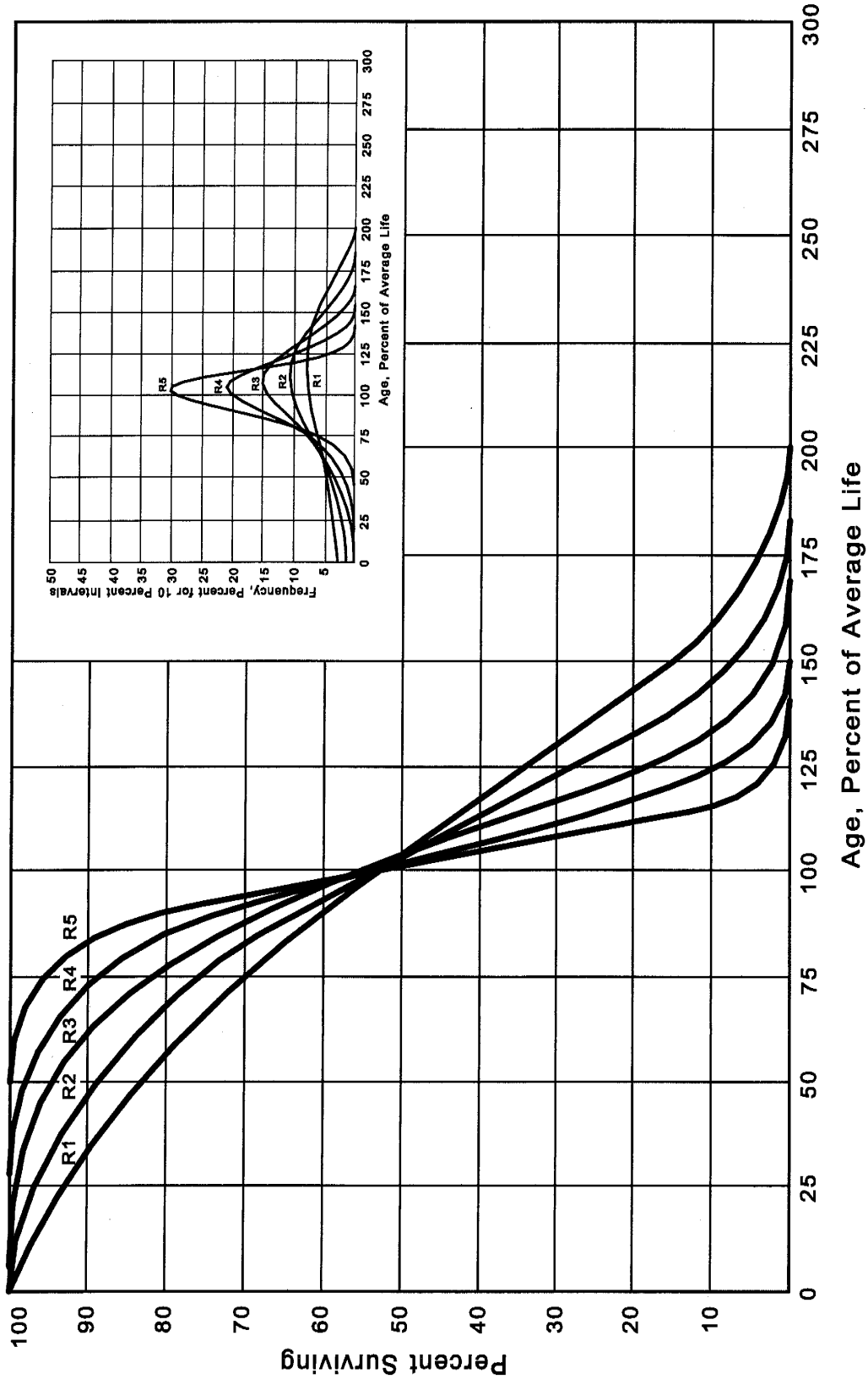


Figure 4. Right Modal or "R" Iowa Type Survivor Curves

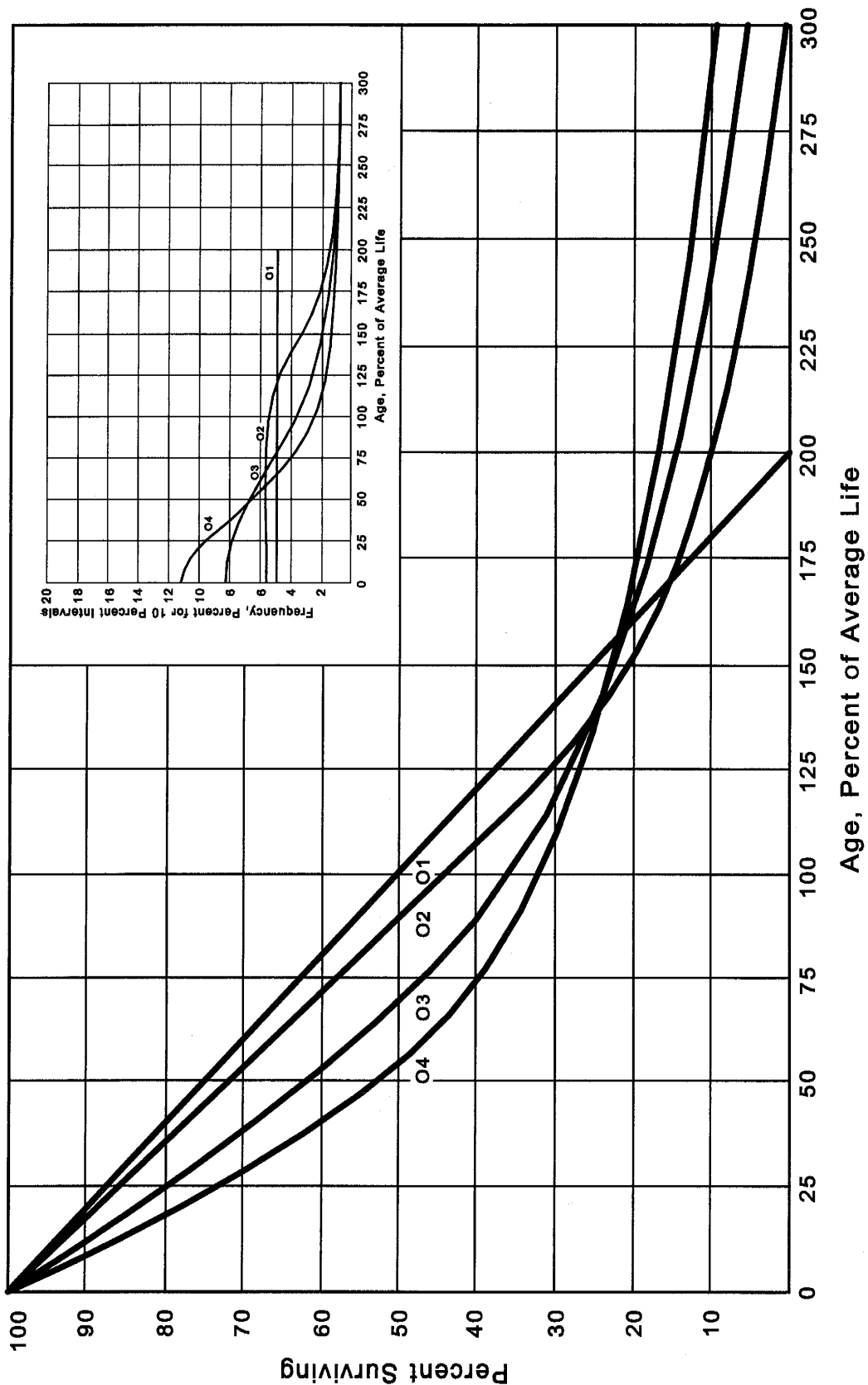


Figure 5. Origin Modal or "O" Iowa Type Survivor Curves

Experiment Station bulletins and in the text, "Engineering Valuation and Depreciation."<sup>1</sup> In 1957, Frank V. B. Couch, Jr., an Iowa State College graduate student submitted a thesis presenting his development of the fourth family consisting of the four O type survivor curves.

### **Retirement Rate Method of Analysis**

The retirement rate method is an actuarial method of deriving survivor curves using the average rates at which property of each age group is retired. The method relates to property groups for which aged accounting experience is available and is the method used to develop the original stub survivor curves in this study. The method (also known as the annual rate method) is illustrated through the use of an example in the following text, and is also explained in several publications, including "Statistical Analyses of Industrial Property Retirements,"<sup>2</sup> "Engineering Valuation and Depreciation,"<sup>3</sup> and "Depreciation Systems."<sup>4</sup>

The average rate of retirement used in the calculation of the percent surviving for the survivor curve (life table) requires two sets of data: first, the property retired during a period of observation, identified by the property's age at retirement; and second, the property exposed to retirement at the beginning of the age intervals during the same period. The period of observation is referred to as the experience band, and the band of years which represent the installation dates of the property exposed to retirement during the experience band is referred to as the placement band. An example of the calculations used in the development of a life table follows. The example includes schedules of annual aged property transactions, a schedule of plant exposed to retirement, a life table and illustrations of smoothing the stub survivor curve.

---

<sup>1</sup>Marston, Anson, Robley Winfrey and Jean C. Hempstead. *Engineering Valuation and Depreciation*, 2nd Edition. New York, McGraw-Hill Book Company. 1953.

<sup>2</sup>Winfrey, Robley, Statistical Analyses of Industrial Property Retirements. Iowa State College, Engineering Experiment Station, Bulletin 125. 1935.

<sup>3</sup>Marston, Anson, Robley Winfrey, and Jean C. Hempstead, *Supra* Note 1.

<sup>4</sup>Wolf, Frank K. and W. Chester Fitch. Depreciation Systems. Iowa State University Press. 1994.



## Schedules of Annual Transactions in Plant Records

A hypothetical property group is used to illustrate the retirement rate method. This property group is observed for the experience band 2007-2016 during which there were placements (or installations) during the years 2002-2016. In order to illustrate the summation of the aged data by age interval, the data were compiled in the manner presented in Schedules 1 and 2 on pages II-11 and II-12. In Schedule 1, year placed and the year of retirement are shown. The age interval during which a retirement occurred is determined from this information. In the example which follows, \$10,000 of the dollars invested in 2002 were retired in 2007. The \$10,000 retirement occurred during the age interval between 4½ and 5½ years on the basis that approximately one-half of the amount of property was installed prior to and subsequent to July 1 of each year. That is, on the average, property installed during a year is placed in service at the midpoint of the year for the purpose of the analysis. All retirements also are stated as occurring at the midpoint of a one-year age interval of time, except the first age interval which encompasses only one-half year.

The total retirements occurring in each age interval in a band are determined by summing the amounts for each transaction year-installation year combination for that age interval. For example, the total of \$143,000 retired for age interval 4½-5½ is the sum of the retirements entered on Schedule 1 immediately above the stair step line drawn on the table beginning with the 2007 retirements of 2002 installations and ending with the 2016 retirements of the 2011 installations. Thus, the total amount of 143 for age interval 4½-5½ equals the sum of:

$$10 + 12 + 13 + 11 + 13 + 13 + 15 + 17 + 19 + 20.$$

SCHEDULE 1. RETIREMENTS FOR EACH YEAR 2007-2016  
SUMMARIZED BY AGE INTERVAL

Placement Band 2002-2016

Experience Band 2007-2016

Year Placed	Retirements, Thousands of Dollars											Total During Age Interval	Age Interval
	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)	2016 (11)	2016 (11)		
2002	10	11	12	13	14	16	23	24	25	26	26	26	13½-14½
2003	11	12	13	15	16	18	20	21	22	19	19	44	12½-13½
2004	11	12	13	14	16	17	19	21	22	18	18	64	11½-12½
2005	8	9	10	11	11	13	14	15	16	17	17	83	10½-11½
2006	9	10	11	12	13	14	16	17	19	20	20	93	9½-10½
2007	4	9	10	11	12	13	14	15	16	20	20	105	8½-9½
2008		5	11	12	13	14	15	16	18	20	20	113	7½-8½
2009			6	12	13	15	16	17	19	19	19	124	6½-7½
2010				6	13	15	16	17	19	19	19	131	5½-6½
2011					7	14	16	17	19	20	20	143	4½-5½
2012						8	18	20	22	23	23	146	3½-4½
2013							9	20	22	25	25	150	2½-3½
2014								11	23	25	25	151	1½-2½
2015									11	24	24	153	½-1½
2016										13	13	80	0-½
<b>Total</b>	<b>53</b>	<b>68</b>	<b>86</b>	<b>106</b>	<b>128</b>	<b>157</b>	<b>196</b>	<b>231</b>	<b>273</b>	<b>308</b>	<b>308</b>	<b>1,606</b>	

**SCHEDULE 2. OTHER TRANSACTIONS FOR EACH YEAR 2007-2016  
SUMMARIZED BY AGE INTERVAL**

Experience Band 2007-2016 Placement Band 2002-2016

Year Placed	Acquisitions, Transfers and Sales, Thousands of Dollars											Total During Age Interval	Age Interval
	During Year												
(1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)	2016 (11)	(12)	(13)	
2002	-	-	-	-	-	-	60 <sup>a</sup>	-	-	-	-	-	13½-14½
2003	-	-	-	-	-	-	-	-	-	-	-	-	12½-13½
2004	-	-	-	-	-	-	-	-	-	-	-	-	11½-12½
2005	-	-	-	-	-	-	-	(5) <sup>b</sup>	-	-	60	-	10½-11½
2006	-	-	-	-	-	-	-	6 <sup>a</sup>	-	-	-	-	9½-10½
2007	-	-	-	-	-	-	-	-	-	-	(5)	-	8½-9½
2008	-	-	-	-	-	-	-	-	-	-	6	-	7½-8½
2009	-	-	-	-	-	-	-	-	-	-	-	-	6½-7½
2010	-	-	-	-	-	-	-	(12) <sup>b</sup>	-	-	-	-	5½-6½
2011	-	-	-	-	-	-	-	-	22 <sup>a</sup>	-	-	-	4½-5½
2012	-	-	-	-	-	-	-	(19) <sup>b</sup>	-	-	10	-	3½-4½
2013	-	-	-	-	-	-	-	-	-	-	-	-	2½-3½
2014	-	-	-	-	-	-	-	-	-	(102) <sup>c</sup>	(121)	-	1½-2½
2015	-	-	-	-	-	-	-	-	-	-	-	-	½-1½
2016	-	-	-	-	-	-	-	-	-	-	-	-	0-½
<b>Total</b>	-	-	-	-	-	-	60	(30)	22	(102)	(50)	-	

<sup>a</sup> Transfer Affecting Exposures at Beginning of Year

<sup>b</sup> Transfer Affecting Exposures at End of Year

<sup>c</sup> Sale with Continued Use

Parentheses Denote Credit Amount.

In Schedule 2, other transactions which affect the group are recorded in a similar manner. The entries illustrated include transfers and sales. The entries which are credits to the plant account are shown in parentheses. The items recorded on this schedule are not totaled with the retirements, but are used in developing the exposures at the beginning of each age interval.

**Schedule of Plant Exposed to Retirement**

The development of the amount of plant exposed to retirement at the beginning of each age interval is illustrated in Schedule 3 on page II-14. The surviving plant at the beginning of each year from 2007 through 2016 is recorded by year in the portion of the table headed "Annual Survivors at the Beginning of the Year." The last amount entered in each column is the amount of new plant added to the group during the year. The amounts entered in Schedule 3 for each successive year following the beginning balance or addition are obtained by adding or subtracting the net entries shown on Schedules 1 and 2. For the purpose of determining the plant exposed to retirement, transfers-in are considered as being exposed to retirement in this group at the beginning of the year in which they occurred, and the sales and transfers-out are considered to be removed from the plant exposed to retirement at the beginning of the following year. Thus, the amounts of plant shown at the beginning of each year are the amounts of plant from each placement year considered to be exposed to retirement at the beginning of each successive transaction year. For example, the exposures for the installation year 2012 are calculated in the following manner:

Exposures at age 0	= amount of addition	= \$750,000
Exposures at age ½	= \$750,000 - \$ 8,000	= \$742,000
Exposures at age 1½	= \$742,000 - \$18,000	= \$724,000
Exposures at age 2½	= \$724,000 - \$20,000 - \$19,000	= \$685,000
Exposures at age 3½	= \$685,000 - \$22,000	= \$663,000

**SCHEDULE 3. PLANT EXPOSED TO RETIREMENT**  
**JANUARY 1 OF EACH YEAR 2007-2016**  
**SUMMARIZED BY AGE INTERVAL**

Year Placed	Exposures, Thousands of Dollars											Total at	
	Annual Survivors at the Beginning of the Year											Beginning of	Age
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Age Interval	Interval	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
2002	255	245	234	222	209	195	239	216	192	167	167	13½-14½	
2003	279	268	256	243	228	212	194	174	153	131	323	12½-13½	
2004	307	296	284	271	257	241	224	205	184	162	531	11½-12½	
2005	338	330	321	311	300	289	276	262	242	226	823	10½-11½	
2006	376	367	357	346	334	321	307	297	280	261	1,097	9½-10½	
2007	420 <sup>a</sup>	416	407	397	386	374	361	347	332	316	1,503	8½-9½	
2008		460 <sup>a</sup>	455	444	432	419	405	390	374	356	1,952	7½-8½	
2009			510 <sup>a</sup>	504	492	479	464	448	431	412	2,463	6½-7½	
2010				580 <sup>a</sup>	574	561	546	530	501	482	3,057	5½-6½	
2011					660 <sup>a</sup>	653	639	623	628	609	3,789	4½-5½	
2012						750 <sup>a</sup>	742	724	685	663	4,332	3½-4½	
2013							850 <sup>a</sup>	841	821	799	4,955	2½-3½	
2014								960 <sup>a</sup>	949	926	5,719	1½-2½	
2015									1,080 <sup>a</sup>	1,069	6,579	½-1½	
2016										1,220 <sup>a</sup>	7,490	0-½	
<b>Total</b>	<b>1,975</b>	<b>2,382</b>	<b>2,824</b>	<b>3,318</b>	<b>3,872</b>	<b>4,494</b>	<b>5,247</b>	<b>6,017</b>	<b>6,852</b>	<b>7,799</b>	<b>44,780</b>		

Experience Band 2007-2016

Placement Band 2002-2016

<sup>a</sup>Additions during the year

For the entire experience band 2007-2016, the total exposures at the beginning of an age interval are obtained by summing diagonally in a manner similar to the summing of the retirements during an age interval (Schedule 1). For example, the figure of 3,789, shown as the total exposures at the beginning of age interval 4½-5½, is obtained by summing:

$$255 + 268 + 284 + 311 + 334 + 374 + 405 + 448 + 501 + 609.$$

### **Original Life Table**

The original life table, illustrated in Schedule 4 on page II-16, is developed from the totals shown on the schedules of retirements and exposures, Schedules 1 and 3, respectively. The exposures at the beginning of the age interval are obtained from the corresponding age interval of the exposure schedule, and the retirements during the age interval are obtained from the corresponding age interval of the retirement schedule. The retirement ratio is the result of dividing the retirements during the age interval by the exposures at the beginning of the age interval. The percent surviving at the beginning of each age interval is derived from survivor ratios, each of which equals one minus the retirement ratio. The percent surviving is developed by starting with 100% at age zero and successively multiplying the percent surviving at the beginning of each interval by the survivor ratio, i.e. one minus the retirement ratio for that age interval. The calculations necessary to determine the percent surviving at age 5½ are as follows:

Percent surviving at age 4½	=	88.15	
Exposures at age 4½	=	3,789,000	
Retirements from age 4½ to 5½	=	143,000	
Retirement Ratio	=	143,000 ÷ 3,789,000	= 0.0377
Survivor Ratio	=	1.000 - 0.0377	= 0.9623
Percent surviving at age 5½	=	(88.15) x (0.9623)	= 84.83

The totals of the exposures and retirements (columns 2 and 3) are shown for the purpose of checking with the respective totals in Schedules 1 and 3. The ratio of the total retirements to the total exposures, other than for each age interval, is meaningless.

SCHEDULE 4. ORIGINAL LIFE TABLE

CALCULATED BY THE RETIREMENT RATE METHOD

Experience Band 2007-2016

Placement Band 2002-2016

(Exposure and Retirement Amounts are in Thousands of Dollars)

Age at Beginning of Interval	Exposures at Beginning of Age Interval	Retirements During Age Interval	Retirement Ratio	Survivor Ratio	Percent Surviving at Beginning of Age Interval
(1)	(2)	(3)	(4)	(5)	(6)
0.0	7,490	80	0.0107	0.9893	100.00
0.5	6,579	153	0.0233	0.9767	98.93
1.5	5,719	151	0.0264	0.9736	96.62
2.5	4,955	150	0.0303	0.9697	94.07
3.5	4,332	146	0.0337	0.9663	91.22
4.5	3,789	143	0.0377	0.9623	88.15
5.5	3,057	131	0.0429	0.9571	84.83
6.5	2,463	124	0.0503	0.9497	81.19
7.5	1,952	113	0.0579	0.9421	77.11
8.5	1,503	105	0.0699	0.9301	72.65
9.5	1,097	93	0.0848	0.9152	67.57
10.5	823	83	0.1009	0.8991	61.84
11.5	531	64	0.1205	0.8795	55.60
12.5	323	44	0.1362	0.8638	48.90
13.5	167	26	0.1557	0.8443	42.24
14.5					35.66
Total	<u>44,780</u>	<u>1,606</u>			

Column 2 from Schedule 3, Column 12, Plant Exposed to Retirement.  
 Column 3 from Schedule 1, Column 12, Retirements for Each Year.  
 Column 4 = Column 3 Divided by Column 2.  
 Column 5 = 1.0000 Minus Column 4.  
 Column 6 = Column 5 Multiplied by Column 6 as of the Preceding Age Interval.

The original survivor curve is plotted from the original life table (column 6, Schedule 4). When the curve terminates at a percent surviving greater than zero, it is called a stub survivor curve. Survivor curves developed from retirement rate studies generally are stub curves.

### **Smoothing the Original Survivor Curve**

The smoothing of the original survivor curve eliminates any irregularities and serves as the basis for the preliminary extrapolation to zero percent surviving of the original stub curve. Even if the original survivor curve is complete from 100% to zero percent, it is desirable to eliminate any irregularities, as there is still an extrapolation for the vintages which have not yet lived to the age at which the curve reaches zero percent. In this study, the smoothing of the original curve with established type curves was used to eliminate irregularities in the original curve.

The Iowa type curves are used in this study to smooth those original stub curves which are expressed as percents surviving at ages in years. Each original survivor curve was compared to the Iowa curves using visual and mathematical matching in order to determine the better fitting smooth curves. In Figures 6, 7, and 8, the original curve developed in Schedule 4 is compared with the L, S, and R Iowa type curves which most nearly fit the original survivor curve. In Figure 6, the L1 curve with an average life between 12 and 13 years appears to be the best fit. In Figure 7, the S0 type curve with a 12-year average life appears to be the best fit and appears to be better than the L1 fitting. In Figure 8, the R1 type curve with a 12-year average life appears to be the best fit and appears to be better than either the L1 or the S0.

In Figure 9, the three fittings, 12-L1, 12-S0 and 12-R1 are drawn for comparison purposes. It is probable that the 12-R1 Iowa curve would be selected as the most representative of the plotted survivor characteristics of the group.



FIGURE 6. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1 IOWA TYPE CURVE ORIGINAL AND SMOOTH SURVIVOR CURVES

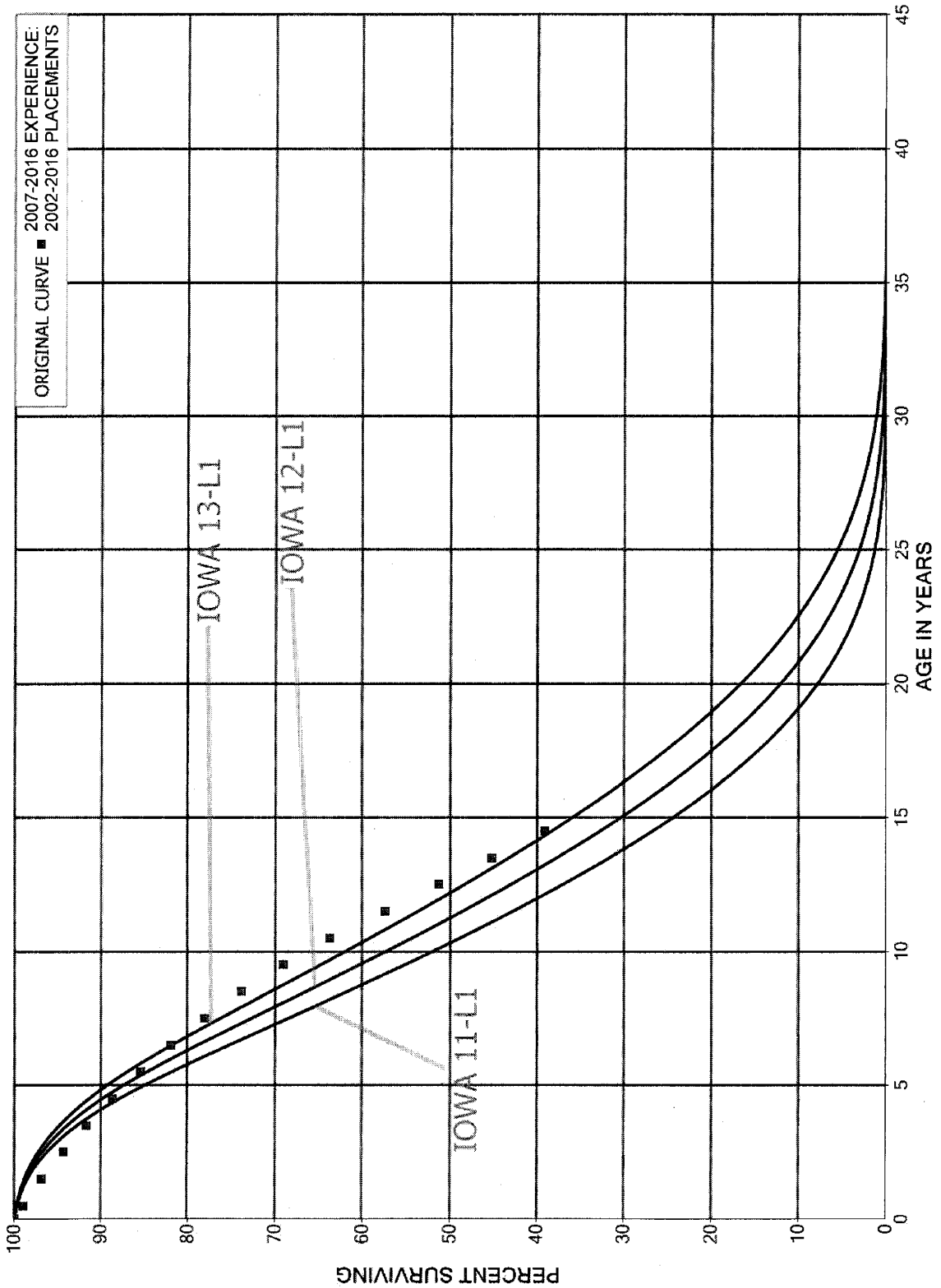


FIGURE 7. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN S0 IOWA TYPE CURVE  
 ORIGINAL AND SMOOTH SURVIVOR CURVES

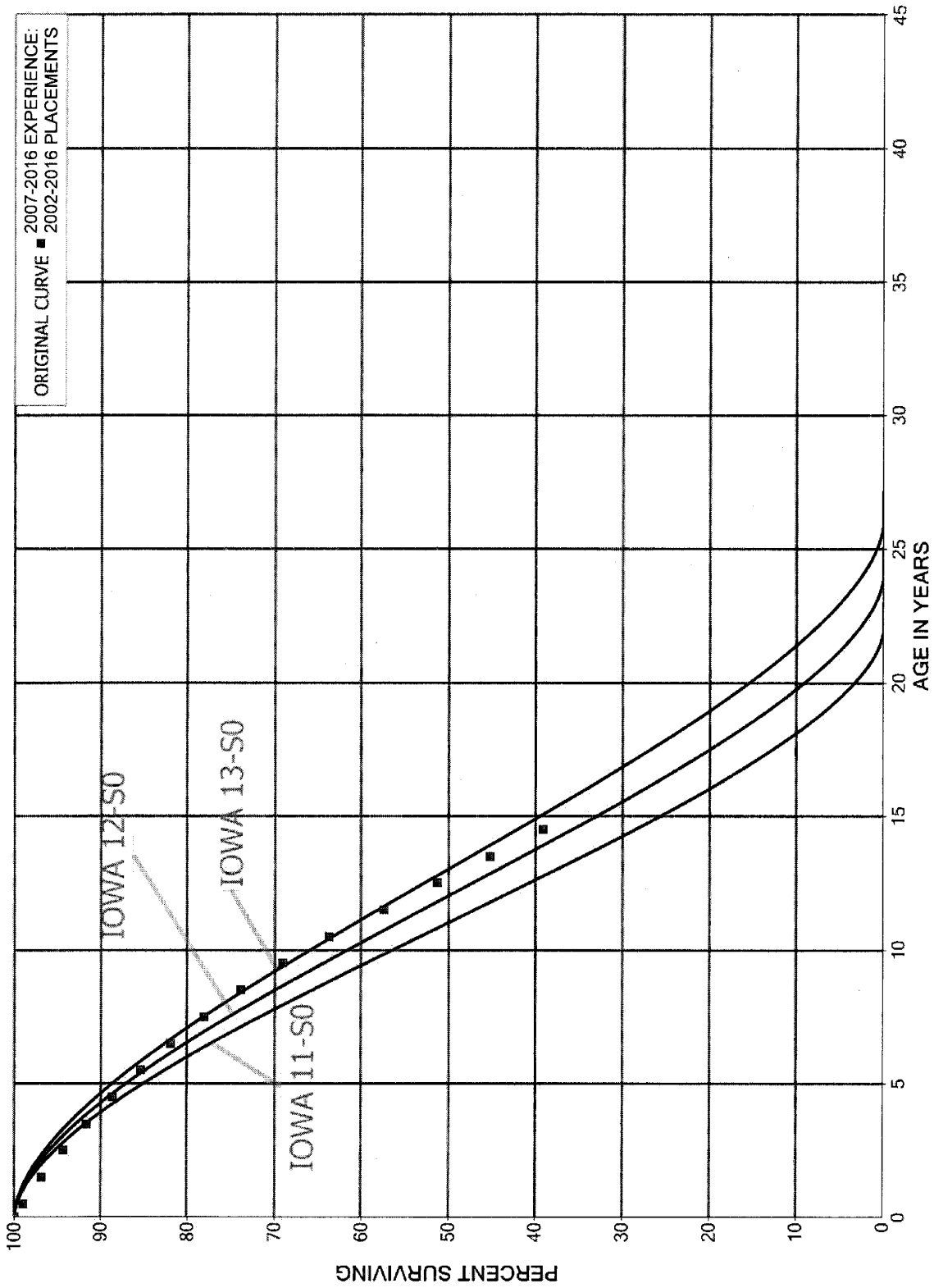


FIGURE 8. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN R1 IOWA TYPE CURVE ORIGINAL AND SMOOTH SURVIVOR CURVES

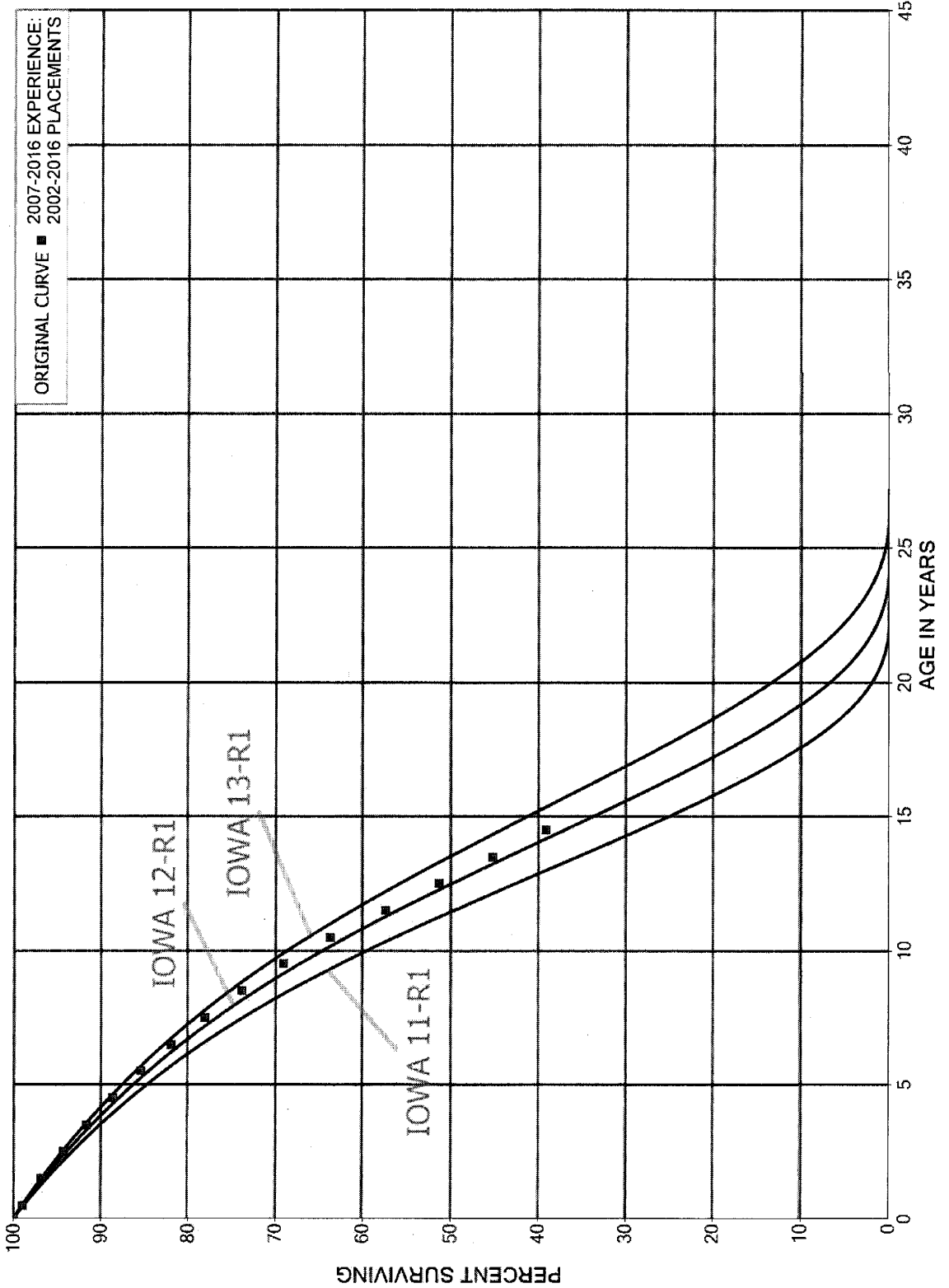
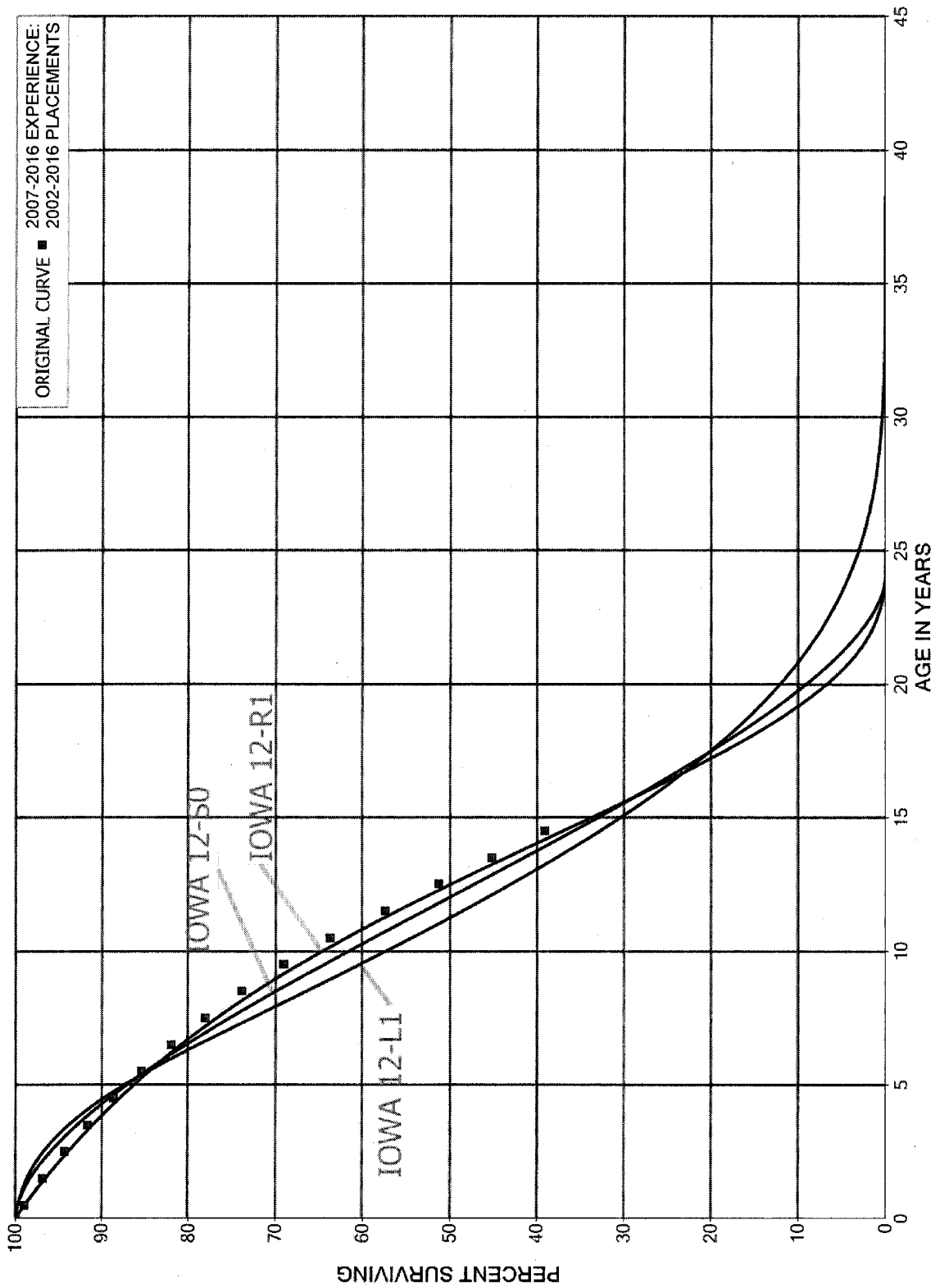


FIGURE 9. ILLUSTRATION OF THE MATCHING OF AN ORIGINAL SURVIVOR CURVE WITH AN L1, S0 AND R1 IOWA TYPE CURVE ORIGINAL AND SMOOTH SURVIVOR CURVES



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## **PART III. SERVICE LIFE CONSIDERATIONS**

## PART III. SERVICE LIFE CONSIDERATIONS

### FIELD TRIPS

In order to be familiar with the operation of the Company and observe representative portions of the plant, a field trip was conducted for the study. A general understanding of the function of the plant and information with respect to the reasons for past retirements and the expected future causes of retirements are obtained during field trips. This knowledge and information were incorporated in the interpretation and extrapolation of the statistical analyses.

The following is a list of the locations visited during the most recent field trip.

March 27, 2017

Keyser Valley Pump Station  
Parrott Avenue Pump Station  
Scranton Wastewater Treatment Facility

**Judgments.** The survivor curve estimates were based on judgment which considered factors including statistical analyses of retirements, Company policies and outlook as determined during discussions with management, and survivor curve estimates from previous studies of other Pennsylvania-American wastewater systems. For depreciable groups which consist of numerous similar items of property, the distribution of the lives of the units in the group was judged on the basis of an average survival pattern for the entire group.

The amortization periods selected for general plant Accounts 390, 393, 394, 396 and 397 are discussed in the section, "Amortization of General Plant Accounts."

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**PART IV. CALCULATION OF ANNUAL AND  
ACCRUED DEPRECIATION**

## **PART IV. CALCULATION OF ANNUAL AND ACCRUED DEPRECIATION**

### **BOOK RESERVE**

The book reserve as of December 31, 2016, is the result of a bringforward of the book reserves established by the Commission for the Scranton wastewater operation. The projected book reserve as of December 31, 2017, is a bringforward of the December 31, 2016 book reserve based on projected accruals, retirements, cost of removal, salvage and other credits.

### **GROUP DEPRECIATION PROCEDURES**

A group procedure for depreciation is appropriate when considering more than a single item of property. Normally the items within a group do not have identical service lives, but have lives that are dispersed over a range of time. There are two primary group procedures, namely, average service life and equal life group. In the average service life procedure, the rate of annual depreciation is based on the average life or average remaining life of the group, and this rate is applied to the surviving balances of the group's cost. A characteristic of this procedure is that the cost of plant retired prior to average life is not fully recouped at the time of retirement, whereas the cost of plant retired subsequent to average life is more than fully recouped. Over the entire life cycle, the portion of cost not recouped prior to average life is balanced by the cost recouped subsequent to average life.

#### **Single Unit of Property**

The calculation of straight line depreciation for a single unit of property is straightforward. For example, if a \$1,000 unit of property attains an age of four years and has a life expectancy of six years, the annual accrual over the total life is:



$$\frac{\$1,000}{(4 + 6)} = \$100 \text{ per year.}$$

The accrued depreciation is:

$$\$1,000 \left( 1 - \frac{6}{10} \right) = \$400.$$

### **Remaining Life Annual Accruals**

For the purpose of calculating remaining life accruals as of December 31, 2017, the depreciation reserve for each plant account is allocated among vintages in proportion to the calculated accrued depreciation for the account. Explanations of remaining life accruals and calculated accrued depreciation follow. The detailed calculations as of December 31, 2017, are set forth in the Results of Study section of the report.

### **Average Service Life Procedure**

In the average service life procedure, the remaining life annual accrual for each vintage is determined by dividing future book accruals (original cost less book reserve) by the average remaining life of the vintage. The average remaining life is a directly weighted average derived from the estimated future survivor curve in accordance with the average service life procedure.

The calculated accrued depreciation for each depreciable property group represents that portion of the depreciable cost of the group which would not be allocated to expense through future depreciation accruals if current forecasts of life characteristics are used as the basis for such accruals. The accrued depreciation calculation consists of applying an appropriate ratio to the surviving original cost of each vintage of each account based upon the attained age and service life. The straight line accrued depreciation ratios are calculated as follows for the average service life procedure:

$$\text{Ratio} = 1 - \frac{\text{Average Remaining Life}}{\text{Average Service Life}}$$

## **AMORTIZATION OF GENERAL PLANT ACCOUNTS**

In order to use a more efficient and cost effective accounting process for equipment recorded in general plant Accounts 390, 393, 394, 396 and 397; amounts capitalized in these accounts are amortized rather than depreciated. Amortization as defined in the Uniform System of Accounts is the gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized.

The primary reasons for the amortization of certain general plant accounts is that the effort required to unitize additions, periodically inventory equipment and determine amounts to be retired for equipment recorded in these accounts is disproportionate to the original cost of the equipment when compared to other wastewater plant accounts.

Accounting for such equipment using an amortization concept consists of capitalization of amounts to these accounts based on the same criteria as used previously under depreciation accounting, amortization of the asset over a fixed period, retirement of the equipment at the end of the amortization period and recognition of any net salvage related to disposition of equipment in these accounts as a gain or loss. For equipment in these accounts that was placed in service prior to implementation of amortization accounting, the net book value by vintage amortized over the remaining amortization period specified for each account and the original cost will be retired at the end of this period.

The amortization periods selected for each account or subaccount are based on a review of the existing depreciation rates for the accounts, typical service lives used for each type of equipment and a consideration of the period during which it is anticipated that most of the benefit of the equipment will be realized. The amortization periods are as follows:

<u>Account Number</u>	<u>Description</u>	<u>Amortization Period, Years</u>
390	Office Furniture and Equipment	20
393	Tools, Shop and Garage Equipment	20
394	Laboratory Equipment	15
396	Communication Equipment	15
397	Miscellaneous Equipment	15

#### **NET SALVAGE**

Experienced net salvage is incorporated in the results of the study as it was reported on the Company's books and records for the period January 1, 2013 through December 31, 2016, and estimated for the period January 1, 2017 through December 31, 2017. The calculation of the amortization is shown in Table 5 on page V-8. The amounts of salvage and removal cost by account for each year are set forth in the section beginning on page VIII-2.

Net salvage is presented in this manner to determine the amount of net salvage to be amortized to the cost of service for ratemaking purposes. In order to be consistent with this manner of recognizing net salvage, no adjustments for net salvage were made to the annual depreciation calculated for the individual accounts.

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**PART V. RESULTS OF STUDY**

## **PART V. RESULTS OF STUDY**

### **DESCRIPTION OF SUMMARY TABULATIONS**

Table 1 presents the development of the net original cost used in the study. The results of the depreciation study are summarized in Table 2 which sets forth, by depreciable group, the estimated survivor curve, calculated annual accruals and book reserve related to net original cost and the annual amortization of net salvage. Table 3 presents the bringforward to December 31, 2017 of the book reserve as of December 31, 2016. Table 4 sets forth the calculation of estimated depreciation accruals for the twelve months ended December 31, 2017. Table 5 presents the amortization of experienced and estimated net salvage, by account, based on the five-year period, 2013-2017. The total amortization amount is incorporated in the total annual accrual in Table 2.

### **DESCRIPTION OF DETAILED TABULATIONS**

Supporting statistical data for the estimates of average service lives and survivor curves, the annual depreciation calculations, and salvage and cost of removal for the years 2013-2017 are presented in three sections.

The section beginning on page VI-2 sets forth, for each depreciable group analyzed by the retirement rate method, a chart depicting the original and estimated survivor curves followed by a tabular presentation of the original life table plotted on the chart. A cumulative summary, by year installed, for utility plant and the supporting data for the original cost depreciation calculations are presented in the section beginning on page VII-3. The tabulations of experienced and estimated net salvage, by year and account for the five-year period 2013-2017, are presented in the section beginning on page VIII-2.

In the first section, the survivor curves estimated for the depreciable groups are shown as dark smooth curves on the charts. Each smooth survivor curve is denoted by a numeral followed by the type curve designation. The numeral used is the average life derived from the entire curve from 100 percent to zero percent surviving. In cases where only a segment of the estimated curve is used in the depreciation calculation, the numeral used for identification purposes is not a designation of the average life of the group. The titles of the charts indicate the group, the symbol used to plot the points of the original life table, and the experience and placement bands of the life tables which were plotted. The experience band indicates the range of years for which the retirements were used to develop the stub survivor curve. The placements indicate, for the related experience band, the range of years of installations which appear in the experience.

The tables of the calculated annual depreciation related to net original cost are presented in account sequence in the second section and indicate the estimated average survivor curves used in the calculations. The tables set forth, for each installation year, the original cost, calculated accrued depreciation, allocated book reserve, remaining life expectancy, and the calculated annual accrual.

Detailed tabulations setting forth the cost of removal, gross salvage and net salvage amounts, by account and year, are presented in the third section. The net salvage amounts, by account and year, are carried forward to Table 5, which presents the five-year amortization of net salvage.

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 1. DEVELOPMENT OF NET ORIGINAL COST AS OF DECEMBER 31, 2017

DEPRECIABLE GROUP (1)	ORIGINAL COST AS OF DECEMBER 31, 2017 (2)	CUSTOMER ADVANCES (3)	CONTRIBUTIONS IN AID OF CONSTRUCTION (4)	EXCLUDED PROPERTY (5)	NET ORIGINAL COST AS OF DECEMBER 31, 2017 (6)
<b>DEPRECIABLE PLANT</b>					
354.30 STRUCTURES AND IMPROVEMENTS - SPP	5,134,823.35				5,134,823.35
354.40 STRUCTURES AND IMPROVEMENTS - TDP	53,510,119.74		2,500,000.00		51,010,119.74
355.00 POWER GENERATING EQUIPMENT	1,286,249.00				1,286,249.00
360.10 COLLECTION SEWERS - FORCE MAINS	239,206.24				239,206.24
361.10 COLLECTION SEWERS - GRAVITY MAINS	70,021,190.62		8,113,082.47		61,908,108.15
361.20 MANHOLES	13,181,195.84				13,181,195.84
363.00 SERVICES	9,804,628.52		841,466.15		8,963,162.37
364.00 FLOW MEASURING DEVICES	645,170.88				645,170.88
371.00 PUMPING EQUIPMENT	3,485,503.70				3,485,503.70
380.00 TREATMENT EQUIPMENT	14,618,708.29				14,618,708.29
389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT	4,505,753.27				4,505,753.27
390.00 OFFICE FURNITURE AND EQUIPMENT	1,403,937.51				1,403,937.51
391.00 TRANSPORTATION EQUIPMENT	3,822,007.17				3,822,007.17
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	927,680.58				927,680.58
394.00 LABORATORY EQUIPMENT	108,802.28				108,802.28
395.00 POWER OPERATED EQUIPMENT	665,081.72				665,081.72
396.00 COMMUNICATION EQUIPMENT	1,177,477.00				1,177,477.00
397.00 MISCELLANEOUS EQUIPMENT	313,000.00				313,000.00
<b>TOTAL DEPRECIABLE PLANT</b>	<b>184,850,535.71</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>173,395,987.09</b>
<b>NONDEPRECIABLE PLANT</b>					
353.20 LAND AND LAND RIGHTS - COLLECTION	3,080,662.60				3,080,662.60
353.30 LAND AND LAND RIGHTS - SPP	43,570.00				43,570.00
353.40 LAND AND LAND RIGHTS - TDP	110,019.50				110,019.50
<b>TOTAL NONDEPRECIABLE PLANT</b>	<b>3,234,252.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>3,234,252.10</b>
<b>TOTAL WASTEWATER PLANT IN SERVICE</b>	<b>188,084,787.81</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>176,630,239.19</b>

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 2. SUMMARY OF ESTIMATED SURVIVOR CURVES, ORIGINAL COST, BOOK RESERVE, AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WASTEWATER PLANT AS OF DECEMBER 31, 2017

	DEPRECIABLE GROUP (1)	SURVIVOR CURVE (2)	ORIGINAL COST AS OF DECEMBER 31, 2017 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	CALCULATED ANNUAL		COMPOSITE REMAINING LIFE (8)
						ACCRUAL AMOUNT (6)	ACCURAL RATE (7)=(6)/(3)	
<b>DEPRECIABLE PLANT</b>								
354.30	STRUCTURES AND IMPROVEMENTS - SPP	50-R2.5	5,134,823.35	1,514,550	3,620,273	86,362	1.68	41.9
354.40	STRUCTURES AND IMPROVEMENTS - TDP	65-R2	51,010,119.74	11,558,364	39,451,756	715,258	1.40	55.2
355.00	POWER GENERATING EQUIPMENT	35-R2.5	1,286,249.00	9,518	1,276,731	36,975	2.87	34.5
360.10	COLLECTION SEWERS - FORCE MAINS	70-S2	239,206.24	153,799	85,407	2,814	1.18	30.4
361.10	COLLECTION SEWERS - GRAVITY MAINS	70-R2.5	61,908,108.15	24,871,622	37,036,486	785,108	1.27	47.2
361.20	MANHOLES	50-S1.5	13,181,195.84	7,369,725	5,811,471	217,391	1.65	26.7
363.00	SERVICES	38-R3	8,963,162.37	4,846,387	4,116,775	310,351	3.46	13.3
364.00	FLOW MEASURING DEVICES	20-L3	645,170.88	80,345	564,826	32,165	4.99	17.6
371.00	PUMPING EQUIPMENT	40-S0	3,485,503.70	639,414	2,846,090	78,052	2.24	36.5
380.00	TREATMENT EQUIPMENT	45-R2	14,618,708.29	5,236,091	9,382,617	271,329	1.86	34.6
389.10	OTHER PLANT AND MISCELLANEOUS EQUIPMENT	20-S2.5	4,505,753.27	805,279	3,700,474	233,761	5.19	15.8
390.00	OFFICE FURNITURE AND EQUIPMENT	20-SQ	1,403,937.51	189,336	1,214,602	70,216	5.00	17.3
391.00	TRANSPORTATION EQUIPMENT	15-L4	3,822,007.17	1,987,760	1,834,247	170,812	4.47	10.7
393.00	TOOLS, SHOP AND GARAGE EQUIPMENT	20-SQ	927,680.58	194,522	733,159	46,385	5.00	15.8
394.00	LABORATORY EQUIPMENT	15-SQ	108,802.28	53,669	55,133	7,252	6.67	7.6
395.00	POWER OPERATED EQUIPMENT	16-L2.5	665,081.72	437,336	227,746	21,867	3.29	10.4
396.00	COMMUNICATION EQUIPMENT	15-SQ	1,177,477.00	39,269	1,138,208	78,497	6.67	14.5
397.00	MISCELLANEOUS EQUIPMENT	15-SQ	313,000.00	10,439	302,561	20,866	6.67	14.5
	<b>TOTAL DEPRECIABLE PLANT</b>		<b>173,395,987.09</b>	<b>59,997,425</b>	<b>113,398,562</b>	<b>3,185,461</b>	<b>1.84</b>	
	<b>AMORTIZATION OF NET SALVAGE</b>					<b>7,659</b>		
	<b>NONDEPRECIABLE PLANT</b>							
353.20	LAND AND LAND RIGHTS - COLLECTION		3,080,662.60					
353.30	LAND AND LAND RIGHTS - SPP		43,570.00					
353.40	LAND AND LAND RIGHTS - TDP		110,019.50					
	<b>TOTAL NONDEPRECIABLE PLANT</b>		<b>3,234,252.10</b>					
	<b>TOTAL WASTEWATER PLANT IN SERVICE</b>		<b>176,630,239.19</b>	<b>59,997,425</b>	<b>113,398,562</b>	<b>3,193,120</b>		



PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 3. BRINGFORWARD TO DECEMBER 31, 2017, OF BOOK RESERVE AS OF DECEMBER 31, 2016

ACCOUNT (1)	BOOK RESERVE BALANCE AS OF 12/31/2016 (2)	+	PROJECTED DEPRECIATION ACCRUALS (3)	-	PROJECTED RETIREMENTS (4)	-	PROJECTED COST OF REMOVAL (5)	+	PROJECTED SALVAGE (6)	+	ACQUISITIONS (7)	=	PROJECTED BOOK RESERVE BALANCE AS OF 12/31/2017 (8)
354.30	1,443,116		71,434										1,514,550
354.40	10,929,899		691,465		45,000		18,000						11,558,364
355.00	0		9,518										9,518
360.10	150,952		2,847										153,799
361.10	24,199,271		730,774		41,435		16,988						24,871,622
361.20	7,154,174		218,935		2,400		984						7,369,725
363.00	4,533,421		323,286		8,000		2,320						4,846,387
364.00	54,243		26,102										80,345
371.00	574,319		65,095										639,414
380.00	4,964,183		271,908										5,236,091
389.10	579,985		225,294										805,279
390.00	136,653		62,780										189,336
391.00	1,838,747		149,013		10,097								1,987,760
393.00	158,463		36,059										194,522
394.00	46,412		7,257										53,669
395.00	415,322		22,014										437,336
396.00	0		39,269										39,269
397.00	0		10,439										10,439
<b>TOTAL</b>	<b>57,179,160</b>		<b>2,963,489</b>		<b>106,932</b>		<b>38,292</b>		<b>0</b>		<b>0</b>		<b>59,997,425</b>

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 4. CALCULATION OF DEPRECIATION ACCRUALS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2017

ACCOUNT (1)	NET ORIGINAL COST AS OF 12/31/2016 (2)	NET ORIGINAL COST AS OF 12/31/2017 (3)	ACCRUAL RATE (4)	AVERAGE ACCRUALS (5)=[(2)+(3)]/2*(4)	AMORTIZATION OF NET SALVAGE (6)	PROJECTED DEPRECIATION ACCRUALS (7)=(5)+(6)
354.30	3,907,437.35	5,134,823.35	1.58	71,434		71,434
354.40	48,481,238.74	51,010,119.74	1.39	691,465		691,465
355.00	0.00	1,286,249.00	1.48	9,518		9,518
360.10	239,206.24	239,206.24	1.19	2,847		2,847
361.10	55,958,587.99	61,908,108.15	1.24	730,774		730,774
361.20	13,038,597.00	13,181,195.84	1.67	218,935		218,935
363.00	8,751,162.37	8,963,162.37	3.65	323,286		323,286
364.00	401,003.88	645,170.88	4.99	26,102		26,102
371.00	2,569,862.70	3,485,503.70	2.15	65,095		65,095
380.00	14,618,708.29	14,618,708.29	1.86	271,908		271,908
389.10	4,142,753.27	4,505,753.27	5.21	225,294		225,294
390.00	1,117,338.21	1,403,937.51	4.98	62,780		62,780
391.00	3,394,097.17	3,822,007.17	4.13	149,013		149,013
393.00	514,681.58	927,680.58	5.00	36,059		36,059
394.00	108,802.28	108,802.28	6.67	7,257		7,257
395.00	665,081.72	665,081.72	3.31	22,014		22,014
396.00	0.00	1,177,477.00	6.67	39,269		39,269
397.00	0.00	313,000.00	6.67	10,439		10,439
TOTAL	157,908,558.79	173,395,987.09		2,963,489	0	2,963,489

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

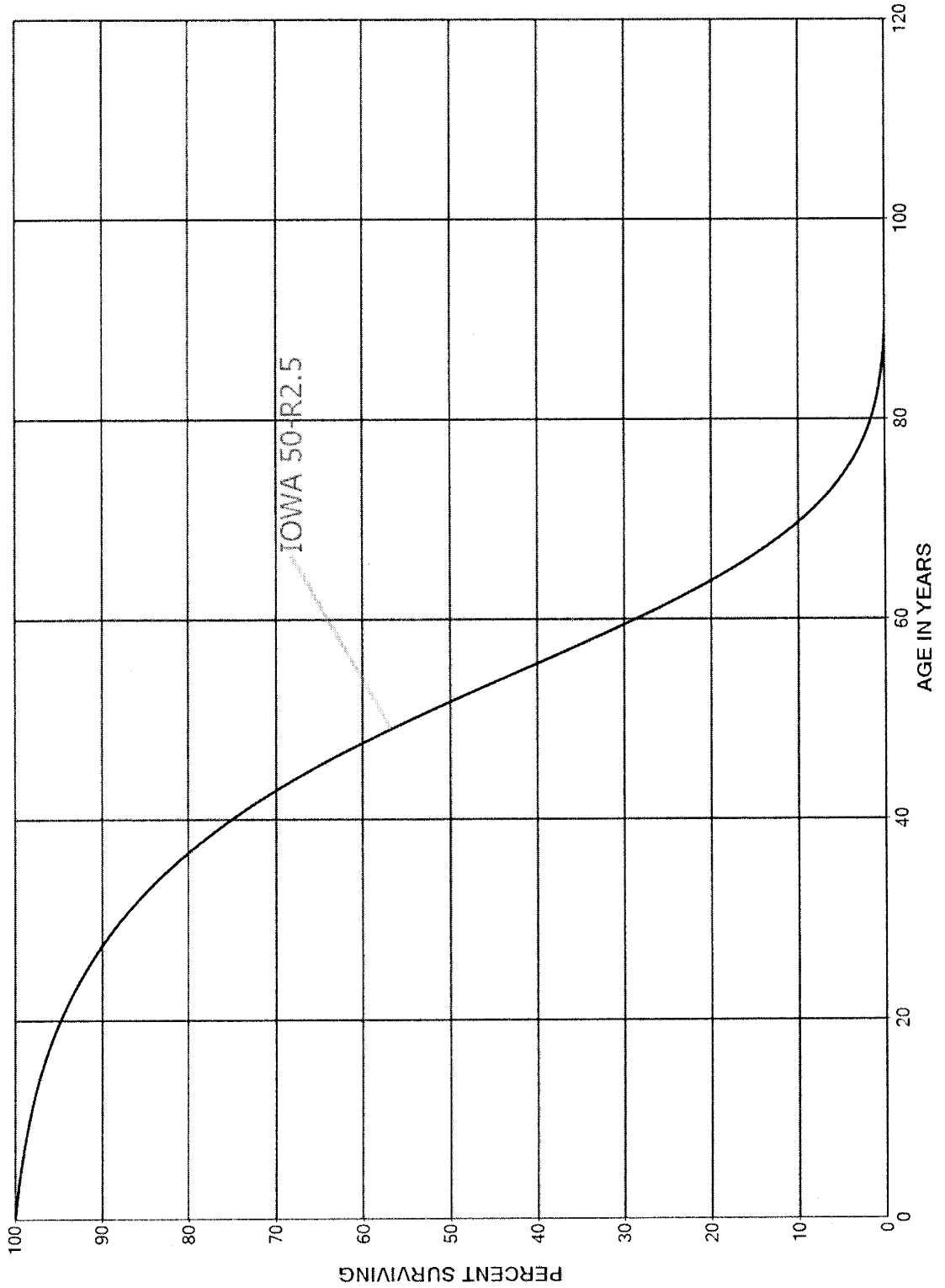
TABLE 5. AMORTIZATION OF EXPERIENCED AND ESTIMATED NET SALVAGE

Account (1)	EXPERIENCED AND ESTIMATED NET SALVAGE					5 - YEAR AMORT. (7)
	2013 (2)	2014 (3)	2015 (4)	2016 (5)	2017 (5)	
354.40	0	0	0	0	(18,000)	3,600
361.10	0	0	0	0	(16,988)	3,398
361.20	0	0	0	0	(984)	197
363.00	0	0	0	0	(2,320)	464
TOTAL	0	0	0	0	(38,292)	7,659

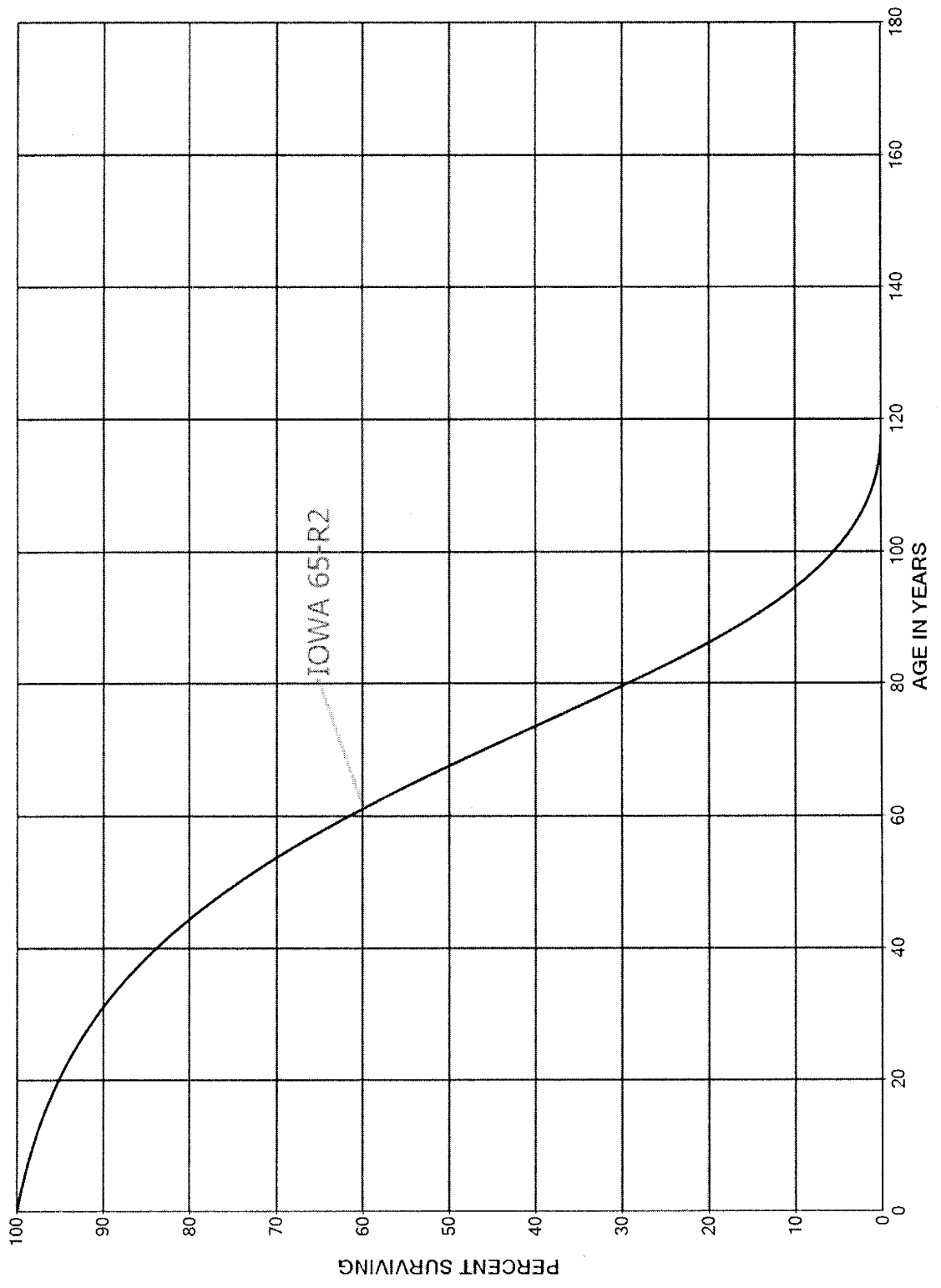
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## PART VI. SERVICE LIFE STATISTICS

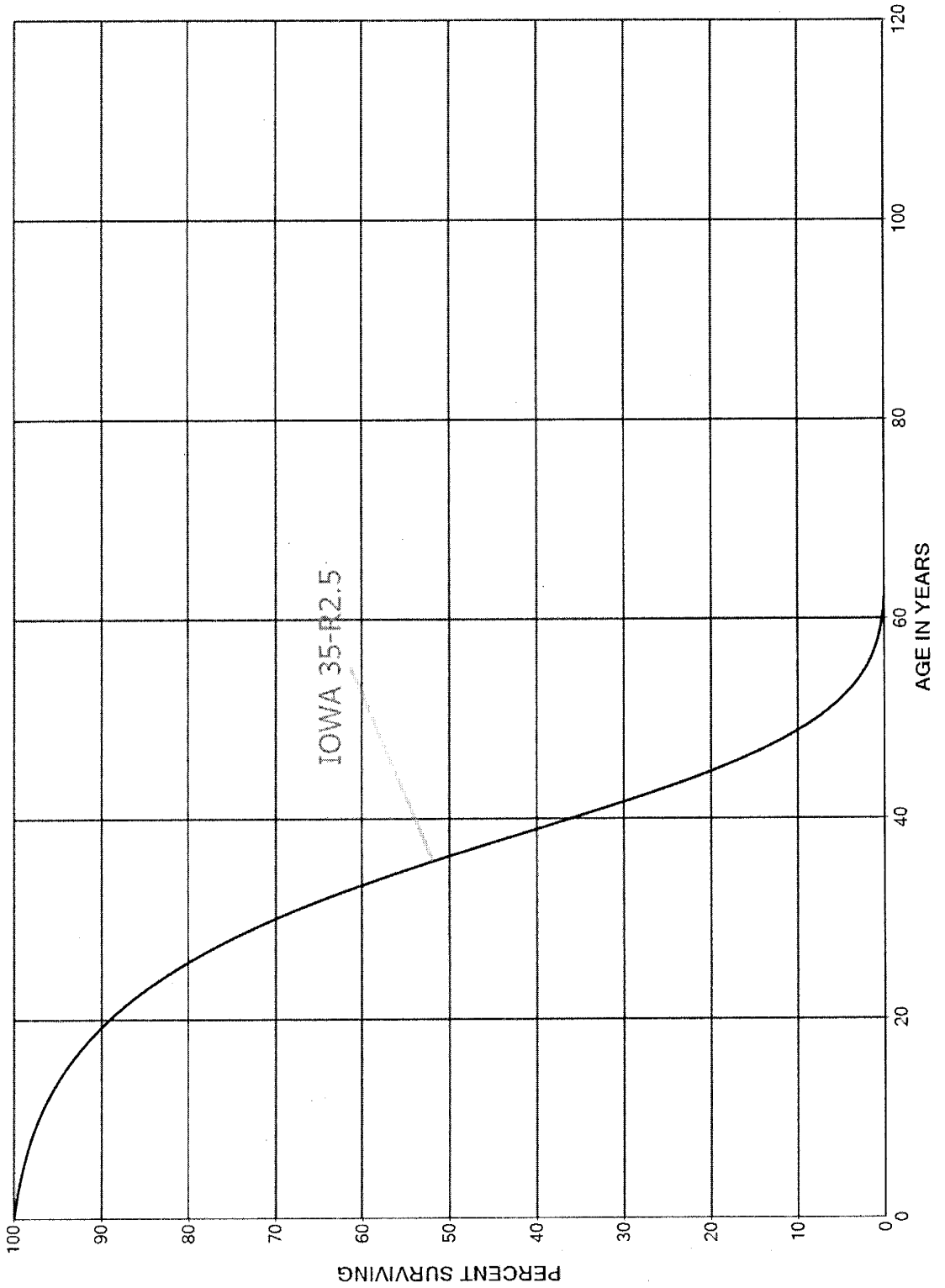
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 354.30 STRUCTURES AND IMPROVEMENTS - SPP  
 SMOOTH SURVIVOR CURVE



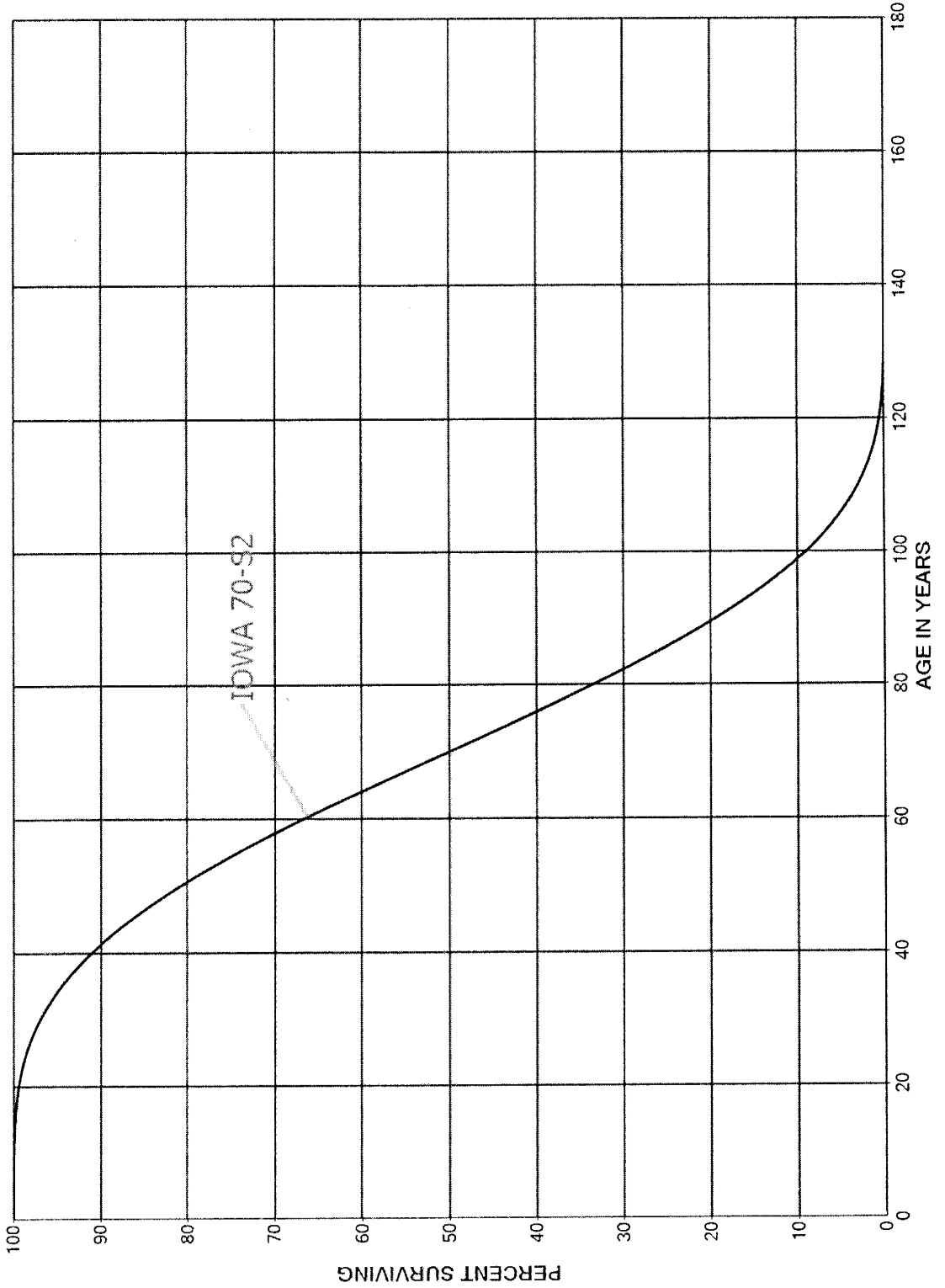
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 354.40 STRUCTURES AND IMPROVEMENTS - TDP  
 SMOOTH SURVIVOR CURVE



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 355.00 POWER GENERATION EQUIPMENT  
 SMOOTH SURVIVOR CURVE

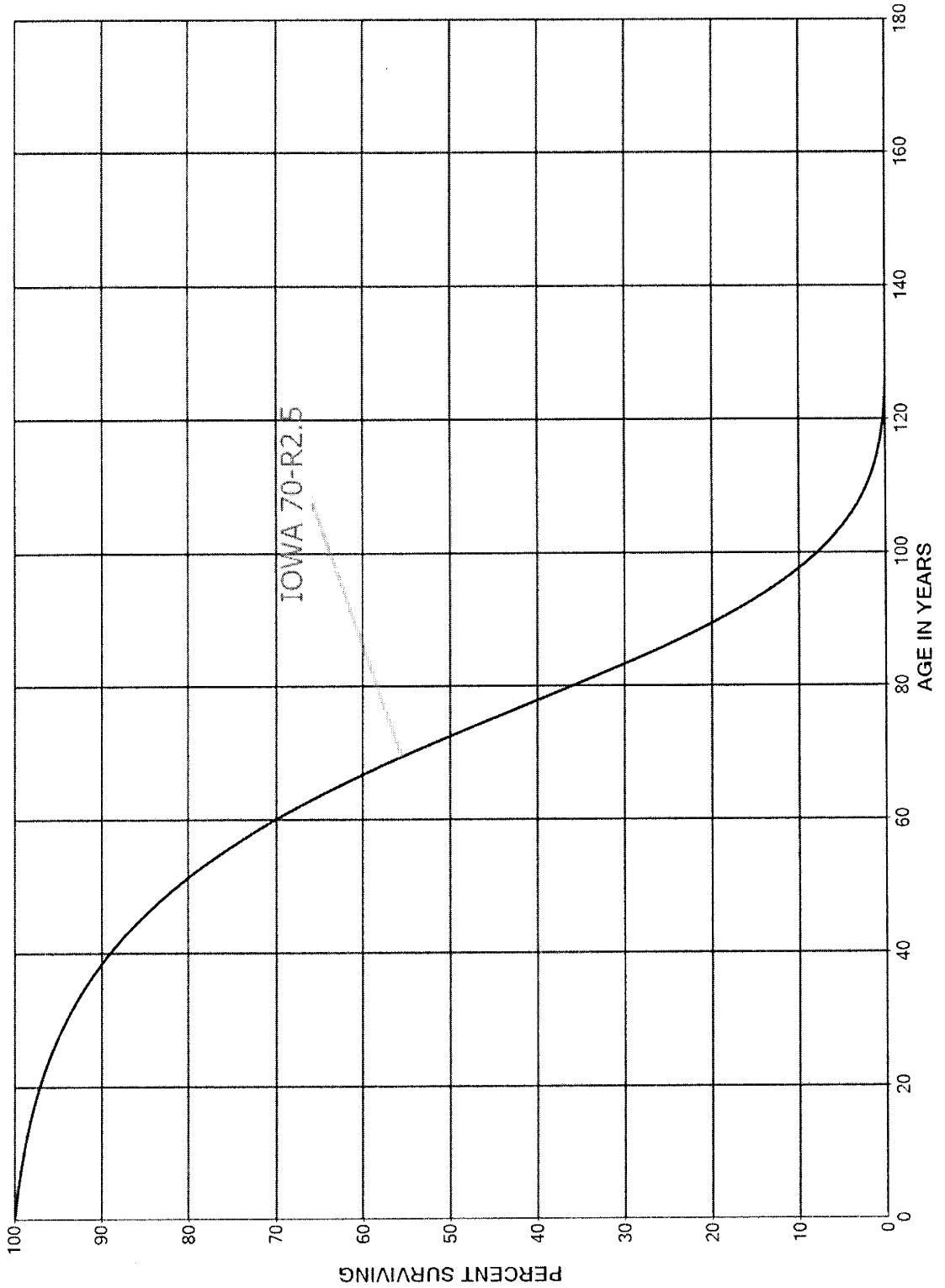


PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 360.10 COLLECTION SEWERS - FORCE MAINS  
 SMOOTH SURVIVOR CURVE

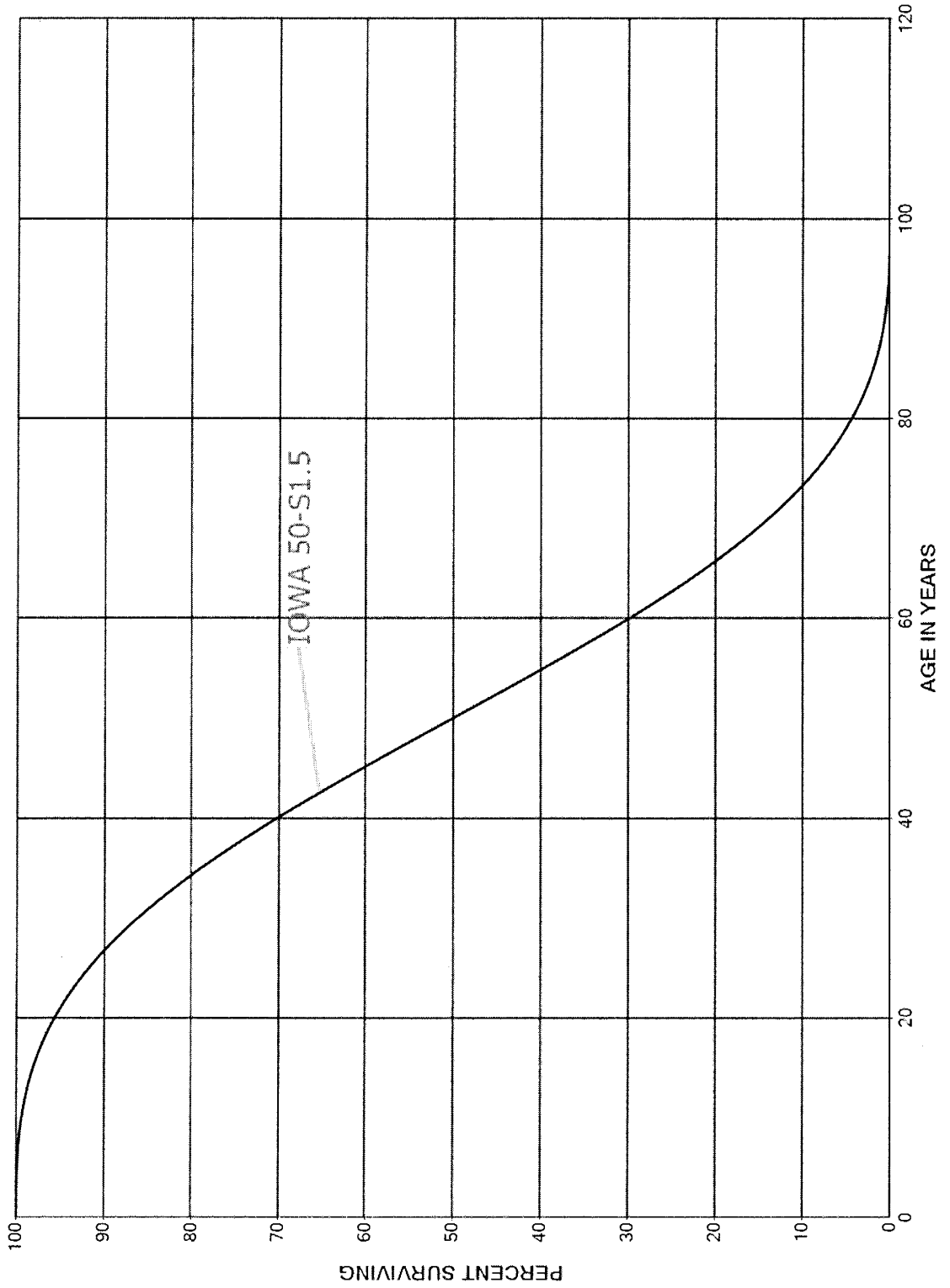




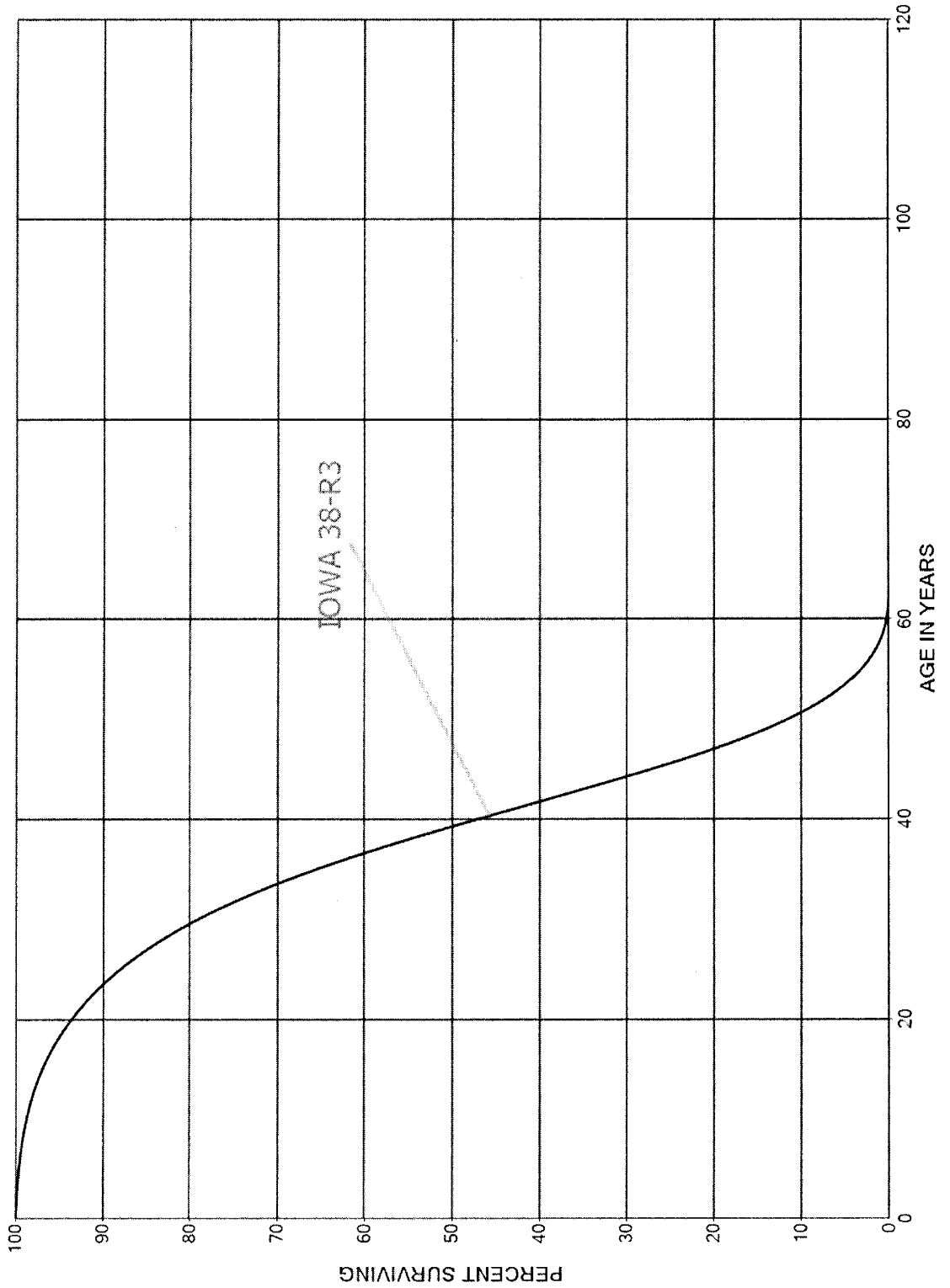
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS  
 SMOOTH SURVIVOR CURVE



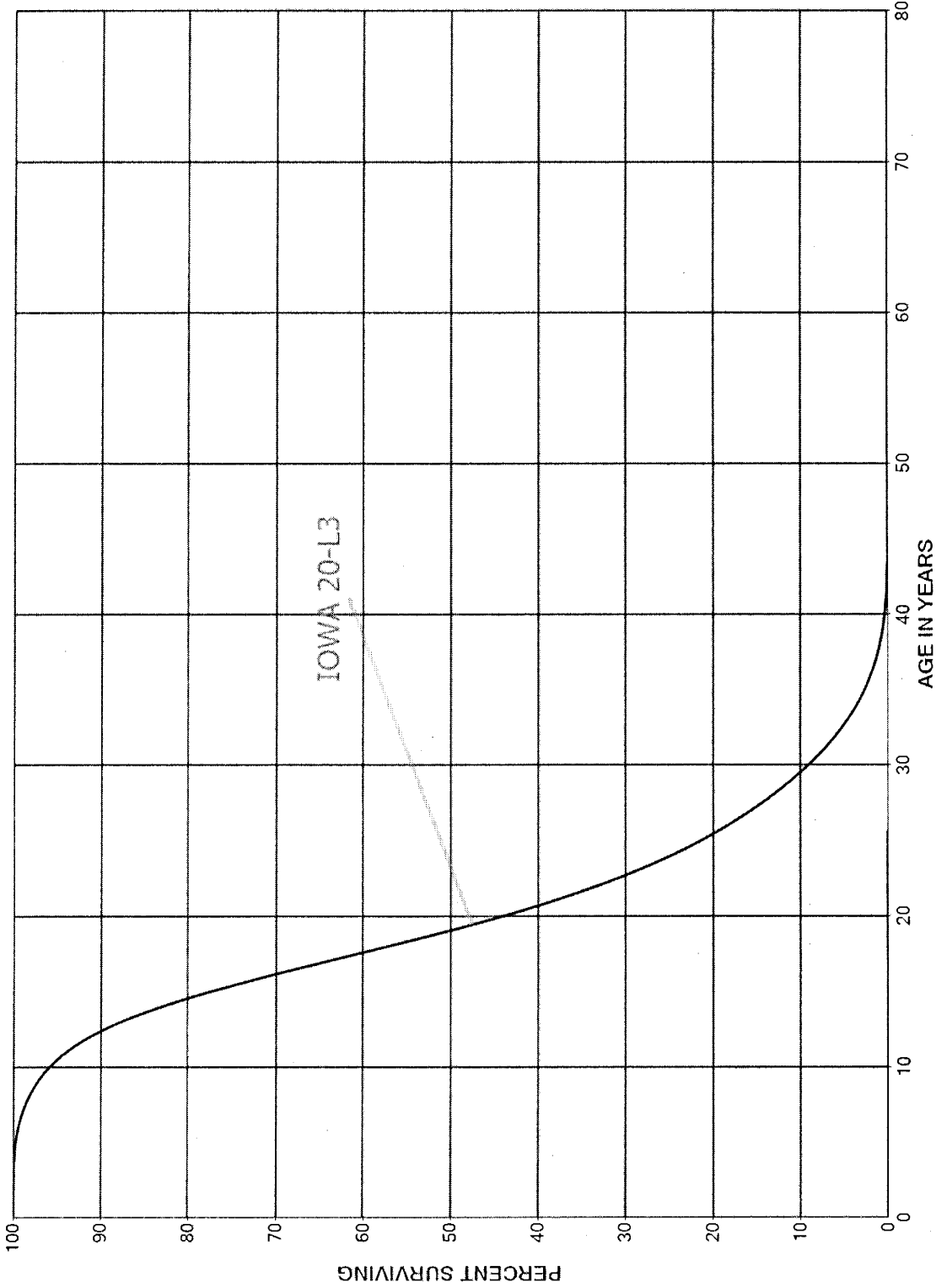
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 361.20 MANHOLES  
 SMOOTH SURVIVOR CURVE



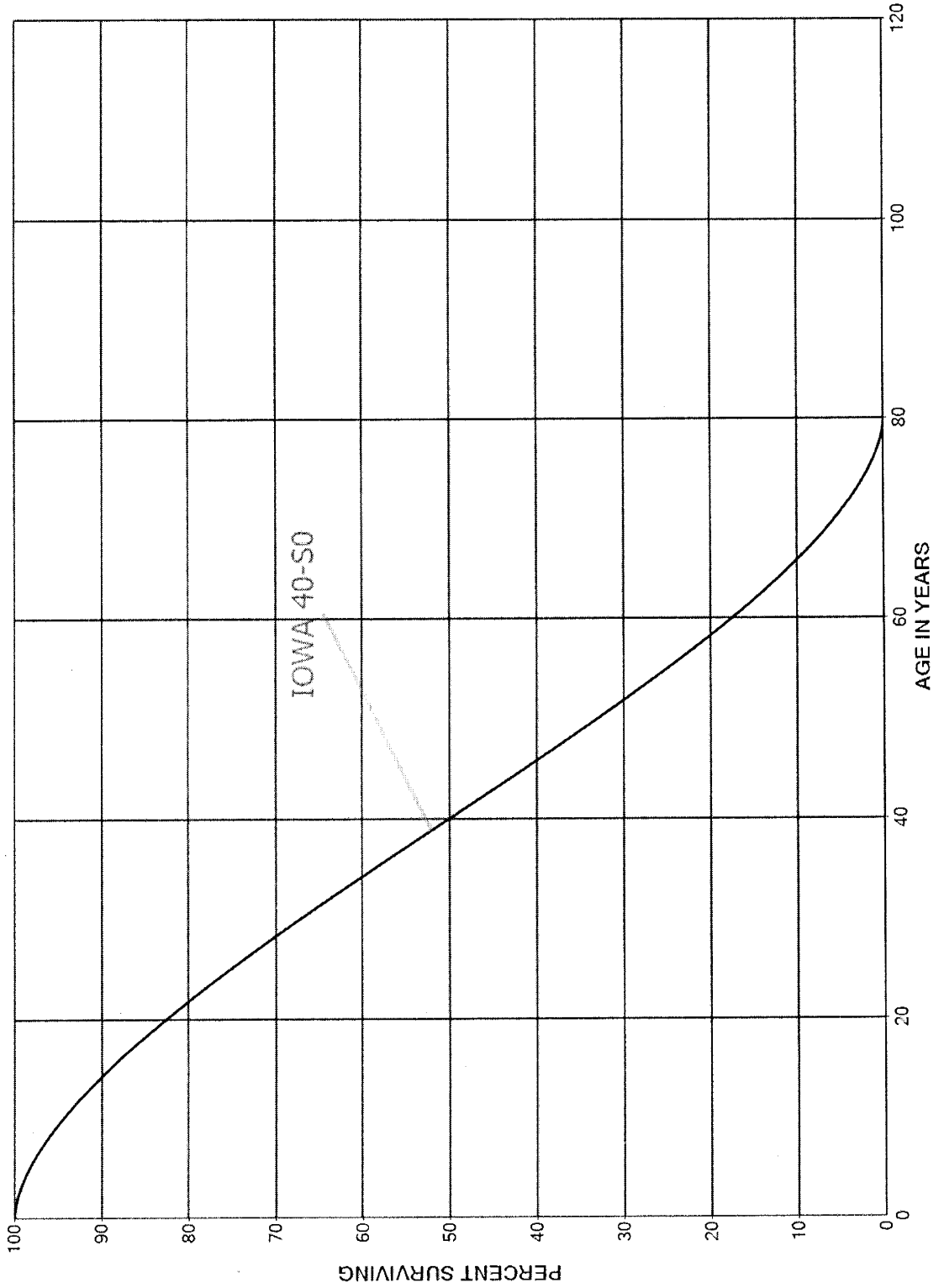
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 363.00 SERVICES  
 SMOOTH SURVIVOR CURVE



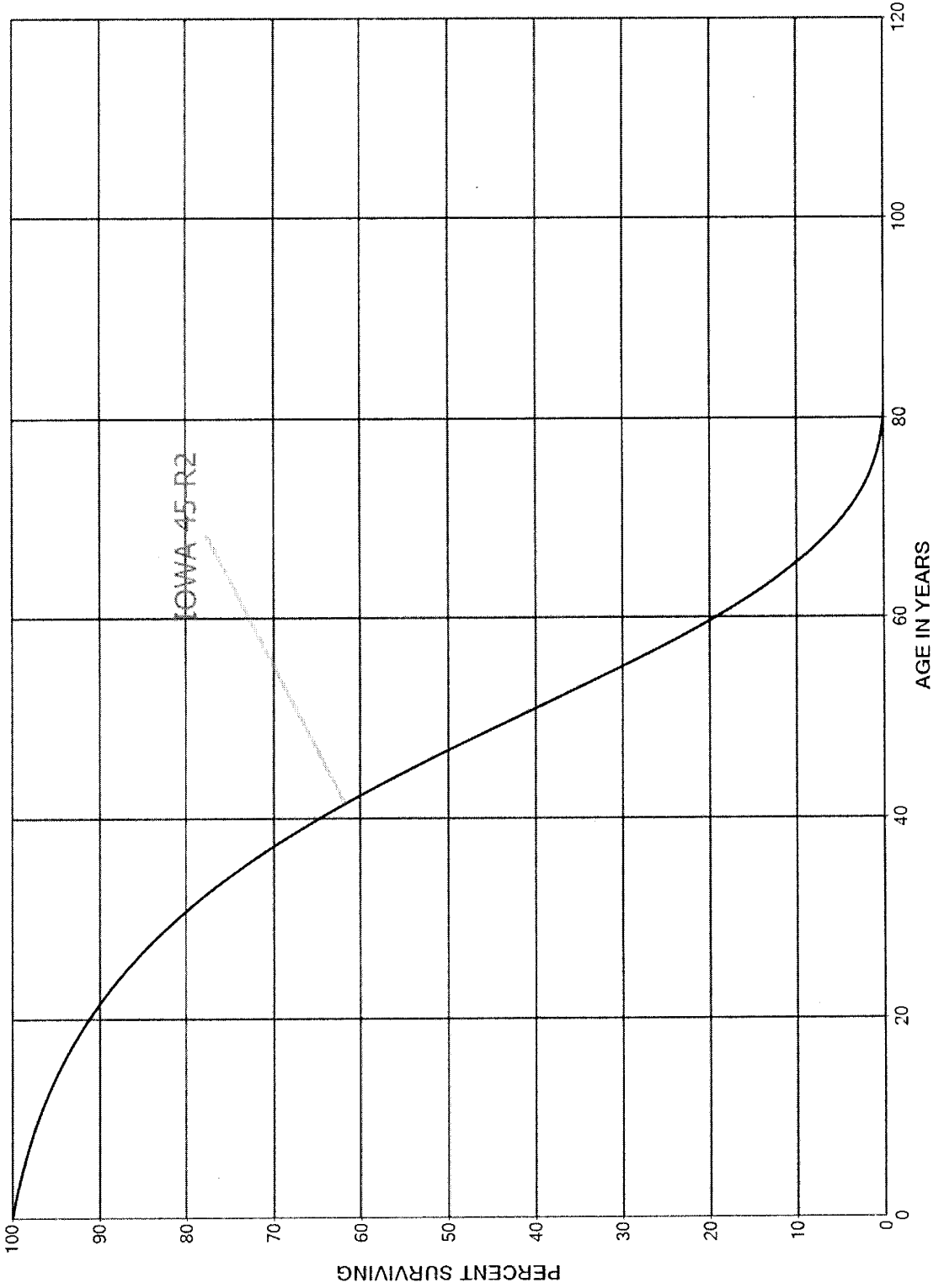
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 364.00 FLOW MEASURING DEVICES  
 SMOOTH SURVIVOR CURVE



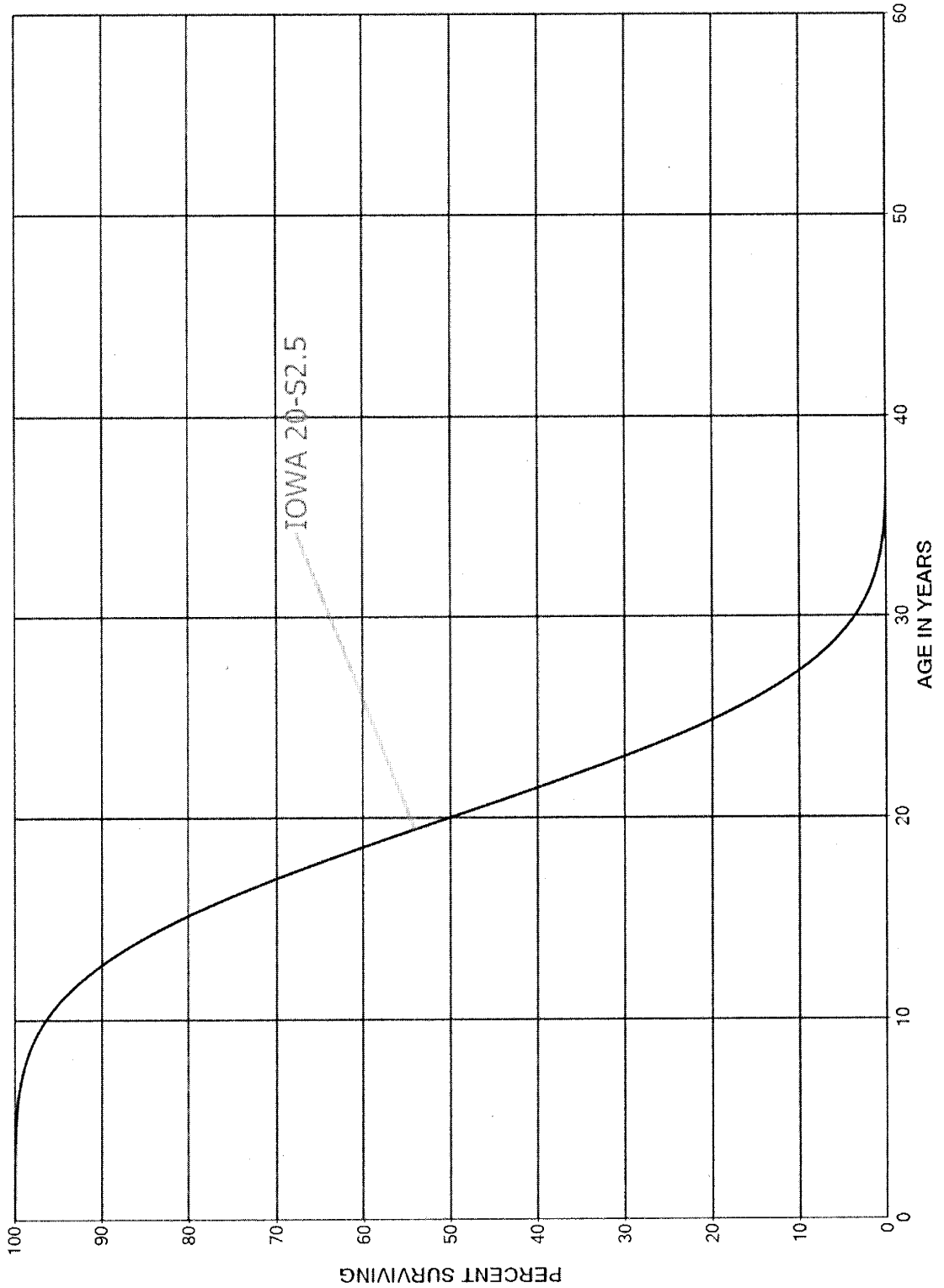
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 371.00 PUMPING EQUIPMENT  
 SMOOTH SURVIVOR CURVE



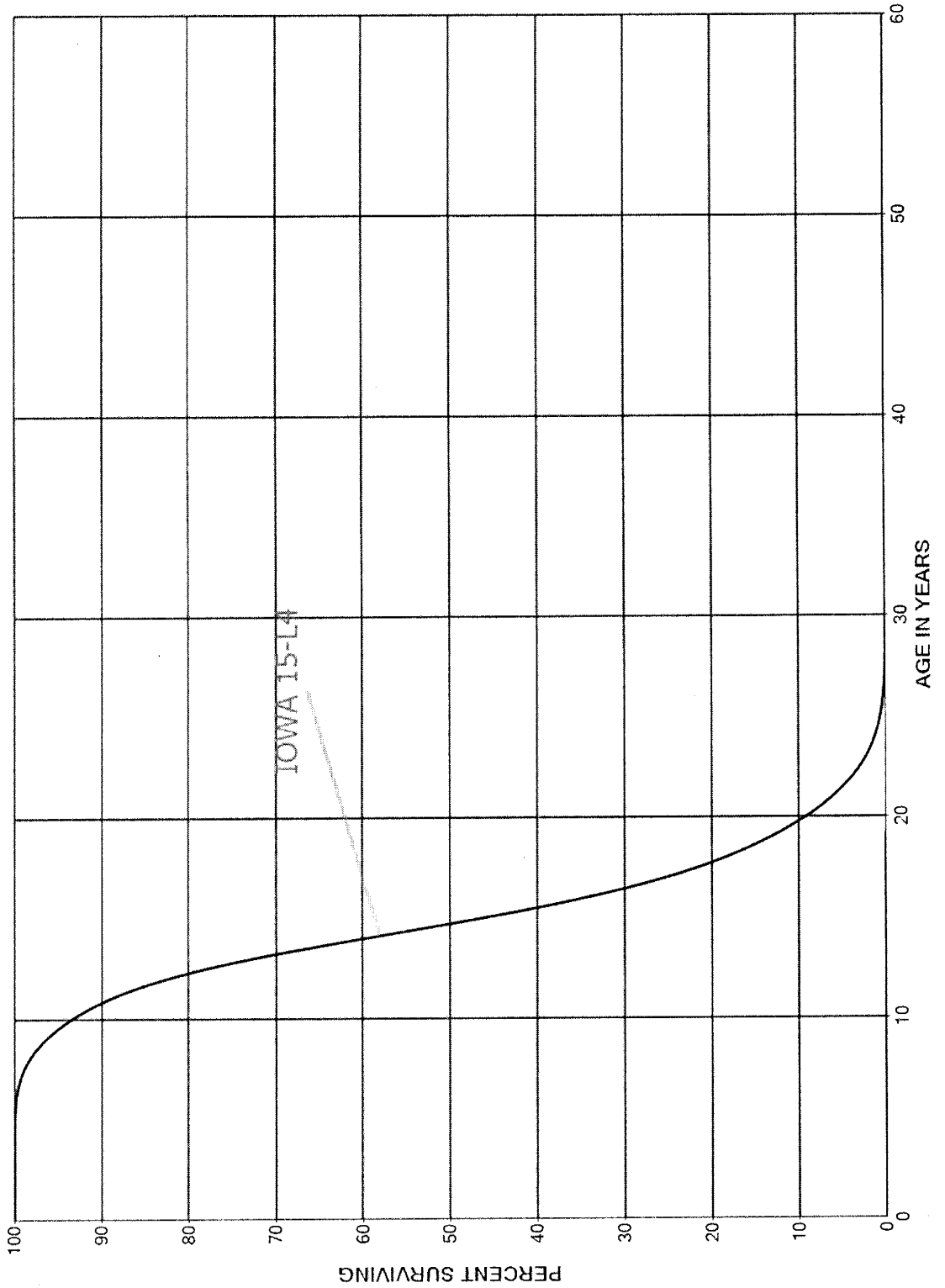
PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 380.00 TREATMENT EQUIPMENT  
 SMOOTH SURVIVOR CURVE



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT  
 SMOOTH SURVIVOR CURVE

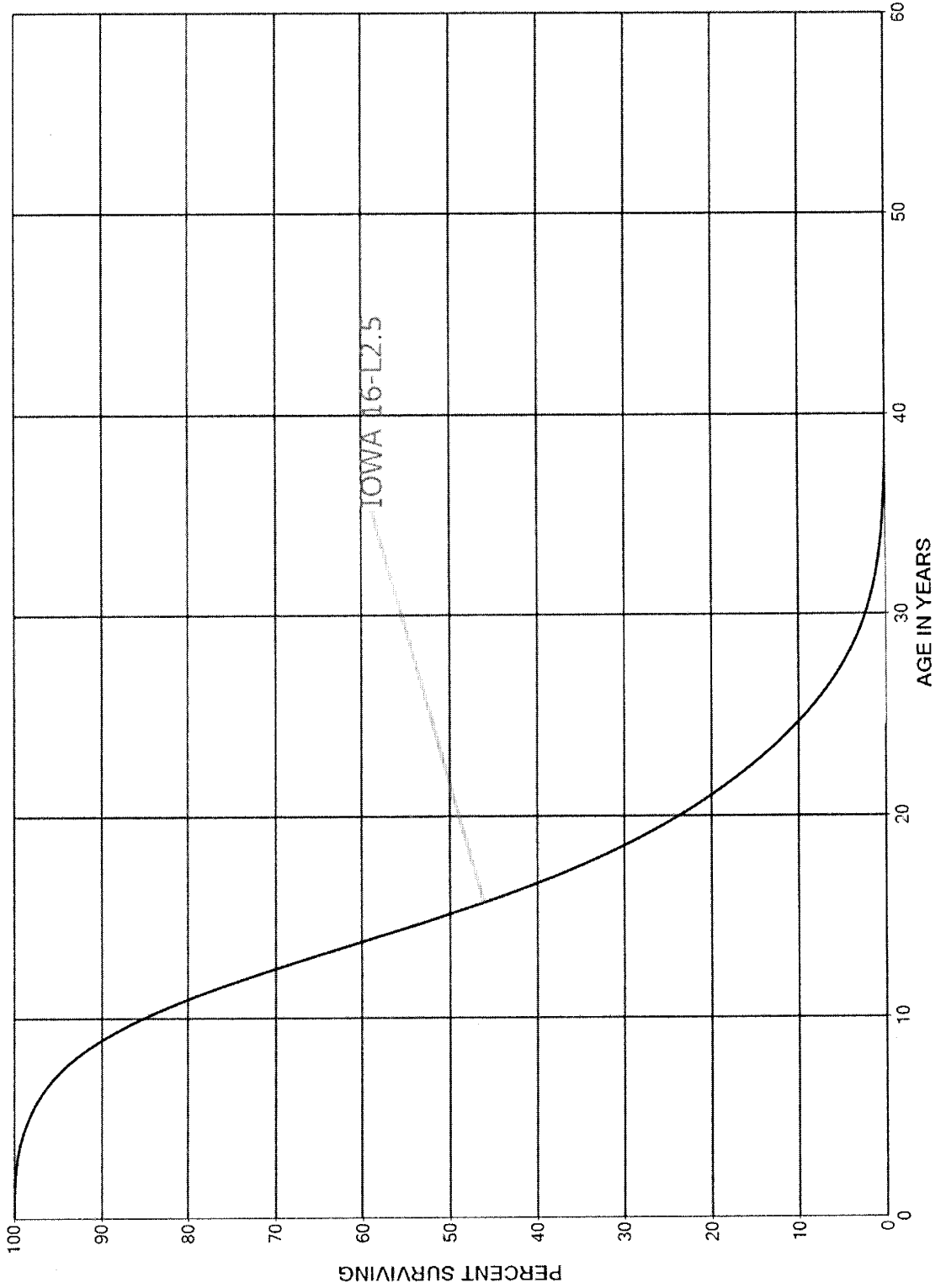


PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS  
 ACCOUNT 391.00 TRANSPORTATION EQUIPMENT  
 SMOOTH SURVIVOR CURVE





PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS  
ACCOUNT 395.00 POWER OPERATED EQUIPMENT  
SMOOTH SURVIVOR CURVE



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**PART VII. DETAILED DEPRECIATION  
CALCULATIONS**

**CUMULATIVE DEPRECIATED ORIGINAL COST**

**PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS**

**CUMULATIVE DEPRECIATED ORIGINAL COST BY YEAR INSTALLED  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017**

<b>YEAR INST (1)</b>	<b>ORIGINAL COST (2)</b>	<b>ACCRUED DEPRECIATION (3)</b>	<b>AMOUNT (2)-(3) (4)</b>	<b>CUMULATIVE AMOUNT (5)</b>	<b>PCT OF COL 4 TOTAL (6)</b>
1918	3,740,497	3,678,090	62,407	62,407	0.05
1938	1,295,745	1,204,277	91,468	153,875	0.13
1945	294,346	259,330	35,016	188,891	0.16
1950	1,162,920	973,641	189,279	378,170	0.31
1955	601,960	482,448	119,512	497,682	0.41
1960	1,141,574	860,166	281,408	779,090	0.65
1965	851,114	607,066	244,048	1,023,138	0.85
1970	1,005,772	668,543	337,229	1,360,368	1.13
1972	31,147,625	20,516,741	10,630,884	11,991,252	9.95
1973	942,568	626,504	316,064	12,307,315	10.21
1974	748,213	482,828	265,385	12,572,700	10.43
1975	2,921,148	1,796,915	1,124,233	13,696,933	11.36
1977	560,762	348,165	212,597	13,909,530	11.54
1978	1,485,705	906,314	579,391	14,488,921	12.02
1979	1,553,086	929,857	623,229	15,112,150	12.53
1980	1,722,094	987,175	734,919	15,847,069	13.14
1981	1,211,029	697,960	513,069	16,360,138	13.57
1982	933,366	529,182	404,184	16,764,322	13.90
1983	669,390	369,657	299,733	17,064,055	14.15
1984	1,823,979	1,239,174	584,805	17,648,860	14.64
1985	3,607,031	1,838,297	1,768,734	19,417,594	16.10
1986	1,471,140	774,475	696,665	20,114,259	16.68
1987	2,810,925	1,765,990	1,044,935	21,159,194	17.55
1988	1,364,877	857,826	507,051	21,666,245	17.97
1989	4,134,937	1,924,457	2,210,480	23,876,725	19.80
1990	4,738,140	2,130,372	2,607,768	26,484,493	21.97
1991	1,988,344	880,089	1,108,255	27,592,748	22.88
1992	3,105,285	1,272,300	1,832,985	29,425,733	24.41
1993	468,888	178,378	290,510	29,716,243	24.65
1994	547,066	262,699	284,367	30,000,611	24.88
1995	290,727	147,926	142,801	30,143,412	25.00
1996	488,029	207,982	280,047	30,423,458	25.23
1997	525,580	215,631	309,949	30,733,407	25.49
1998	2,847,343	1,012,229	1,835,114	32,568,521	27.01
1999	1,100,669	339,540	761,129	33,329,650	27.64
2000	315,762	81,233	234,529	33,564,179	27.84
2001	7,500	7,500	0	33,564,179	27.84
2002	209,548	120,745	88,803	33,652,983	27.91
2003	2,530,843	619,472	1,911,371	35,564,354	29.50
2004	7,823,237	2,445,671	5,377,566	40,941,920	33.96
2005	2,496,626	573,381	1,923,245	42,865,165	35.55
2006	6,108,316	1,893,931	4,214,385	47,079,550	39.05
2007	1,313,973	336,851	977,122	48,056,672	39.86
2008	799,714	377,742	421,972	48,478,644	40.21
2009	1,310,555	760,672	549,883	49,028,527	40.66
2010	10,240,040	1,662,770	8,577,270	57,605,797	47.78
2011	1,181,605	186,339	995,266	58,601,063	48.60
2012	1,056,855	301,315	755,540	59,356,602	49.23
2013	5,433,955	1,169,794	4,264,161	63,620,764	52.77
2014	918,022	91,862	826,160	64,446,924	53.45
2015	6,304,484	394,921	5,909,563	70,356,487	58.35
2016	35,903,266	1,064,753	34,838,513	105,195,000	87.25
2017	15,594,360	217,141	15,377,219	120,572,219	100.00
SUBTOTAL	184,850,536	64,278,317	120,572,219		
UNDATED	(11,454,549)	(4,280,892)	(7,173,657)		
NONDEPRECIABLE	3,234,252	0	3,234,252		
TOTAL	176,630,239	59,997,425	116,632,814		

**NET UTILITY PLANT IN SERVICE**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.30 STRUCTURES AND IMPROVEMENTS - SPP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1972	575,666.97	412,293	555,417	20,250	14.19	1,427
2006	3,300,035.38	698,947	941,581	2,358,454	39.41	59,844
2015	31,735.00	1,492	2,010	29,725	47.65	624
2017	1,227,386.00	11,537	15,542	1,211,844	49.53	24,467
	5,134,823.35	1,124,269	1,514,550	3,620,273		86,362
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						41.9 1.68

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.40 STRUCTURES AND IMPROVEMENTS - TDP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R2						
NET SALVAGE PERCENT.. 0						
1972	12,932,797.57	7,170,719	8,934,152	3,998,646	28.96	138,075
1985	1,265,958.34	526,056	655,424	610,534	37.99	16,071
2003	2,499,799.98	488,811	609,020	1,890,780	52.29	36,159
2004	240,211.22	43,867	54,655	185,556	53.13	3,492
2009	7,209.84	839	1,045	6,165	57.44	107
2010	8,400,966.35	864,627	1,077,258	7,323,708	58.31	125,600
2011	9,518.51	851	1,060	8,459	59.19	143
2012	23,674.11	1,796	2,238	21,436	60.07	357
2013	8,319.57	517	644	7,676	60.96	126
2014	188,425.59	9,131	11,377	177,049	61.85	2,863
2015	5,553,406.45	192,259	239,539	5,313,867	62.75	84,683
2016	19,805,951.21	414,340	516,235	19,289,716	63.64	303,107
2017	2,573,881.00	17,811	22,191	2,551,690	64.55	39,530
9999	2,500,000.00-	454,663-	566,474-	1,933,526-		35,055-
	51,010,119.74	9,276,961	11,558,364	39,451,756		715,258
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 55.2						1.40

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 355.00 POWER GENERATING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R2:5						
NET SALVAGE PERCENT.. 0						
2017	1,286,249.00	17,274	9,518	1,276,731	34.53	36,975
	1,286,249.00	17,274	9,518	1,276,731		36,975
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						34.5 2.87



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 360.10 COLLECTION SEWERS - FORCE MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2						
NET SALVAGE PERCENT.. 0						
1972	234,615.90	133,799	151,767	82,849	30.08	2,754
1989	4,590.34	1,791	2,032	2,558	42.69	60
	239,206.24	135,590	153,799	85,407		2,814
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						30.4 1.18

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
1918	3,521,497.71	3,144,204	3,459,090	62,408	7.50	8,321
1938	888,850.45	724,795	797,382	91,468	12.92	7,080
1945	230,775.55	179,280	197,235	33,541	15.62	2,147
1950	1,006,446.30	748,937	823,942	182,504	17.91	10,190
1955	470,491.79	332,572	365,878	104,614	20.52	5,098
1960	940,809.10	626,174	688,884	251,925	23.41	10,761
1965	657,036.11	407,737	448,571	208,465	26.56	7,849
1970	767,659.68	439,324	483,322	284,338	29.94	9,497
1972	15,419,852.21	8,513,917	9,366,570	6,053,282	31.35	193,087
1973	525,400.90	284,767	313,286	212,115	32.06	6,616
1974	463,563.10	246,416	271,094	192,469	32.79	5,870
1975	2,159,853.64	1,125,586	1,238,311	921,543	33.52	27,492
1977	318,164.81	159,038	174,965	143,200	35.01	4,090
1978	838,947.76	410,363	451,460	387,488	35.76	10,836
1979	876,136.20	419,047	461,014	415,122	36.52	11,367
1980	1,111,690.56	519,482	571,507	540,184	37.29	14,486
1981	672,675.82	306,935	337,674	335,002	38.06	8,802
1982	502,324.67	223,534	245,921	256,404	38.85	6,600
1983	369,529.19	160,324	176,380	193,149	39.63	4,874
1984	418,018.84	176,584	194,269	223,750	40.43	5,534
1985	1,591,319.22	654,032	719,532	871,787	41.23	21,144
1986	749,484.51	299,472	329,464	420,021	42.03	9,993
1987	695,052.95	269,583	296,581	398,472	42.85	9,299
1988	278,292.95	104,677	115,160	163,133	43.67	3,736
1989	2,460,078.02	896,526	986,311	1,473,767	44.49	33,126
1990	2,876,609.24	1,014,206	1,115,777	1,760,832	45.32	38,853
1991	1,114,740.46	379,647	417,668	697,072	46.16	15,101
1992	2,126,962.61	698,856	768,845	1,358,118	47.00	28,896
1993	362,077.36	114,572	126,046	236,031	47.85	4,933
1994	161,618.80	49,179	54,104	107,515	48.70	2,208
1995	44,490.95	12,991	14,292	30,199	49.56	609
1996	174,927.03	48,929	53,829	121,098	50.42	2,402
1997	222,414.65	59,449	65,403	157,012	51.29	3,061
1998	1,432,464.92	365,078	401,640	1,030,825	52.16	19,763
1999	727,121.33	176,174	193,818	533,303	53.04	10,055
2000	303,685.37	69,717	76,699	226,986	53.93	4,209
2002	114,548.25	23,401	25,745	88,803	55.70	1,594
2003	6,747.43	1,292	1,421	5,326	56.60	94
2004	1,751,739.48	312,808	344,135	1,407,604	57.50	24,480
2005	1,350,731.13	223,641	246,038	1,104,693	58.41	18,913
2006	1,135,237.28	173,362	190,724	944,513	59.31	15,925

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
2007	631,196.85	88,096	96,919	534,278	60.23	8,871
2008	185,753.97	23,511	25,866	159,888	61.14	2,615
2010	199,907.36	20,049	22,057	177,850	62.98	2,824
2011	633,756.88	55,137	60,659	573,098	63.91	8,967
2012	205,943.62	15,180	16,700	189,244	64.84	2,919
2013	340,933.34	20,603	22,666	318,267	65.77	4,839
2014	295,556.36	13,891	15,282	280,274	66.71	4,201
2015	16,174.08	545	600	15,574	67.64	230
2016	9,680,944.83	196,426	216,098	9,464,847	68.58	138,012
2017	5,990,955.00	40,199	44,225	5,946,730	69.53	85,528
9999	8,113,082.47-	2,962,725-	3,259,437-	4,853,645-		102,889-
	61,908,108.15	22,607,520	24,871,622	37,036,486		785,108
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						47.2 1.27

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
1918	191,746.62	190,788	191,747			
1938	262,835.95	235,186	262,836			
1945	40,669.27	34,894	39,194	1,475	7.10	208
1950	100,374.80	83,331	93,600	6,775	8.49	798
1955	82,918.78	66,368	74,547	8,372	9.98	839
1960	124,779.11	95,805	107,611	17,168	11.61	1,479
1965	115,792.27	84,760	95,205	20,587	13.40	1,536
1970	131,449.53	91,016	102,232	29,218	15.38	1,900
1972	1,405,921.84	949,278	1,066,259	339,663	16.24	20,915
1973	300,434.81	200,150	224,815	75,620	16.69	4,531
1974	145,093.35	95,355	107,106	37,987	17.14	2,216
1975	428,728.72	277,730	311,955	116,774	17.61	6,631
1977	135,640.56	85,264	95,771	39,870	18.57	2,147
1978	365,163.66	225,890	253,727	111,437	19.07	5,844
1979	376,312.01	228,948	257,161	119,151	19.58	6,085
1980	344,573.03	205,986	231,370	113,203	20.11	5,629
1981	303,819.91	178,403	200,388	103,432	20.64	5,011
1982	241,148.23	138,950	156,073	85,075	21.19	4,015
1983	167,174.60	94,420	106,055	61,120	21.76	2,809
1984	193,122.48	106,874	120,044	73,078	22.33	3,273
1985	425,320.13	230,353	258,740	166,580	22.92	7,268
1986	362,311.29	191,808	215,445	146,866	23.53	6,242
1987	250,968.80	129,751	145,740	105,229	24.15	4,357
1988	96,392.54	48,620	54,611	41,782	24.78	1,686
1989	923,946.47	454,027	509,977	413,969	25.43	16,279
1990	1,029,429.05	492,067	552,705	476,724	26.10	18,265
1991	480,547.98	223,166	250,667	229,881	26.78	8,584
1992	446,663.06	201,177	225,968	220,695	27.48	8,031
1993	106,810.93	46,591	52,332	54,479	28.19	1,933
1994	78,788.27	33,217	37,310	41,478	28.92	1,434
1995	19,031.01	7,742	8,696	10,335	29.66	348
1996	77,780.89	30,459	34,213	43,568	30.42	1,432
1997	99,512.38	37,417	42,028	57,484	31.20	1,842
1998	667,563.35	240,456	270,088	397,475	31.99	12,425
1999	208,264.73	71,643	80,472	127,793	32.80	3,896
2004	334,047.62	86,452	97,106	236,942	37.06	6,393
2005	622,656.90	149,936	168,413	454,244	37.96	11,966
2006	485,366.19	108,043	121,357	364,009	38.87	9,365
2007	261,470.56	53,392	59,971	201,500	39.79	5,064
2008	80,959.63	15,026	16,878	64,082	40.72	1,574
2010	100,530.47	14,858	16,689	83,841	42.61	1,968

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
2011	201,872.35	25,920	29,114	172,758	43.58	3,964
2012	100,204.91	10,922	12,268	87,937	44.55	1,974
2013	16,187.89	1,447	1,625	14,563	45.53	320
2014	101,869.91	7,111	7,987	93,883	46.51	2,019
2017	144,999.00	1,450	1,629	143,370	49.50	2,896
	13,181,195.84	6,582,447	7,369,725	5,811,471		217,391
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 26.7						1.65

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
1918	27,252.55	27,253	27,253			
1938	144,058.85	144,059	144,059			
1945	22,900.96	22,901	22,901			
1950	56,099.13	56,099	56,099			
1955	48,549.69	48,013	42,023	6,527	0.42	6,527
1960	75,985.35	72,746	63,671	12,314	1.62	7,601
1965	78,285.87	72,311	63,290	14,996	2.90	5,171
1970	106,663.09	94,818	82,989	23,674	4.22	5,610
1972	578,770.62	505,660	442,576	136,195	4.80	28,374
1973	116,732.14	101,004	88,403	28,329	5.12	5,533
1974	139,556.25	119,541	104,628	34,928	5.45	6,409
1975	332,565.69	281,806	246,649	85,917	5.80	14,813
1977	106,956.56	88,465	77,429	29,528	6.57	4,494
1978	281,593.81	229,795	201,127	80,467	6.99	11,512
1979	300,637.48	241,854	211,682	88,955	7.43	11,972
1980	265,830.09	210,567	184,298	81,532	7.90	10,321
1981	234,533.52	182,690	159,898	74,636	8.40	8,885
1982	189,892.78	145,317	127,188	62,705	8.92	7,030
1983	132,686.69	99,654	87,222	45,465	9.46	4,806
1984	157,657.29	116,044	101,567	56,090	10.03	5,592
1985	324,432.97	233,764	204,601	119,832	10.62	11,284
1986	295,255.08	207,922	181,983	113,272	11.24	10,078
1987	204,899.85	140,895	123,318	81,582	11.87	6,873
1988	70,462.74	47,228	41,336	29,127	12.53	2,325
1989	746,322.12	486,878	426,137	320,185	13.21	24,238
1990	832,102.11	527,727	461,890	370,212	13.90	26,634
1991	393,055.06	241,937	211,754	181,301	14.61	12,409
1992	531,659.29	317,039	277,487	254,172	15.34	16,569
1994	66,309.93	36,924	32,318	33,992	16.84	2,019
1995	17,151.11	9,198	8,050	9,101	17.62	517
1996	69,395.32	35,775	31,312	38,083	18.41	2,069
1997	87,089.30	43,063	37,691	49,398	19.21	2,571
1998	573,152.82	271,038	237,224	335,929	20.03	16,771
1999	165,282.74	74,551	65,250	100,033	20.86	4,795
2000	12,076.91	5,180	4,534	7,543	21.70	348
2004	187,335.72	63,153	55,274	132,062	25.19	5,243
2005	502,022.49	157,344	137,715	364,307	26.09	13,963
2006	405,901.95	117,496	102,838	303,064	27.00	11,225
2007	228,765.69	60,682	53,112	175,654	27.92	6,291
2008	64,937.74	15,636	13,685	51,253	28.85	1,777
2009	79,556.89	17,188	15,044	64,513	29.79	2,166

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
2011	170,938.27	28,430	24,883	146,055	31.68	4,610
2012	79,912.33	11,272	9,866	70,046	32.64	2,146
2013	16,089.65	1,863	1,631	14,459	33.60	430
2014	63,312.03	5,715	5,001	58,311	34.57	1,687
2017	220,000.00	2,836	2,482	217,518	37.51	5,799
9999	841,466.15-	516,771-	454,981-	386,485-		29,136-
	8,963,162.37	5,504,560	4,846,387	4,116,775		310,351
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						13.3 3.46

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 364.00 FLOW MEASURING DEVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-L3						
NET SALVAGE PERCENT.. 0						
2009	19,181.61	7,864	7,996	11,186	11.80	948
2010	104,719.11	38,275	38,918	65,801	12.69	5,185
2011	9,728.50	3,108	3,160	6,568	13.61	483
2012	12,254.13	3,333	3,389	8,865	14.56	609
2013	5,882.00	1,318	1,340	4,542	15.52	293
2014	3,236.17	565	575	2,661	16.51	161
2016	246,002.36	18,450	18,760	227,242	18.50	12,283
2017	244,167.00	6,104	6,207	237,960	19.50	12,203
	645,170.88	79,017	80,345	564,826		32,165
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						17.6 4.99



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 371.00 PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-S0						
NET SALVAGE PERCENT.. 0						
1997	74,241.00	26,820	48,848	25,393	25.55	994
1998	126,283.62	43,852	79,869	46,415	26.11	1,778
2006	346,984.97	78,245	142,510	204,475	30.98	6,600
2008	62,260.00	11,938	21,743	40,517	32.33	1,253
2009	44,215.81	7,705	14,033	30,183	33.03	914
2010	786,048.51	122,820	223,697	562,352	33.75	16,662
2012	53,890.00	6,399	11,655	42,235	35.25	1,198
2013	27,499.94	2,722	4,958	22,542	36.04	625
2014	21,950.00	1,729	3,149	18,801	36.85	510
2015	53,680.00	3,087	5,622	48,058	37.70	1,275
2016	972,808.85	34,535	62,900	909,909	38.58	23,585
2017	915,641.00	11,217	20,430	895,211	39.51	22,658
	3,485,503.70	351,069	639,414	2,846,090		78,052
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						36.5 2.24

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 380.00 TREATMENT EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R2						
NET SALVAGE PERCENT.. 0						
1984	1,055,180.71	614,822	823,294	231,887	18.78	12,348
1986	64,089.04	35,534	47,583	16,506	20.05	823
1987	1,660,003.55	896,402	1,200,351	459,653	20.70	22,205
1988	919,728.60	482,959	646,719	273,010	21.37	12,775
1994	240,349.45	103,778	138,967	101,382	25.57	3,965
1995	210,054.10	87,290	116,888	93,166	26.30	3,542
1996	165,925.39	66,186	88,628	77,297	27.05	2,858
1997	42,322.23	16,176	21,661	20,661	27.80	743
1998	47,878.66	17,481	23,408	24,471	28.57	857
2003	24,295.90	6,744	9,031	15,265	32.51	470
2004	5,234,903.35	1,358,772	1,819,501	3,415,402	33.32	102,503
2006	11,772.93	2,621	3,510	8,263	34.98	236
2009	260,012.20	43,276	57,950	202,062	37.51	5,387
2010	248,635.18	36,689	49,129	199,506	38.36	5,201
2011	17,809.00	2,283	3,057	14,752	39.23	376
2012	48,330.00	5,263	7,048	41,282	40.10	1,029
2014	73,530.88	5,131	6,871	66,660	41.86	1,592
2016	4,293,887.12	128,817	172,495	4,121,392	43.65	94,419
	14,618,708.29	3,910,224	5,236,091	9,382,617		271,329
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						34.6 1.86

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-S2.5						
NET SALVAGE PERCENT.. 0						
2013	4,142,753.27	927,977	797,480	3,345,273	15.52	215,546
2017	363,000.00	9,075	7,799	355,201	19.50	18,215
	4,505,753.27	937,052	805,279	3,700,474		233,761
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.8						5.19

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 390.00 OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2007	34,229.60	17,971	17,947	16,283	9.50	1,714
2008	54,626.00	25,947	25,912	28,714	10.50	2,735
2009	13,014.19	5,531	5,524	7,490	11.50	651
2010	74,451.51	27,919	27,882	46,570	12.50	3,726
2011	31,757.95	10,321	10,307	21,451	13.50	1,589
2012	81,649.54	22,454	22,424	59,226	14.50	4,085
2013	22,813.81	5,133	5,126	17,688	15.50	1,141
2014	65,694.99	11,497	11,482	54,213	16.50	3,286
2015	14,460.77	1,808	1,806	12,655	17.50	723
2016	714,543.15	53,591	53,519	661,024	18.50	35,731
2017	296,696.00	7,417	7,407	289,289	19.50	14,835
	1,403,937.51	189,589	189,336	1,214,602		70,216
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						17.3 5.00

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 391.00 TRANSPORTATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 15-L4						
NET SALVAGE PERCENT.. 0						
2001	7,500.00	6,130	7,500			
2002	95,000.00	76,760	95,000			
2004	75,000.00	58,400	75,000			
2005	21,215.00	15,911	21,215			
2006	274,132.58	194,634	268,548	5,585	4.35	1,284
2007	46,030.00	30,472	42,044	3,986	5.07	786
2008	225,283.34	137,272	189,402	35,881	5.86	6,123
2009	648,949.00	359,083	495,449	153,500	6.70	22,910
2010	245,374.89	121,215	167,248	78,127	7.59	10,293
2011	69,519.00	29,986	41,373	28,146	8.53	3,300
2012	283,568.72	103,786	143,200	140,369	9.51	14,760
2013	569,531.08	170,859	235,744	333,787	10.50	31,789
2014	74,011.10	17,269	23,827	50,184	11.50	4,364
2015	628,453.46	104,744	144,522	483,931	12.50	38,714
2016	130,529.00	13,053	18,010	112,519	13.50	8,335
2017	427,910.00	14,262	19,678	408,232	14.50	28,154
	3,822,007.17	1,453,836	1,987,760	1,834,247		170,812

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 10.7 4.47

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 393.00 TOOLS, SHOP AND GARAGE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	44,148.67	25,385	25,385	18,764	8.50	2,208
2007	88,820.75	46,631	46,631	42,190	9.50	4,441
2008	32,994.25	15,672	15,672	17,322	10.50	1,650
2009	57,515.11	24,444	24,444	33,071	11.50	2,876
2010	42,200.18	15,825	15,825	26,375	12.50	2,110
2011	29,347.68	9,538	9,538	19,810	13.50	1,467
2012	55,529.53	15,271	15,271	40,259	14.50	2,776
2013	116,235.29	26,153	26,152	90,083	15.50	5,812
2014	13,575.00	2,376	2,376	11,199	16.50	679
2015	6,574.00	822	822	5,752	17.50	329
2016	27,741.12	2,081	2,081	25,660	18.50	1,387
2017	412,999.00	10,325	10,325	402,674	19.50	20,650
	927,680.58	194,523	194,522	733,159		46,385

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.8 5.00

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 394.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	4,744.41	3,637	3,637	1,107	3.50	316
2007	3,524.28	2,467	2,467	1,057	4.50	235
2008	44,629.31	28,265	28,268	16,361	5.50	2,975
2010	9,256.54	4,628	4,628	4,629	7.50	617
2011	7,356.65	3,188	3,188	4,169	8.50	490
2012	12,243.36	4,489	4,490	7,753	9.50	816
2013	10,187.71	3,056	3,056	7,132	10.50	679
2014	16,860.02	3,934	3,935	12,925	11.50	1,124
	108,802.28	53,664	53,669	55,133		7,252

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 7.6 6.67

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 395.00 POWER OPERATED EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 16-L2.5						
NET SALVAGE PERCENT.. 0						
2006	99,992.04	57,933	93,841	6,151	6.73	914
2007	19,935.00	10,964	17,760	2,175	7.20	302
2008	48,270.00	24,889	40,316	7,954	7.75	1,026
2009	180,900.00	85,928	139,187	41,713	8.40	4,966
2010	27,950.00	12,001	19,439	8,511	9.13	932
2012	99,654.42	32,575	52,766	46,888	10.77	4,354
2013	157,521.76	42,827	69,372	88,150	11.65	7,567
2016	30,858.50	2,874	4,655	26,204	14.51	1,806
	665,081.72	269,991	437,336	227,746		21,867
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						10.4 3.29



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 396.00 COMMUNICATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2017	1,177,477.00	39,245	39,269	1,138,208	14.50	78,497
	1,177,477.00	39,245	39,269	1,138,208		78,497
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					14.5	6.67

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 397.00 MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2017

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2017	313,000.00	10,432	10,439	302,561	14.50	20,866
	313,000.00	10,432	10,439	302,561		20,866
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..					14.5	6.67

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**PART VIII. EXPERIENCED AND ESTIMATED  
NET SALVAGE**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

EXPERIENCED RETIREMENTS BY ACCOUNT AND ASSOCIATED  
 COST OF REMOVAL, GROSS SALVAGE, AND NET SALVAGE

ACCT	REGULAR RETIREMENTS	COST OF REMOVAL	GROSS SALVAGE	NET SALVAGE
2017 TRANSACTION YEAR				
354.40	45,000.00	18,000.00		18,000.00-
361.10	41,435.00	16,988.00		16,988.00-
361.20	2,400.00	984.00		984.00-
363.00	8,000.00	2,320.00		2,320.00-
390.00	10,096.70			
	106,931.70	38,292.00		38,292.00-
TOTAL	106,931.70	38,292.00		38,292.00-

Exhibit No. 11-I  
Witness: J. J. Spanos

**PENNSYLVANIA-AMERICAN WATER COMPANY**

**HERSHEY, PENNSYLVANIA**

**SCRANTON WASTEWATER OPERATIONS**

**2018 DEPRECIATION STUDY**

**CALCULATED ANNUAL DEPRECIATION ACCRUALS**

**RELATED TO WASTEWATER PLANT**

**AS OF DECEMBER 31, 2018**

*Prepared by:*



***Gannett Fleming***

*Excellence Delivered As Promised*

Exhibit No. 11-I  
Witness: J. J. Spanos

PENNSYLVANIA-AMERICAN WATER COMPANY

Hershey, Pennsylvania

SCRANTON WASTEWATER OPERATIONS

2018 DEPRECIATION STUDY

CALCULATED ANNUAL DEPRECIATION ACCRUALS  
RELATED TO WASTEWATER PLANT  
AS OF DECEMBER 31, 2018

GANNETT FLEMING VALUATION AND RATE CONSULTANTS, LLC

Camp Hill, Pennsylvania



**Gannett Fleming**

*Excellence Delivered As Promised*

April 21, 2017

Pennsylvania-American Water Company  
800 West Hersheypark Drive  
Hershey, PA 17033

Attention: Mr. John R. Cox  
Manager of Rates and Regulations

Gentlemen:

Pursuant to your request, we have determined the annual depreciation accruals applicable to wastewater plant as of December 31, 2018. The results of our study at December 31, 2017 are presented in our report titled "2017 Depreciation Study - Calculated Annual Depreciation Accruals Related to Wastewater Plant as of December 31, 2017". The same methods, procedures and estimates are used in both studies.

Summaries of the original cost, annual accruals, book depreciation reserve and amortization of net salvage are presented in Tables 1 through 5, beginning on page I-3 of the attached report.

Respectfully submitted,

GANNETT FLEMING VALUATION  
AND RATE CONSULTANTS, LLC

JOHN J. SPANOS  
Sr. Vice President

JJS:mlw

062027.400

Gannett Fleming Valuation and Rate Consultants, LLC

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**PART I. RESULTS OF STUDY**

**PENNSYLVANIA-AMERICAN WATER COMPANY**

**SCRANTON WASTEWATER OPERATIONS**

**DEPRECIATION STUDY**

**PART I. RESULTS OF STUDY**

**DESCRIPTION OF SUMMARY TABULATIONS**

Tables 1 through 5 presented on pages I-3 through I-7 summarize the results of the depreciation study as of December 31, 2018. Table 1 sets forth the development of the net original cost by account as of December 31, 2018. Table 2 sets forth, by depreciable group, the estimated survivor curve, original cost, book depreciation reserve as of December 31, 2018, future book accruals, calculated annual accrual amount and rate, and composite remaining life for plant in service. Table 3 presents the bringforward of the book reserve to December 31, 2018. Table 4 sets forth the calculation of the depreciation accruals for the twelve months ended December 31, 2018. Table 5 presents the annual amortization of experienced and estimated net salvage based on the period 2014 through 2018.

**DESCRIPTION OF DETAILED TABULATIONS**

The supporting data for the depreciation calculations are presented in account sequence in the section beginning on page II-2. The original cost, calculated accrued depreciation, allocated book reserve, future accruals, remaining life and annual accrual are shown for each vintage of each account or subaccount. The amounts of regular retirements, gross salvage and cost of removal are set forth by account for the years 2014 through 2018, beginning on pages III-2 and III-3.

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

TABLE 1. DEVELOPMENT OF NET ORIGINAL COST AS OF DECEMBER 31, 2018

DEPRECIABLE GROUP (1)	ORIGINAL COST AS OF DECEMBER 31, 2018 (2)	CUSTOMER ADVANCES (3)	CONTRIBUTIONS IN AID OF CONSTRUCTION (4)	EXCLUDED PROPERTY (5)	NET ORIGINAL COST AS OF DECEMBER 31, 2018 (6)
<b>DEPRECIABLE PLANT</b>					
354.30 STRUCTURES AND IMPROVEMENTS - SPP	6,139,529.35				6,139,529.35
354.40 STRUCTURES AND IMPROVEMENTS - TDP	54,468,092.74		2,500,000.00		51,968,092.74
355.00 POWER GENERATING EQUIPMENT	2,456,749.00				2,456,749.00
360.10 COLLECTION SEWERS - FORCE MAINS	239,206.24				239,206.24
361.10 COLLECTION SEWERS - GRAVITY MAINS	74,895,782.62		8,113,082.47		66,782,700.15
361.20 MANHOLES	13,323,794.84				13,323,794.84
363.00 SERVICES	10,016,628.52				9,175,162.37
364.00 FLOW MEASURING DEVICES	766,324.88		841,466.15		766,324.88
371.00 PUMPING EQUIPMENT	4,224,621.70				4,224,621.70
380.00 TREATMENT EQUIPMENT	14,618,708.29				14,618,708.29
389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT	5,131,753.27				5,131,753.27
390.00 OFFICE FURNITURE AND EQUIPMENT	1,463,937.51				1,463,937.51
391.00 TRANSPORTATION EQUIPMENT	3,822,007.17				3,822,007.17
393.00 TOOLS, SHOP AND GARAGE EQUIPMENT	977,680.58				977,680.58
394.00 LABORATORY EQUIPMENT	108,802.28				108,802.28
395.00 POWER OPERATED EQUIPMENT	665,081.72				665,081.72
396.00 COMMUNICATION EQUIPMENT	1,906,454.00				1,906,454.00
397.00 MISCELLANEOUS EQUIPMENT	681,751.00				681,751.00
<b>TOTAL DEPRECIABLE PLANT</b>	<b>195,906,905.71</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>184,452,357.09</b>
<b>NONDEPRECIABLE PLANT</b>					
353.20 LAND AND LAND RIGHTS - COLLECTION	12,080,662.60				12,080,662.60
353.30 LAND AND LAND RIGHTS - SPP	43,570.00				43,570.00
353.40 LAND AND LAND RIGHTS - TDP	110,019.50				110,019.50
<b>TOTAL NONDEPRECIABLE PLANT</b>	<b>12,234,252.10</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>12,234,252.10</b>
<b>TOTAL WASTEWATER PLANT IN SERVICE</b>	<b>208,141,157.81</b>	<b>0.00</b>	<b>11,454,548.62</b>	<b>0.00</b>	<b>196,686,606.19</b>

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 2. SUMMARY OF ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK RESERVE, AND CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO WASTEWATER PLANT AS OF DECEMBER 31, 2018

DEPRECIABLE GROUP	SURVIVOR CURVE (2)	ORIGINAL COST AS OF DECEMBER 31, 2018 (3)	BOOK RESERVE (4)	FUTURE ACCRUALS (5)	CALCULATED ANNUAL ACCRUAL AMOUNT (6)	CALCULATED ANNUAL ACCRUAL RATE (7)=(6)/(3)	COMPOSITE REMAINING LIFE (8)
<b>DEPRECIABLE PLANT</b>							
354.30	STRUCTURES AND IMPROVEMENTS - SPP	6,139,529.35	1,590,518	4,549,011	107,198	1.75	42.4
354.40	STRUCTURES AND IMPROVEMENTS - TDP	51,988,092.74	12,219,940	39,748,153	729,645	1.40	54.5
355.00	POWER GENERATING EQUIPMENT	2,456,749.00	57,476	2,399,273	70,491	2.87	34.0
360.10	COLLECTION SEWERS - FORCE MAINS	239,206.24	156,622	82,584	2,779	1.16	29.7
361.10	COLLECTION SEWERS - GRAVITY MAINS	66,782,700.15	25,622,189	41,160,511	860,047	1.29	47.9
361.20	MANHOLES	13,323,794.84	7,585,225	5,738,570	216,841	1.63	26.5
363.00	SERVICES	9,175,162.37	5,150,043	4,025,119	301,126	3.28	13.4
364.00	FLOW MEASURING DEVICES	766,324.88	112,791	653,534	38,368	5.01	17.0
371.00	PUMPING EQUIPMENT	4,224,621.70	712,429	3,512,193	96,728	2.29	36.3
380.00	TREATMENT EQUIPMENT	14,618,708.29	5,507,999	9,110,709	269,868	1.85	33.8
389.10	OTHER PLANT AND MISCELLANEOUS EQUIPMENT	5,131,753.27	1,053,451	4,078,302	264,799	5.16	15.4
390.00	OFFICE FURNITURE AND EQUIPMENT	1,463,937.51	260,558	1,203,380	73,250	5.00	16.4
391.00	TRANSPORTATION EQUIPMENT	3,822,007.17	2,158,604	1,663,403	171,490	4.49	9.7
393.00	TOOLS, SHOP AND GARAGE EQUIPMENT	977,680.58	242,196	735,485	48,880	5.00	15.0
394.00	LABORATORY EQUIPMENT	108,802.28	60,926	47,876	7,252	6.67	6.6
395.00	POWER OPERATED EQUIPMENT	665,081.72	459,217	205,865	21,507	3.23	9.6
396.00	COMMUNICATION EQUIPMENT	1,906,454.00	124,348	1,782,106	128,392	6.73	13.9
397.00	MISCELLANEOUS EQUIPMENT	681,751.00	37,632	644,119	45,983	6.73	14.0
	<b>TOTAL DEPRECIABLE PLANT</b>	<b>184,452,357.09</b>	<b>63,112,164</b>	<b>121,340,193</b>	<b>3,454,544</b>	<b>1.87</b>	
	<b>AMORTIZATION OF NET SALVAGE</b>				<b>13,466</b>		
<b>NONDEPRECIABLE PLANT</b>							
353.20	LAND AND LAND RIGHTS - COLLECTION	12,080,662.60					
353.30	LAND AND LAND RIGHTS - SPP	43,570.00					
353.40	LAND AND LAND RIGHTS - TDP	110,019.50					
	<b>TOTAL NONDEPRECIABLE PLANT</b>	<b>12,234,252.10</b>					
	<b>TOTAL WASTEWATER PLANT IN SERVICE</b>	<b>196,686,609.19</b>	<b>63,112,164</b>	<b>121,340,193</b>	<b>3,468,010</b>		

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

TABLE 3. BRINGFORWARD TO DECEMBER 31, 2018, OF BOOK RESERVE AS OF DECEMBER 31, 2017

ACCOUNT (1)	BOOK RESERVE BALANCE AS OF 12/31/2017 (2)	+	PROJECTED DEPRECIATION ACCRUALS (3)	-	PROJECTED RETIREMENTS (4)	-	PROJECTED COST OF REMOVAL (5)	+	PROJECTED SALVAGE (6)	+	ACQUISITIONS (7)	=	PROJECTED BOOK RESERVE BALANCE AS OF 12/31/2018 (8)
354.30	1,514,550		86,968		10,000		1,000						1,590,518
354.40	11,558,364		721,534		53,060		6,898						12,219,940
355.00	9,518		47,958										57,476
360.10	153,799		2,823										156,622
361.10	24,871,622		811,338		43,720		17,051						25,622,189
361.20	7,369,725		218,836		2,400		936						7,585,225
363.00	4,846,387		314,056		8,000		2,400						5,150,043
364.00	80,345		32,446										112,791
371.00	639,414		78,765		5,000		750						712,429
380.00	5,236,091		271,908										5,507,999
389.10	805,279		248,172										1,053,451
390.00	189,336		71,222										260,558
391.00	1,987,760		170,844										2,158,604
393.00	194,522		47,674										242,196
394.00	53,669		7,257										60,926
395.00	437,336		21,881										459,217
396.00	39,269		85,079										124,348
397.00	10,439		27,193										37,632
TOTAL	59,997,425		3,265,954		122,180		29,035		0		0		63,112,164

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

TABLE 4. CALCULATION OF DEPRECIATION ACCRUALS FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2018

ACCOUNT (1)	NET ORIGINAL COST AS OF 12/31/2017 (2)	NET ORIGINAL COST AS OF 12/31/2018 (3)	ACCRUAL RATE (4)	AVERAGE ACCRUALS $(5) = \frac{[(2) + (3)]}{2} \times (4)$ **	AMORTIZATION OF NET SALVAGE (6) **	PROJECTED DEPRECIATION ACCRUALS $(7) = (5) + (6)$
354.30	5,134,823.35	6,139,529.35	1.68	86,968		86,968
354.40	51,010,119.74	51,968,092.74	1.40	717,934	3,600	721,534
355.00	1,286,249.00	2,456,749.00	2.87	47,958		47,958
360.10	239,206.24	239,206.24	1.18	2,823		2,823
361.10	61,908,108.15	66,782,700.15	1.27	807,940	3,398	811,338
361.20	13,181,195.84	13,323,794.84	1.65	218,639	197	218,836
363.00	8,963,162.37	9,175,162.37	3.46	313,592	464	314,056
364.00	645,170.88	766,324.88	4.99	32,446		32,446
371.00	3,485,503.70	4,224,621.70	2.24	78,765		78,765
380.00	14,618,708.29	14,618,708.29	1.86	271,908		271,908
389.10	4,505,753.27	5,131,753.27	5.19	248,172		248,172
390.00	1,403,937.51	1,463,937.51	5.00	71,222		71,222
391.00	3,822,007.17	3,822,007.17	4.47	170,844		170,844
393.00	927,680.58	977,680.58	5.00	47,674		47,674
394.00	108,802.28	108,802.28	6.67	7,257		7,257
395.00	665,081.72	665,081.72	3.29	21,881		21,881
396.00	1,177,477.00	1,906,454.00	6.67	85,079		85,079
397.00	313,000.00	681,751.00	6.67	27,193		27,193
TOTAL	<b>173,395,987.09</b>	<b>184,452,357.09</b>		<b>3,258,295</b>	<b>7,659</b>	<b>3,265,954</b>

\*\* = developed in monthly bringforward schedule

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

TABLE 5. AMORTIZATION OF EXPERIENCED AND ESTIMATED NET SALVAGE

Account (1)	EXPERIENCED AND ESTIMATED NET SALVAGE					5 - YEAR AMORT. (7)
	2014 (2)	2015 (3)	2016 (4)	2017 (5)	2018 (5)	
354.30	0	0	0	0	(1,000)	200
354.40	0	0	0	(18,000)	(6,898)	4,980
361.10	0	0	0	(16,988)	(17,051)	6,808
361.20	0	0	0	(984)	(936)	384
363.00	0	0	0	(2,320)	(2,400)	944
371.00	0	0	0	0	(750)	150
TOTAL	0	0	0	(38,292)	(29,035)	13,466

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## PART II. DETAILED DEPRECIATION CALCULATIONS



**CUMULATIVE DEPRECIATED ORIGINAL COST**

**PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS**

**CUMULATIVE DEPRECIATED ORIGINAL COST BY YEAR INSTALLED  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018**

YEAR INST (1)	ORIGINAL COST (2)	ACCRUED DEPRECIATION (3)	AMOUNT (2)-(3) (4)	CUMULATIVE AMOUNT (5)	PCT OF COL 4 TOTAL (6)
1918 1918	3,732,735	3,651,603	81,132	81,132	0.06
1938 1938	1,293,574	1,199,693	93,881	175,013	0.14
1945 1945	293,946	259,108	34,838	209,851	0.16
1950 1950	1,161,534	973,567	187,967	397,819	0.31
1955 1955	601,306	485,174	116,132	513,950	0.40
1960 1960	1,140,473	865,954	274,519	788,469	0.61
1965 1965	850,371	613,205	237,166	1,025,635	0.80
1970 1970	1,004,989	677,255	327,734	1,353,370	1.05
1972 1972	31,107,640	20,659,398	10,448,242	11,801,612	9.18
1973 1973	941,951	637,066	304,885	12,106,497	9.41
1974 1974	747,673	491,965	255,708	12,362,205	9.61
1975 1975	2,919,132	1,826,240	1,092,892	13,455,098	10.46
1977 1977	560,398	355,698	204,700	13,659,798	10.62
1978 1978	1,484,783	926,508	558,275	14,218,073	11.05
1979 1979	1,552,138	951,444	600,694	14,818,767	11.52
1980 1980	1,721,075	1,009,255	711,820	15,530,587	12.07
1981 1981	1,210,342	715,440	494,902	16,025,489	12.46
1982 1982	932,852	543,300	389,552	16,415,041	12.76
1983 1983	669,031	379,707	289,324	16,704,365	12.99
1984 1984	1,823,580	1,259,483	564,097	17,268,462	13.43
1985 1985	3,604,093	1,878,493	1,725,600	18,994,062	14.77
1986 1986	1,470,458	797,685	672,773	19,666,836	15.29
1987 1987	2,810,370	1,799,336	1,011,034	20,677,870	16.08
1988 1988	1,364,670	874,004	490,666	21,168,536	16.46
1989 1989	4,133,071	1,988,835	2,144,236	23,312,772	18.13
1990 1990	4,736,052	2,204,263	2,531,789	25,844,562	20.09
1991 1991	1,987,514	913,016	1,074,498	26,919,060	20.93
1992 1992	3,103,909	1,319,531	1,784,378	28,703,438	22.32
1993 1993	468,707	183,900	284,807	28,988,245	22.54
1994 1994	546,951	271,418	275,533	29,263,778	22.75
1995 1995	290,697	152,306	138,391	29,402,169	22.86
1996 1996	487,914	216,168	271,746	29,673,915	23.07
1997 1997	525,127	220,724	304,403	29,978,318	23.31
1998 1998	2,845,942	1,056,521	1,789,421	31,767,738	24.70
1999 1999	1,100,291	357,330	742,961	32,510,699	25.28
2000 2000	315,632	85,110	230,522	32,741,221	25.46
2001 2001	7,500	7,500	0	32,741,221	25.46
2002 2002	209,503	122,087	87,416	32,828,637	25.52
2003 2003	2,528,541	652,160	1,876,381	34,705,018	26.98
2004 2004	7,822,292	2,583,672	5,238,620	39,943,638	31.06
2005 2005	2,495,975	619,102	1,876,873	41,820,511	32.51
2006 2006	6,102,193	1,972,153	4,130,040	45,950,551	35.73
2007 2007	1,313,690	364,032	949,658	46,900,210	36.46
2008 2008	799,481	394,632	404,849	47,305,059	36.78
2009 2009	1,310,432	792,383	518,049	47,823,107	37.18
2010 2010	10,231,798	1,820,636	8,411,162	56,234,270	43.72
2011 2011	1,181,359	211,683	969,676	57,203,946	44.47
2012 2012	1,056,665	339,024	717,641	57,921,587	45.03
2013 2013	5,433,800	1,444,490	3,989,310	61,910,897	48.13
2014 2014	917,761	115,326	802,435	62,713,333	48.76
2015 2015	6,300,550	534,868	5,765,682	68,479,015	53.24
2016 2016	35,886,285	1,734,471	34,151,814	102,630,829	79.79
2017 2017	15,589,605	635,694	14,953,911	117,584,740	91.42
2018 2018	11,178,550	141,430	11,037,120	128,621,860	100.00
SUBTOTAL	195,906,906	67,285,046	128,621,860		
9999 UNDATED	(11,454,549)	(4,172,882)	(7,281,667)		
NONDEPRECIABLE	12,234,252	0	12,234,252		
TOTAL	196,686,609	63,112,164	133,574,445		

**NET UTILITY PLANT IN SERVICE**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.30 STRUCTURES AND IMPROVEMENTS - SPP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-R2.5						
NET SALVAGE PERCENT.. 0						
1972	571,260.69	415,192	542,164	29,097	13.66	2,130
2006	3,295,406.49	756,625	988,012	2,307,394	38.52	59,901
2015	31,707.81	2,086	2,724	28,984	46.71	621
2017	1,226,448.36	34,586	45,163	1,181,285	48.59	24,311
2018	1,014,706.00	9,538	12,455	1,002,251	49.53	20,235
	6,139,529.35	1,218,027	1,590,518	4,549,011		107,198
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						42.4 1.75

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 354.40 STRUCTURES AND IMPROVEMENTS - TDP

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 65-R2						
NET SALVAGE PERCENT.. 0						
1972	12,909,656.41	7,285,048	8,971,835	3,937,821	28.32	139,047
1985	1,264,236.49	539,538	664,463	599,773	37.26	16,097
2003	2,497,500.21	520,629	641,176	1,856,324	51.45	36,080
2004	239,997.15	46,929	57,795	182,202	52.29	3,484
2009	7,204.07	934	1,150	6,054	56.57	107
2010	8,394,426.95	976,356	1,202,422	7,192,005	57.44	125,209
2011	9,511.28	979	1,206	8,305	58.31	142
2012	23,656.47	2,114	2,603	21,053	59.19	356
2013	8,313.52	631	777	7,537	60.07	125
2014	188,292.50	11,702	14,411	173,882	60.96	2,852
2015	5,549,558.43	268,932	331,201	5,218,357	61.85	84,371
2016	19,792,515.10	685,217	843,873	18,948,642	62.75	301,970
2017	2,572,191.16	53,810	66,270	2,505,921	63.64	39,377
2018	1,011,033.00	6,996	8,616	1,002,417	64.55	15,529
9999	2,500,000.00-	477,335-	587,858-	1,912,142-		35,101-
	51,968,092.74	9,922,480	12,219,940	39,748,153		729,645
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						54.5 1.40

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 355.00 POWER GENERATING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 35-R2.5						
NET SALVAGE PERCENT.. 0						
2017	1,286,249.00	51,823	44,099	1,242,150	33.59	36,980
2018	1,170,500.00	15,720	13,377	1,157,123	34.53	33,511
	2,456,749.00	67,543	57,476	2,399,273		70,491
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						34.0 2.87

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 360.10 COLLECTION SEWERS - FORCE MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-S2						
NET SALVAGE PERCENT.. 0						
1972	234,615.90	135,875	154,522	80,094	29.46	2,719
1989	4,590.34	1,847	2,100	2,490	41.84	60
	239,206.24	137,722	156,622	82,584		2,779
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 29.7						1.16

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
1918	3,514,231.95	3,149,244	3,433,100	81,132	7.27	11,160
1938	887,571.62	728,066	793,690	93,882	12.58	7,463
1945	230,488.79	180,440	196,704	33,785	15.20	2,223
1950	1,005,296.29	754,978	823,028	182,268	17.43	10,457
1955	470,007.55	335,919	366,197	103,811	19.97	5,198
1960	939,930.56	633,645	690,758	249,173	22.81	10,924
1965	656,478.12	413,489	450,759	205,719	25.91	7,940
1970	767,076.49	446,661	486,921	280,155	29.24	9,581
1972	15,408,618.14	8,664,112	9,445,047	5,963,571	30.64	194,634
1973	525,019.35	289,884	316,013	209,006	31.35	6,667
1974	463,239.21	251,076	273,707	189,532	32.06	5,912
1975	2,158,349.50	1,147,314	1,250,726	907,624	32.79	27,680
1977	317,952.36	162,337	176,969	140,983	34.26	4,115
1978	838,406.31	419,086	456,860	381,546	35.01	10,898
1979	875,575.36	428,279	466,882	408,693	35.76	11,429
1980	1,111,001.07	531,381	579,277	531,724	36.52	14,560
1981	672,263.07	314,142	342,457	329,806	37.29	8,844
1982	502,025.35	229,069	249,716	252,309	38.06	6,629
1983	369,311.89	164,344	179,157	190,155	38.85	4,895
1984	417,779.53	181,258	197,596	220,184	39.63	5,556
1985	1,590,422.52	671,842	732,398	858,025	40.43	21,222
1986	749,072.39	307,869	335,619	413,453	41.23	10,028
1987	694,677.73	277,572	302,591	392,087	42.03	9,329
1988	278,145.98	107,882	117,606	160,540	42.85	3,747
1989	2,458,805.79	924,855	1,008,216	1,450,590	43.67	33,217
1990	2,875,150.21	1,047,791	1,142,233	1,732,917	44.49	38,951
1991	1,114,188.27	392,829	428,236	685,952	45.32	15,136
1992	2,125,926.71	724,027	789,286	1,336,641	46.16	28,957
1993	361,905.59	118,911	129,629	232,277	47.00	4,942
1994	161,543.23	51,117	55,724	105,819	47.85	2,211
1995	44,470.74	13,532	14,752	29,719	48.70	610
1996	174,848.50	51,056	55,658	119,190	49.56	2,405
1997	222,317.92	62,185	67,790	154,528	50.42	3,065
1998	1,431,847.64	382,719	417,215	1,014,633	51.29	19,782
1999	726,818.56	185,237	201,933	524,886	52.16	10,063
2000	303,559.75	73,549	80,178	223,382	53.04	4,212
2002	114,502.77	24,847	27,087	87,416	54.81	1,595
2003	6,744.86	1,378	1,502	5,243	55.70	94
2004	1,751,073.26	335,208	365,422	1,385,651	56.60	24,481
2005	1,350,237.15	241,112	262,844	1,087,393	57.50	18,911
2006	1,134,824.07	187,893	204,829	929,995	58.41	15,922



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.10 COLLECTION SEWERS - GRAVITY MAINS

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 70-R2.5						
NET SALVAGE PERCENT.. 0						
2007	630,975.34	96,356	105,041	525,934	59.31	8,868
2008	185,689.26	25,917	28,253	157,436	60.23	2,614
2010	199,840.71	22,668	24,711	175,130	62.06	2,822
2011	633,552.17	63,539	69,266	564,286	62.98	8,960
2012	205,877.93	17,911	19,525	186,353	63.91	2,916
2013	340,827.69	25,122	27,386	313,442	64.84	4,834
2014	295,466.17	17,855	19,464	276,002	65.77	4,196
2015	16,169.27	760	829	15,340	66.71	230
2016	9,678,118.72	326,249	355,656	9,322,463	67.64	137,825
2017	5,989,247.21	121,522	132,475	5,856,772	68.58	85,401
2018	4,918,312.00	33,002	35,977	4,882,335	69.53	70,219
9999	8,113,082.47-	2,855,341-	3,112,706-	5,000,376-		104,483-
	66,782,700.15	23,503,695	25,622,189	41,160,511		860,047
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 47.9						1.29

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
1918	191,501.27	191,501	191,501			
1938	262,621.14	236,307	262,621			
1945	40,640.98	35,089	39,588	1,053	6.83	154
1950	100,313.98	83,862	94,615	5,699	8.20	695
1955	82,875.42	66,847	75,419	7,456	9.67	771
1960	124,723.45	96,611	108,999	15,724	11.27	1,395
1965	115,748.76	85,608	96,585	19,164	13.02	1,472
1970	131,408.55	92,065	103,870	27,539	14.97	1,840
1972	1,405,515.82	961,092	1,084,330	321,186	15.81	20,315
1973	300,354.37	202,799	228,803	71,551	16.24	4,406
1974	145,055.63	96,636	109,027	36,029	16.69	2,159
1975	428,619.84	281,689	317,809	110,811	17.14	6,465
1977	135,609.01	86,573	97,674	37,935	18.08	2,098
1978	365,085.34	229,493	258,920	106,165	18.57	5,717
1979	376,234.17	232,738	262,581	113,653	19.07	5,960
1980	344,503.37	209,596	236,472	108,031	19.58	5,517
1981	303,764.41	181,590	204,875	98,889	20.11	4,917
1982	241,104.19	141,576	159,730	81,374	20.64	3,943
1983	167,146.65	96,310	108,660	58,487	21.19	2,760
1984	193,091.60	109,058	123,042	70,050	21.76	3,219
1985	425,253.65	235,335	265,511	159,743	22.33	7,154
1986	362,261.06	196,201	221,359	140,902	22.92	6,148
1987	250,934.01	132,844	149,878	101,056	23.53	4,295
1988	96,380.43	49,829	56,218	40,162	24.15	1,663
1989	923,836.66	465,983	525,735	398,102	24.78	16,065
1990	1,029,309.38	505,803	570,661	458,648	25.43	18,036
1991	480,499.67	229,679	259,130	221,370	26.10	8,482
1992	446,618.15	207,409	234,004	212,614	26.78	7,939
1993	106,801.32	48,103	54,271	52,530	27.48	1,912
1994	78,781.67	34,365	38,772	40,010	28.19	1,419
1995	19,029.45	8,023	9,052	9,977	28.92	345
1996	77,775.57	31,639	35,696	42,080	29.66	1,419
1997	99,505.58	38,966	43,962	55,544	30.42	1,826
1998	667,523.34	250,989	283,172	384,351	31.20	12,319
1999	208,253.40	75,013	84,632	123,621	31.99	3,864
2004	334,037.26	92,328	104,167	229,870	36.18	6,354
2005	622,637.97	161,139	181,801	440,837	37.06	11,895
2006	485,355.72	116,874	131,860	353,496	37.96	9,312
2007	261,464.92	58,202	65,665	195,800	38.87	5,037
2008	80,958.23	16,532	18,652	62,306	39.79	1,566
2010	100,529.11	16,768	18,918	81,611	41.66	1,959

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 361.20 MANHOLES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 50-S1.5						
NET SALVAGE PERCENT.. 0						
2011	201,870.84	29,837	33,663	168,208	42.61	3,948
2012	100,204.16	12,866	14,516	85,688	43.58	1,966
2013	16,187.81	1,764	1,990	14,198	44.55	319
2014	101,869.60	9,107	10,275	91,595	45.53	2,012
2017	144,998.93	4,350	4,908	140,091	48.50	2,888
2018	144,999.00	1,450	1,636	143,363	49.50	2,896
	13,323,794.84	6,748,438	7,585,225	5,738,570		216,841
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						26.5 1.63

PENNSYLVANIA-AMERICAN WATER COMPANY  
SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
1918	27,001.69	27,002	27,002			
1938	143,381.54	143,382	143,382			
1945	22,816.24	22,816	22,816			
1950	55,924.15	55,924	55,924			
1955	48,422.57	48,091	43,558	4,865	0.26	4,865
1960	75,819.30	73,086	66,197	9,622	1.37	7,023
1965	78,144.11	72,715	65,861	12,283	2.64	4,653
1970	106,504.40	95,462	86,464	20,040	3.94	5,086
1972	577,972.80	509,529	461,500	116,473	4.50	25,883
1973	116,577.36	101,851	92,250	24,327	4.80	5,068
1974	139,378.53	120,599	109,231	30,148	5.12	5,888
1975	332,163.05	284,524	257,705	74,458	5.45	13,662
1977	106,837.04	89,490	81,055	25,782	6.17	4,179
1978	281,291.71	232,659	210,728	70,564	6.57	10,740
1979	300,328.00	245,083	221,981	78,347	6.99	11,208
1980	265,570.88	213,644	193,506	72,065	7.43	9,699
1981	234,314.29	185,603	168,108	66,206	7.90	8,381
1982	189,722.65	147,784	133,854	55,869	8.40	6,651
1983	132,572.81	101,453	91,890	40,683	8.92	4,561
1984	157,527.75	118,311	107,159	50,369	9.46	5,324
1985	324,180.74	238,613	216,121	108,060	10.03	10,774
1986	295,035.96	212,582	192,544	102,492	10.62	9,651
1987	204,754.44	144,190	130,599	74,155	11.24	6,597
1988	70,414.95	48,419	43,855	26,560	11.87	2,238
1989	745,838.70	499,906	452,784	293,055	12.53	23,388
1990	831,592.84	542,506	491,369	340,224	13.21	25,755
1991	392,826.45	249,134	225,650	167,176	13.90	12,027
1992	531,364.34	327,071	296,241	235,123	14.61	16,093
1994	66,276.52	38,231	34,627	31,650	16.08	1,968
1995	17,142.96	9,546	8,646	8,497	16.84	505
1996	69,364.13	37,201	33,694	35,670	17.62	2,024
1997	87,052.06	44,878	40,648	46,404	18.41	2,521
1998	572,919.87	283,292	256,589	316,331	19.21	16,467
1999	165,218.94	78,130	70,765	94,454	20.03	4,716
2000	12,072.52	5,445	4,932	7,141	20.86	342
2004	187,281.16	67,520	61,156	126,125	24.30	5,190
2005	501,884.92	169,190	153,242	348,643	25.19	13,841
2006	405,798.00	127,185	115,197	290,601	26.09	11,138
2007	228,710.30	66,205	59,964	168,746	27.00	6,250
2008	64,922.89	17,221	15,598	49,325	27.92	1,767
2009	79,539.72	19,152	17,347	62,193	28.85	2,156

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 363.00 SERVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 38-R3						
NET SALVAGE PERCENT.. 0						
2011	170,906.08	32,698	29,616	141,290	30.73	4,598
2012	79,898.15	13,289	12,036	67,862	31.68	2,142
2013	16,086.96	2,269	2,055	14,032	32.64	430
2014	63,302.09	7,330	6,639	56,663	33.60	1,686
2017	219,971.96	8,509	7,707	212,265	36.53	5,811
2018	220,000.00	2,836	2,569	217,431	37.51	5,797
9999	841,466.15-	519,294-	472,318-	369,148-		27,617-
	9,175,162.37	5,662,262	5,150,043	4,025,119		301,126
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						13.4 3.28

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 364.00 FLOW MEASURING DEVICES

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-L3						
NET SALVAGE PERCENT.. 0						
2009	19,181.61	8,689	8,634	10,548	10.94	964
2010	104,719.11	42,935	42,662	62,057	11.80	5,259
2011	9,728.50	3,556	3,533	6,196	12.69	488
2012	12,254.13	3,915	3,890	8,364	13.61	615
2013	5,882.00	1,600	1,590	4,292	14.56	295
2014	3,236.17	725	720	2,516	15.52	162
2016	246,002.36	30,750	30,555	215,447	17.50	12,311
2017	244,167.00	18,313	18,197	225,970	18.50	12,215
2018	121,154.00	3,029	3,010	118,144	19.50	6,059
	766,324.88	113,512	112,791	653,534		38,368

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 17.0 5.01

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 371.00 PUMPING EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 40-S0						
NET SALVAGE PERCENT.. 0						
1997	73,929.02	27,742	46,015	27,914	24.99	1,117
1998	125,772.21	45,435	75,362	50,410	25.55	1,973
2006	346,018.09	83,650	138,748	207,270	30.33	6,834
2008	62,107.93	12,981	21,531	40,577	31.64	1,282
2009	44,115.72	8,459	14,031	30,085	32.33	931
2010	784,414.29	136,684	226,714	557,700	33.03	16,885
2012	53,798.96	7,411	12,292	41,507	34.49	1,203
2013	27,459.20	3,261	5,409	22,050	35.25	626
2014	21,922.72	2,170	3,599	18,324	36.04	508
2015	53,626.24	4,223	7,005	46,621	36.85	1,265
2016	972,090.15	55,895	92,712	879,378	37.70	23,326
2017	915,249.17	32,491	53,892	861,357	38.58	22,327
2018	744,118.00	9,115	15,119	728,999	39.51	18,451
	4,224,621.70	429,517	712,429	3,512,193		96,728

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 36.3 2.29

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 380.00 TREATMENT EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 45-R2						
NET SALVAGE PERCENT.. 0						
1984	1,055,180.71	629,352	831,686	223,495	18.16	12,307
1986	64,089.04	36,446	48,163	15,926	19.41	821
1987	1,660,003.55	920,372	1,216,268	443,736	20.05	22,131
1988	919,728.60	496,653	656,325	263,404	20.70	12,725
1994	240,349.45	107,677	142,295	98,054	24.84	3,947
1995	210,054.10	90,697	119,856	90,198	25.57	3,527
1996	165,925.39	68,952	91,120	74,805	26.30	2,844
1997	42,322.23	16,882	22,309	20,013	27.05	740
1998	47,878.66	18,300	24,183	23,696	27.80	852
2003	24,295.90	7,175	9,482	14,814	31.71	467
2004	5,234,903.35	1,453,000	1,920,132	3,314,771	32.51	101,962
2006	11,772.93	2,839	3,752	8,021	34.15	235
2009	260,012.20	48,188	63,680	196,332	36.66	5,355
2010	248,635.18	41,383	54,687	193,948	37.51	5,171
2011	17,809.00	2,628	3,473	14,336	38.36	374
2012	48,330.00	6,197	8,189	40,141	39.23	1,023
2014	73,530.88	6,569	8,681	64,850	40.98	1,582
2016	4,293,887.12	214,694	283,718	4,010,169	42.75	93,805
	14,618,708.29	4,168,004	5,507,999	9,110,709		269,868
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						33.8 1.85



PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 389.10 OTHER PLANT AND MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 20-S2.5						
NET SALVAGE PERCENT.. 0						
2013	4,142,753.27	1,130,972	1,014,973	3,127,780	14.54	215,116
2017	363,000.00	27,225	24,433	338,567	18.50	18,301
2018	626,000.00	15,650	14,045	611,955	19.50	31,382
	5,131,753.27	1,173,847	1,053,451	4,078,302		264,799
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.4						5.16

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 390.00 OFFICE FURNITURE AND EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2007	34,229.60	19,682	19,627	14,603	8.50	1,718
2008	54,626.00	28,679	28,599	26,027	9.50	2,740
2009	13,014.19	6,182	6,165	6,849	10.50	652
2010	74,451.51	31,642	31,554	42,898	11.50	3,730
2011	31,757.95	11,909	11,876	19,882	12.50	1,591
2012	81,649.54	26,536	26,462	55,188	13.50	4,088
2013	22,813.81	6,274	6,257	16,557	14.50	1,142
2014	65,694.99	14,781	14,740	50,955	15.50	3,287
2015	14,460.77	2,531	2,524	11,937	16.50	723
2016	714,543.15	89,318	89,068	625,475	17.50	35,741
2017	296,696.00	22,252	22,190	274,506	18.50	14,838
2018	60,000.00	1,500	1,496	58,504	19.50	3,000
	1,463,937.51	261,286	260,558	1,203,380		73,250

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 16.4 5.00

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 391.00 TRANSPORTATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 15-L4						
NET SALVAGE PERCENT.. 0						
2001	7,500.00	6,210	7,500			
2002	95,000.00	77,646	95,000			
2004	75,000.00	59,750	75,000			
2005	21,215.00	16,519	21,215			
2006	274,132.58	205,599	265,606	8,527	3.75	2,274
2007	46,030.00	32,681	42,219	3,811	4.35	876
2008	225,283.34	149,138	192,666	32,617	5.07	6,433
2009	648,949.00	395,424	510,834	138,115	5.86	23,569
2010	245,374.89	135,773	175,400	69,975	6.70	10,444
2011	69,519.00	34,342	44,365	25,154	7.59	3,314
2012	283,568.72	122,312	158,010	125,559	8.53	14,720
2013	569,531.08	208,448	269,286	300,245	9.51	31,572
2014	74,011.10	22,203	28,683	45,328	10.50	4,317
2015	628,453.46	146,637	189,435	439,018	11.50	38,175
2016	130,529.00	21,755	28,105	102,424	12.50	8,194
2017	427,910.00	42,791	55,280	372,630	13.50	27,602
	3,822,007.17	1,677,228	2,158,604	1,663,403		171,490

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 9.7 4.49

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 393.00 TOOLS, SHOP AND GARAGE EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 20-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	44,148.67	27,593	27,598	16,551	7.50	2,207
2007	88,820.75	51,072	51,080	37,741	8.50	4,440
2008	32,994.25	17,322	17,325	15,669	9.50	1,649
2009	57,515.11	27,320	27,324	30,191	10.50	2,875
2010	42,200.18	17,935	17,938	24,262	11.50	2,110
2011	29,347.68	11,005	11,007	18,341	12.50	1,467
2012	55,529.53	18,047	18,050	37,480	13.50	2,776
2013	116,235.29	31,965	31,970	84,265	14.50	5,811
2014	13,575.00	3,054	3,055	10,520	15.50	679
2015	6,574.00	1,150	1,150	5,424	16.50	329
2016	27,741.12	3,468	3,469	24,272	17.50	1,387
2017	412,999.00	30,975	30,980	382,019	18.50	20,650
2018	50,000.00	1,250	1,250	48,750	19.50	2,500
	977,680.58	242,156	242,196	735,485		48,880

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 15.0 5.00

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 394.00 LABORATORY EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2006	4,744.41	3,954	3,954	790	2.50	316
2007	3,524.28	2,702	2,702	822	3.50	235
2008	44,629.31	31,241	31,245	13,384	4.50	2,974
2010	9,256.54	5,245	5,246	4,011	6.50	617
2011	7,356.65	3,678	3,678	3,679	7.50	491
2012	12,243.36	5,305	5,306	6,937	8.50	816
2013	10,187.71	3,736	3,736	6,452	9.50	679
2014	16,860.02	5,058	5,059	11,801	10.50	1,124
	108,802.28	60,919	60,926	47,876		7,252
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 6.6						6.67

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 395.00 POWER OPERATED EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. IOWA 16-L2.5						
NET SALVAGE PERCENT.. 0						
2006	99,992.04	60,307	92,597	7,395	6.35	1,165
2007	19,935.00	11,550	17,734	2,201	6.73	327
2008	48,270.00	26,548	40,763	7,507	7.20	1,043
2009	180,900.00	93,276	143,218	37,682	7.75	4,862
2010	27,950.00	13,276	20,384	7,566	8.40	901
2012	99,654.42	37,869	58,145	41,509	9.92	4,184
2013	157,521.76	51,491	79,061	78,461	10.77	7,285
2016	30,858.50	4,764	7,315	23,544	13.53	1,740
	665,081.72	299,081	459,217	205,865		21,507

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 9.6 3.23

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 396.00 COMMUNICATION EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2017	1,177,477.00	117,748	103,078	1,074,399	13.50	79,585
2018	728,977.00	24,297	21,270	707,707	14.50	48,807
	1,906,454.00	142,045	124,348	1,782,106		128,392
COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT ..						13.9 6.73

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

ACCOUNT 397.00 MISCELLANEOUS EQUIPMENT

CALCULATED REMAINING LIFE DEPRECIATION ACCRUAL  
 RELATED TO ORIGINAL COST AS OF DECEMBER 31, 2018

YEAR (1)	ORIGINAL COST (2)	CALCULATED ACCRUED (3)	ALLOC. BOOK RESERVE (4)	FUTURE BOOK ACCRUALS (5)	REM. LIFE (6)	ANNUAL ACCRUAL (7)
SURVIVOR CURVE.. 15-SQUARE						
NET SALVAGE PERCENT.. 0						
2017	313,000.00	31,300	27,022	285,978	13.50	21,184
2018	368,751.00	12,290	10,610	358,141	14.50	24,699
	681,751.00	43,590	37,632	644,119		45,883

COMPOSITE REMAINING LIFE AND ANNUAL ACCRUAL RATE, PERCENT .. 14.0 6.73



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**PART III. EXPERIENCED NET SALVAGE**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

EXPERIENCED RETIREMENTS BY ACCOUNT AND ASSOCIATED  
 COST OF REMOVAL, GROSS SALVAGE, AND NET SALVAGE

ACCT	REGULAR RETIREMENTS	COST OF REMOVAL	GROSS SALVAGE	NET SALVAGE
2017 TRANSACTION YEAR				
354.40	45,000.00	18,000.00		18,000.00-
361.10	41,435.00	16,988.00		16,988.00-
361.20	2,400.00	984.00		984.00-
363.00	8,000.00	2,320.00		2,320.00-
390.00	10,096.70			
	106,931.70	38,292.00		38,292.00-

PENNSYLVANIA-AMERICAN WATER COMPANY  
 SCRANTON WASTEWATER OPERATIONS

EXPERIENCED RETIREMENTS BY ACCOUNT AND ASSOCIATED  
 COST OF REMOVAL, GROSS SALVAGE, AND NET SALVAGE

ACCT	REGULAR RETIREMENTS	COST OF REMOVAL	GROSS SALVAGE	NET SALVAGE
2018 TRANSACTION YEAR				
354.30	10,000.00	1,000.00		1,000.00-
354.40	53,060.00	6,898.00		6,898.00-
361.10	43,720.00	17,051.00		17,051.00-
361.20	2,400.00	936.00		936.00-
363.00	8,000.00	2,400.00		2,400.00-
371.00	5,000.00	750.00		750.00-
	122,180.00	29,035.00		29,035.00-
TOTAL	229,111.70	67,327.00		67,327.00-