pended on the construction; and, finally, the number of feet of construction was divided by the man-hours expended to determine the number of feet of Well constructed per man-hour.

In order to present a comparison of the man-hour productivity and costs of the earlier years with those of 1938, the year to which Original Cost was trended in Exhibit No. 20, an analysis of 1938 costs similar to the analysis made for the earlier period also had to be and was undertaken. It was supplemented by an analysis of costs for 1937, which had been given the same value for trending purposes in Exhibit No. 20 as those of 1938, viz., 100.0, for the reason that the 1938 Construction alone did not provide a great amount of construction experience.

The amounts of Original Cost for the years that were analyzed and the amounts to which they were trended are reproduced from Exhibit No. 20 in Table 4.

17 TABLE 4.—*Producing gas wells—Well construction—Original cost and original cost trended per Exhibit No. 20, pages 66 and 67, 1896–1900, 1911–15, 1937, and 1938*

Year first placed in public service	Original cost	Trended to 1938 prices (1938=100.0)	Original cost trended to 1938 prices
(A)	(B)	(C)	(D) (B divided by C)
1896	$16,621.49	27.8	$59,789.53
1897	24,765.33	27.8	89,083.92
1898	9,619.62	27.8	34,602.95
1899	76,100.49	27.8	273,742.77
1900	106,957.23	31.1	343,913.87
	234,064.16		801,133.04
1911	667,715.80	38.2	1,747,947.11
1912	609,543.22	38.2	1,595,662.86
1913	818,211.69	40.2	2,035,352.44
1914	800,037.36	40.2	1,990,142.66
1915	579,832.99	40.2	1,442,370.60
	3,475,341.06		8,811,475.67
1937	163,520.10	100.0	163,520.10
1938	153,069.59	100.0	153,069.59

18 The analysis of Original Cost for the years enumerated in Table 4 was made from the company's "Well Construction Record" which gives the depth and cost of construction of each well. A summary of the results of the analysis by years showing Well Construction Costs divided into five classifi-

cations is presented in Table 5. The analysis discloses that more than nine-tenths of total Original Cost is in the two classifications that cover drilling operations, namely, Original Drilling and Drilling Deeper, and it was made particularly to ascertain the amount of direct costs applicable to each of these two operations.

19 TABLE 5.—*Producing gas wells—Well construction—Analysis of original cost per Exhibit No. 20, 1896–1900, 1911–15, 1937, and 1938*

Year	Original drilling exclusive of overheads [1]	Drilling deeper exclusive of overheads [1]	Adjustments for change in equipment	Overheads	Purchased from nonutility	Total original cost (exhibit No. 20)
1896	$16,621.49					$16,621.49
1897	23,396.79	$1,368.54				24,765.33
1898	9,057.08	562.54				9,619.62
1899	42,469.28		*$833.91*	$33.79	$34,431.33	76,100.49
1900	95,693.61		*755.95*	392.09	11,627.48	106,957.23
1911	594,521.77	32,609.08	*4,278.26*	34,717.18	10,146.03	667,715.80
1912	573,598.10	12,355.11	*5,629.86*	29,193.11	26.76	609,543.22
1913	755,865.14	22,263.65	*6,844.48*	38,955.19	7,972.19	818,211.69
1914	729,261.77	29,872.25	*5,068.18*	38,195.30	7,776.22	800,037.36
1915	479,850.19	54,289.09	*1,328.65*	32,329.82	14,692.54	579,832.99
1937	115,040.72	25,124.37	4,506.45	18,002.74	845.82	163,520.10
1938	114,721.81	12,973.30	5,029.56	15,680.75	4,664.17	153,069.59

[1] The amounts shown in this column for the years 1896 to 1900 include the cost of a number of wells drilled for other companies, for which the overheads could not be determined and segregated.

20 *Man-Hour Productivity.*

With direct labor costs and number of feet drilled available from the analysis of Original Cost, both for Original Drilling and Drilling Deeper, it was possible by the use of the wage rates used in developing the trend factors of Exhibit No. 20 to obtain the number of man-hours expended in each year and consequently the number of feet of Well constructed per man-hour. The man-hours expended, relating as they do to all the direct costs of Well Construction, embrace not only the drilling operation but the installation of casing and tubing as well. These computations are shown in Tables 6 and 7 which also show the average performance for each year translated into the ratio it bears to 1938 performance.

21 TABLE 6.—*Producing gas wells—Well construction—Determination of number of feet of original drilling drilled per man-hour in the years 1896–1900, 1911–15, 1937, and 1938*

Year	Cost of original drilling exclusive of overheads (table 6)	Average hourly wage rates (Appendix D)	Man-hours expended	Feet of original drilling	Feet of original drilling drilled per man-hour	Ratios of man-hour productivity (1938=100.0)
(A)	(B)	(C)	(D) (B÷C)	(E)	(F) (E÷D)	(G)
1896	$16,621.49	$0.287	57,914	8,938	0.1543	38.8
1897	23,396.79	.287	81,521	13,104	.1607	40.5
1898	9,057.08	.287	31,557	4,974	.1576	39.7
1899	42,469.28	.287	147,976	24,166	.1633	41.1
1900	95,693.61	.322	297,185	59,083	.1988	50.1
1911	594,521.77	.396	1,501,318	353,725	.2356	59.3
1912	573,598.10	.396	1,448,480	343,376	.2371	59.7
1913	755,865.14	.416	1,816,983	437,257	.2406	60.6
1914	729,261.77	.416	1,753,033	450,457	.2569	64.7
1915	479,850.19	.416	1,153,486	313,577	.2719	68.5
1937	115,040.72	1.064	108,120	47,701	.4411	111.1
1938	114,721.81	1.074	106,817	42,438	.3972	100.0

22 TABLE 7.—*Producing gas wells—Well construction—Determination of number of feet of "drilling deeper" drilled per man-hour in the years 1896–1900, 1911–15, 1937, and 1938*

Year	Cost of drilling deeper exclusive of overheads (table 6)	Average hourly wage rates (Appendix D)	Man-hours expended	Feet of drilling deeper	Feet of drilling deeper drilled per man-hour	Ratios of man-hour productivity (1938=100.0)
(A)	(B)	(C)	(D) (B÷C)	(E)	(F) (E÷D)	(G)
1896		$0.287				
1897	$1,368.54	.287	4,768	860	0.1804	69.1
1898	562.54	.287	1,960	311	.1587	60.8
1899		.287				
1900		.322				
1911	32,609.08	.396	82,346	11,720	.1423	54.5
1912	12,355.11	.396	31,199	6,382	.2045	78.4
1913	22,263.65	.416	53,518	10,859	.2029	77.7
1914	29,872.25	.416	71,808	11,267	.1569	60.1
1915	54,289.09	.416	130,502	18,115	.1388	53.2
1937	25,124.37	1.064	23,613	5,014	.2123	81.3
1938	12,973.30	1.074	12,079	3,153	.2610	100.0

23 These two tables definitely show that the man-hours of years prior to 1938 were less productive than the man-hours of 1938. It is particularly notable that a steady improvement in man-hour productivity is discernible for Original Drilling during the years of the two five-year periods for which the volume of work done provides truly representative ratios.

A series of ratios that reflect not only increases in the hourly wage-rates but increases in the hourly productivity as well, as shown in Tables 6 and 7, has been computed and is presented in Table 8. These ratios are predicated upon the cost per foot, to construct, a unit which automatically gives weight both to wage-rate and productivity factors. The cost per foot was determined by dividing the Original Cost of Well Construction at December 31, 1938, installed in each of the years shown, by the number of feet that that Original Cost represents, as determined from the Well Construction Record used in the analysis of Original Cost. The comparison of these ratios with the trend factors used in Exhibit No. 20 (CF. page 17) is illuminating.

24 TABLE 8.—*Producing gas wells—Well construction—Determination of original drilling, drilling deeper, and combined costs per foot, exclusive of overheads, for the years 1896–1900, 1911–15, 1937, and 1938*

Year	Original drilling				Drilling deeper				Combined			
	Cost (table 6)	Feet	Cost per foot	Ratio of cost per foot (1938=100.0)	Cost (table 6)	Feet	Cost per foot	Ratio of cost per foot (1938=100.0)	Cost	Feet	Cost per foot	Ratio of cost per foot (1938=100.0)
(A)	(B)	(C)	(D) (B÷C)	(E)	(F)	(G)	(H) (F÷G)	(I)	(J) (B+F)	(K) (C+G)	(L) (J÷K)	(M)
1896	$16,621.49	8,938	$1.86	68.9					$16,621.49	8,938	$1.86	66.4
1897	23,396.79	13,104	1.78	65.9	$1,368.54	860	$1.59	38.7	24,765.33	13,964	1.77	63.2
1898	9,057.08	4,974	1.82	67.4	562.54	311	1.81	44.0	9,619.62	5,285	1.82	65.0
1899	42,469.28	24,166	1.76	65.1					42,469.28	24,166	1.76	62.9
1900	95,693.61	59,083	1.62	60.0					95,693.61	59,083	1.62	57.9
1896–1900	187,238.25	110,265	1.70	63.0	1,931.08	1,171	1.65	40.1	189,169.33	111,436	1.70	60.7
1911	594,521.77	353,725	1.68	62.2	32,609.08	11,720	2.78	67.6	627,130.85	365,445	1.72	61.4
1912	573,598.10	343,376	1.67	61.9	12,355.11	6,382	1.94	47.2	585,953.21	349,758	1.68	60.0
1913	755,865.14	437,257	1.73	64.1	22,263.65	10,859	2.05	49.9	778,128.79	448,116	1.74	62.1
1914	729,261.77	450,457	1.62	60.0	29,872.25	11,267	2.65	64.5	759,134.02	461,724	1.64	58.6
1915	479,850.19	313,577	1.53	56.6	54,289.09	18,115	3.00	73.0	534,139.28	331,692	1.61	57.5
1911–15	3,133,096.97	1,898,392	1.65	61.1	151,389.18	58,343	2.59	63.0	3,284,486.15	1,956,735	1.68	60.0
1937	115,040.72	47,701	2.41	89.2	25,124.37	5,014	5.01	121.9	140,165.09	52,715	2.66	95.0
1938	114,721.81	42,438	2.70	100.0	12,973.30	3,153	4.11	100.0	127,695.11	45,591	2.80	100.0

Next to Producing Gas Wells—Well Construction, Mains-Construction is the largest of the property accounts consisting chiefly of labor costs. Primarily, it contains the cost of labor for laying mains and certain other costs incident to that operation, such as teaming and freight. From an Original Cost of $5,266,108 it was trended to $9,684,569, an amount $4,418,461 or 84 percent in excess of that Original Cost.

In preparing analyses and in making comparisons of Mains-Construction two things were kept in mind: that lines consisted of pipe of several dimensions and that they had been laid under varying conditions, such as soil and terrain conditions, not to mention others. These obstacles were overcome by making comparisons by pipe size, and for those sizes only for which there was sufficient footage to assure typical average costs.

Two studies were made: one embracing 1,400,315 feet of main installed, based upon an analysis of the Original Cost shown in Exhibit No. 20 for the years 1911–15 and 1936–38, and the other embracing 3,294,595 feet, based upon typical construction in three sizes of main for the years 1898–1938. To the extent that both studies cover main in plant existing at December 31, 1938, they overlap. The first study is an analysis and comparison of amounts of Original Cost that were trended in Exhibit No. 20; the
26 second is an analysis and comparison of all typical installations in three sizes of main over a long period of years, including both main that was and was not in plant as of December 31, 1938.

The Development of the Trend Factors.

Similar to Well Construction, in that it is made up of labor costs, Mains-Construction was trended in the same way as that account, by the use of trend factors developed from hourly wage-rates. The method employed has been analyzed and compared in this report in the same manner that the method employed for Well Construction has been analyzed and compared, and for the same general purpose.

The factors used in Exhibit No. 20 to trend Mains-Construction were derived for the years prior to 1906 from hourly wage-rates for common labor, the only wage-rates available for those years, and for the years 1906 to 1938 from hourly wage-rates for roustabouts and laborers. The factors for 1906 and subsequent

years were obtained by weighting the hourly wage-rates, as found on the company's books, of one roustabout and four laborers. (See pp. 55–6, Exhibit No. 20.) For example, the factor of 40.4 which was used to trend Original Cost installed in 1911 is a composite of one-fifth of 39.01 and four-fifths of 40.80, the trend factors for roustabout and laborer, respectively, for 1911. (See Appendix E and F.) These factors are the ratio that the 1911 hourly wage-rates of roustabout and laborer bear to the 1938 wage-rates for those types of labor. Having been trended
27 in the same manner that Well Construction was trended, the Original Cost of Mains-Construction trended represents, as the Original Cost of Well Construction trended does, the capitalization of man-hours of bygone years at 1938 labor rates.

Analysis of Original Cost.

The analysis of Original Cost of Mains-Construction for the years 1911–15 and 1936–38 was undertaken for the purpose of making a comparison of the man-hour productivity and the cost per foot to lay mains in two periods. The amounts of that Original Cost analyzed and the amounts to which they were trended in Exhibit No. 20 are shown in Table 9. Their classification into Direct Costs and Overheads are shown in Table 10.

28 TABLE 9.—*Mains—Construction—Original cost and original cost trended per Exhibit No. 20 (p. 82), for the years 1911–15, 1936, 1937, and 1938*

Year first placed in public service	Original cost	Trend to 1938 prices (1938=100.0)	Original cost trended to 1938 prices
(A)	(B)	(C)	(D) (B÷C)
1911	$235,578.12	40.4	$583,114.15
1912	8,866.88	40.6	21,839.61
1913	342,213.67	41.7	820,656.26
1914	4,534.52	41.3	10,979.47
1915	13,499.97	41.8	32,296.57
	604,693.16		1,468,886.06
1936	671,024.71	88.1	761,662.55
1937	113,713.37	100.0	113,713.37
1938	3,563.97	100.0	3,563.97
	788,302.05		

29 TABLE 10.—*Mains—Construction—Original cost per Exhibit No. 20 subdivided into direct costs and overheads for the years 1911–15, 1936, 1937, and 1938*

Year	Direct costs	Overheads	Total
1911–15	[1] $580,155.05	$25,581.31	$604,693.16
1936	612,268.75	58,755.96	671,024.71
1937	104,295.89	9,417.48	113,713.37
1938	3,313.45	250.52	3,563.97
1936–38	719,878.09	68,423.96	788,302.05

[1] Includes $1,043.20 for lines installed prior to 1911 and $87,793.07 for property purchased from a predecessor.

30 *Man-Hour Productivity.*

Table 11 shows the direct costs of the 1911–15 and 1936–38 periods for 10-, 12-, 16-, and 20-inch main with the footage of installation for each size. The direct costs of these sizes comprise about 97 percent of the total direct costs for each period. This table also shows the number of feet of main, by sizes, installed per man-hour during each of the two periods, and the ratio of the man-hour productivity in the 1911–15 period to man-hour productivity in the 1936–38 period. The number of feet installed per man-hour was obtained by dividing the number of feet installed by the number of man-hours expended on their installation, and the number of man-hours expended, by dividing direct costs by the average hourly wage rates for Mains-Construction as determined from the working papers of Exhibit No. 20. The man-hour productivity of three years, 1936–38, rather than the productivity of 1938 alone was compared with the 1911–15 man-hour productivity for the reason that the amount of Original Cost installed in 1938, being only $3,563, does not afford adequate performance experience.

The comparisons for all four dimensions of pipe indicate greater man-hour productivity in the later period.

31 TABLE 11.—*Mains—Construction—Determination of feet of main installed per man-hour in the years 1911–15 and 1936–38*

Period	Dimension of main in inches	Year installed	Original cost exclusive of overheads—direct costs (table 12)	Average hourly wage rates (Appendix G)	Man-hours expended	Feet of main installed	Feet of main installed per man-hour	Ratio of man-hour productivity (1936–38=100.0)
(A)	(B)	(C)	(D)	(E)	(F) (D÷E)	(G)	(H) (G÷F)	(I)
1911–15	10	1911	$8,106.12	$0.219	37,014	17,888		
		1912		.220				
		1913	49,517.89	.225	220,080	121,850		
		1914		.224				
		1915	12,987.04	.256	50,731	31,151		
		Total	70,611.05	.229	307,825	170,889	.5551	54.3
	12	1911	108,108.57	.219	493,646	203,678		
		1912		.220				
		1913	10,436.60	.225	46,385	13,789		
		1914	4.29	.224	19	10		
		1915		.256				
		Total	118,549.46	.220	540,050	217,477	.4027	90.1
	16	1911		.219				
		1912	5,222.12	.220	23,737	5,870		
		1913	120,403.26	.225	535,126	110,388		
		1914	1,115.46	.224	4,980	1,740		
		1915		.256				
		Total	126,740.84	.225	563,843	117,998	.2093	44.2

31 TABLE 11.—*Mains—Construction—Determination of feet of main installed per man-hour in the years 1911–15 and 1936–38*—Con.

Period	Dimension of main in inches	Year installed	Original cost exclusive of overheads—direct costs (table 12)	Average hourly wage rates (Appendix G)	Man-hours expended	Feet of main installed	Feet of main installed per man-hour	Ratio of man-hour productivity (1936–38=100.0)
(A)	(B)	(C)	(D)	(E)	(F) (D÷E)	(G)	(H) (G÷F)	(I)
	20	1911	$108,081.13	$0.219	493,521	125,905		
		1912	258.12	.220	1,173	228		
		1913	143,439.64	.225	637,510	100,338		
		1914	1,559.70	.224	6,963	1,914		
		1915		.256				
		Total	253,338.59	.222	1,139,167	228,385	0.2005	67.0
	Other dimensions and miscellaneous		10,915.11					
			580,155.05					
32 1936–38	10	1936	261.64	.483	542	347		
		1937	22,661.80	.558	40,613	42,138		
		1928	882.94	.564	1,565	1,171		
		Total	23,806.38	.557	42,720	43,656	1.0219	100.0
	12	1936	611,480.34	.483	1,266,005	560,292		
		1937	238.49	.558	427	5,629		
		1938	20.33	.564	36	21		
		Total	611,739.16	.483	1,266,468	565,942	.4469	100.0
	16	1936	229.47	.483	475	162		
		1937	63,273.24	.558	113,393	53,836		
		1938	708.25	.564	1,256	500		

	Total	64, 210. 96	. 557	115, 124	54, 498	. 4734	100. 0
20	1936	620. 08	. 483	1, 284	342		
	1937	1, 964. 24	. 558	3, 520	1, 095		
	1938	59. 83	. 564	106	33		
	Total	2, 644. 15	. 539	4, 910	1, 470	. 2994	100. 0
Other dimensions and miscellaneous		17, 477. 44					
		719, 878. 09					

33 Having developed the number of feet of main installed per hour, it was next sought to determine the cost per foot to install main of each size. This is done in Table 12 by dividing the average hourly wage rates by the number of feet installed per hour.

The hourly wage rates used for the 1911–15 period in Table 12 are the weighted averages derived from the five annual rates used to develop the trend factors of Exhibit No. 20. The hourly wage rate used for 1938 in that table, i. e., $0.564, is the 1938 wage rate used to develop the trend factors of Exhibit No. 20, corrected to include social security taxes for that year. (See Appendix G.) The 1938 costs are based upon the man-hour productivity of 1936, 1937, and 1938, at 1938 wage rates, the performance of three years being used because Mains-Construction in 1938 was only $3,563, which was inadequate for the purpose of developing typical costs. The cost per foot to install main in the 1911–15 period is best compared with the 1938 cost by means of the ratios in Column F. These ratios, unlike the trend factors used in Exhibit No. 20 which are based on hourly wage rates only, reflect not only hourly wage rates but man-hour productivity as well.

34 TABLE 12.—*Mains—Construction—Determination of cost to install 10-, 12-, 16-, and 20-inch main per foot, exclusive of overheads, for the years 1911–15 and 1938*

Period	Main dimension in inches	Average hourly wage-rates (table 13)	Feet installed per hour (table 13)	Cost to install per foot	Ratio of cost per foot (1938=100.0)
(A)	(B)	(C)	(D)	(E) (C÷D)	(F)
1911–15	10	$0.229	0.5551	$0.413	74.8
	12	.220	.4027	.546	43.3
	16	.225	.2093	1.075	90.3
	20	.222	.2005	1.107	58.8
1938	10	.564	[1] 1.0219	.552	100.0
	12	.564	[1] .4469	1.262	100.0
	16	.564	[1] .4734	1.190	100.0
	20	.564	[1] .2994	1.884	100.0

[1] Performance of 1936, 1937, and 1938 used for purpose of comparison.

35 *Analysis of $3,244,145 of Typical Construction.*

The second study of Mains-Construction is based upon an analysis of large, typical installations of 10-, 12-, and 20-inch main. These sizes were chosen for analysis because they represent a predominant amount of the footage and cost in the Mains-

Construction Account. The jobs analyzed represent $3,244,145 of costs and 3,294,595 feet of main. The analysis was made from data contained in the company's Mains Lines Inventory Ledger. It includes all large typical installations undertaken during the period of the company's existence from 1898 to 1938, inclusive.

The study was made simply to determine whether the number of feet of main laid per man-hour was greater or less in recent years than it had formerly been. To reach a sound conclusion in this matter an analysis of a great many feet of installation had to be made, for a true trend in productivity could be clearly established only by comparisons based on great quantities of installation. The requirement was met by analyzing all large, typical construction jobs of the three sizes of main most frequently occurring in the company's system and then tabulating the results into two chronological groups, construction completed prior to December 31, 1924, and Construction completed subsequent to December 31, 1924. The cleavage was made at December 31, 1924, because the year 1924 marked the end of the ten-hour day (See Appendix F) and the beginning of the eight-hour day which it was thought might in the long run have an effect on man-hour productivity. This date also served to divide the period examined into two large spans of years in each of which many feet of main were installed.

36

The results of the analysis are shown in Table 13. This tabulation gives by job the number of feet of 10-, 12-, and 20-inch main installed per man-hour and clearly indicates the calculation by means of which this information was determined. The average hourly wage rates used in the calculation (Column E) are the wage rates that underlie the factors used to trend the account in Exhibit No. 20.

The "cost to install" figures shown in Column D of the table are in some instances the result of allocations of total costs of main installation jobs. Allocations of job costs had to be made in those instances where more than one dimension of main had been installed. They were made on the basis of cubic yards of excavation per trench foot, as established by Mr. Antonelli. (See appendix H.) Since the portion of job costs excluded from Table 13 is less than 5 percent except for three jobs, the effect of the allocations on results is not great; in most instances the amount allocated was less than 1 percent.

Table 14 is a recapitulation of the figures shown on Table 13. It is to be noted that the number of jobs analyzed for 10-, 12-, and

20-inch main were 21, 14, and 5, respectively, and that, in the order given, the years they cover range from 1905 to 1937,
37 from 1910 to 1936, and from 1911 to 1925. In other words, the analysis of 10-inch main covers the greatest number of jobs and the longest period, and the analysis of the 20-inch main the least number and the shortest period.

38 TABLE 13.—*Mains—Construction—Determination of the number of feet of 10-, 12-, and 20-inch main installed per man-hour in the years prior and subsequent to Dec. 31, 1924*

10-INCH

Year installed	Line number	Feet of pipe installed	Cost to install	Average hourly wage-rate (Appendix G)	Man-hours expended	Feet of main installed per man-hour
(A)	(B)	(C)	(D)	(E)	(F) (D÷E)	(G) (C÷F)
1905	[1] 13	107,950	$41,021	$0.192	213,652	0.5053
1905	[2] 18	92,689	45,846	.192	238,782	.3882
1908	[2] 27	90,167	28,060	.212	132,361	.6812
1908	[2] 28	97,944	30,211	.212	142,505	.6873
1910	[2] 48	19,739	9,301	.215	43,262	.4563
1910	[2] 51	40,171	17,933	.215	83,411	.4816
1910	[1] 52	85,398	31,628	.215	147,111	.5805
1911	[1] 42	1,497	713	.219	3,258	.4595
1912	[1] 55	254,630	166,269	.220	755,770	.3369
1912	[2] 68	70,127	26,862	.220	122,102	.5743
1913	[1] 4	14,336	8,564	.225	38,064	.3766
1914	[1] 79	6,141	1,884	.224	8,415	[3] .7298
1916	[2] 107	16,463	8,689	.244	35,614	.4623
1920	[2] 128	52,986	61,591	.389	158,333	.3346
1921	[1] 139	6,992	8,296	.330	25,140	[4] .2781
Prior to 12/31/24		957,230	486,874	.227	2,147,780	.4457
1925	[2] 166	33,704	398794	.412	96,588	[4] .3489
1925	[1] 162	10,150	9,765	.412	23,702	.4282
1927	[2] 177	3,252	1,804	.440	4,101	.7930
1929	[2] 180	26,773	8,971	.440	20,390	[3] 1.3130
1929	[2] 181	50,305	25,263	.440	57,416	.8761
1937	[2] 200	39,192	19,948	.558	35,752	1.0962
Subsequent to 12/31/24		163,376	105,547	.444	237,949	.6866

[1] Indicates screw joint.
[2] Indicates dresser coupled joint.
[3] Maximum.
[4] Minimum.

38 TABLE 13.—*Mains—Construction—Determination of the number of feet of 10-, 12-, and 20-inch main installed per man-hour in the years prior and subsequent to Dec. 31, 1924*—Continued

39 12-INCH

Year installed	Line number	Feet of pipe installed	Cost to install	Average hourly wage-rate (Appendix G)	Man-hours expended	Feet of main installed per man-hour
(A)	(B)	(C)	(D)	(E)	(F) (D÷E)	(G) (C÷F)
1910	[2] 32	60,664	$50,068	$0.215	232,874	[4] 0.2605
1910	[2] 39	82,676	50,454	.215	234,671	.3523
1911	[2] 42	108,101	60,860	.219	277,903	.3890
1912	[2] 57	161,672	91,869	.220	417,588	.3872
1913	[1] 4	14,055	9,924	.225	44,107	.3187
1923	[2] 151	60,336	74,937	.329	227,774	.2649
1923	[2] 154	30,825	28,098	.329	85,407	.3609
1924	[2] 156	64,079	71,614	.383	186,984	.3427
1924	[2] 32	25,900	20,247	.383	52,866	[3] .4899
1924	[2] 117	99,129	78,144	.383	204,034	.4858
Prior to 12/31/24		707,437	536,220	.273	1,964,208	.3602
1925	[2] 8	48,815	31,186	.412	75,696	.6449
1925	[2] 166	22,157	30,928	.412	75,070	[4] .2952
1936	[2] 193	58,396	30,170	.483	62,466	[3] .9348
1936	[5] 192	501,883	572,027	.483	1,184,322	.4238
Subsequent to 12/31/24		631,251	664,314	.475	1,397,554	.4517

40 20-INCH

1911	[2] 45	125,897	$132,148	$0.219	603,416	0.2086
1913	[2] 4	100,534	133,325	.225	592,558	.1697
1916	[2] 106	104,365	143,333	.244	587,433	.1777
1924	[2] 155	80,619	134,143	.383	350,244	.2302
Prior to 12/31/24		411,415	542,950	.254	2,133,651	.1928
1925	[2] 162	423,886	908,240	.412	2,204,467	.1923

[1] Indicates screw joint.
[2] Indicates dresser coupled joint.
[3] Maximum.
[4] Minimum.
[5] Indicates welded joint.

41 TABLE 14.—*Mains—Construction—Comparison of feet of 10-, 12-, and 20-inch main installed per man-hour subsequent to and prior to Dec. 31, 1924*

Dimension of main in inches	Mains installed subsequent to or prior to Dec. 31, 1924	Span of years	Number of jobs	Number of feet installed	Cost to install	Feet of pipe installed per man-hour		
						Average	Maximum	Minimum
10	Subsequent	1925–1937	6	163,376	$105,547	0.6866	1.3130	0.3489
	Prior	1905–1921	15	957,230	486,874	.4457	.7298	.2781
	Increased productivity per man-hour in later period					.2409	.5832	.0708
12	Subsequent	1925–1936	4	631,251	664,314	.4517	.9348	.2952
	Prior	1910–1924	10	707,437	536,220	.3602	.4899	.2605
	Increased productivity per man-hour in later period					.0915	.4449	.0347
20	Subsequent	1925	1	423,886	908,240	.1923	.1923	.1923
	Prior	1911–1924	4	411,415	542,950	.1928	.2302	.1697
	Increased productivity per man-hour in later period					(.0005)	(.0379)	.0226

42 MAINS-EQUIPMENT

Mains-Equipment is the largest of the company's accounts chargeable with equipment costs. Primarily, it contains the cost of pipe, valves and fittings that go into main lines. From an Original Cost of $10,225,450, this account was trended to $13,360,169, an amount $3,134,719 or 30 percent in excess of that Original Cost.

In the exposition of this account, which follows, the factors used to trend its Original Cost in Exhibit No. 20 are explained, the points of difference between this account and the Well-Construction and Mains-Construction Accounts are noted, the inherent fallacy of the factors used to trend this account are pointed out, and finally, a comparison of pipe prices adjusted to reveal the effect of the trend with the pipe prices shown in the Estimated Cost of Reproduction New offered by Mr. George I. Rhodes for the Company, is presented. The comparison conclusively shows the error of the trending.

The Development of the Trend Factors.

The mechanics by which trending was accomplished need not again be discussed; they are the same for this account as for Well-Construction and Mains-Construction. Attention may be immediately directed to the basis for the trend factors.

The data underlying Exhibit No. 20 show that the factors developed to trend Mains-Equipment are composites derived
43 by combining a Fittings Trend and a Line-Pipe Trend weighted in the ratio of 13½ and 86½ percent, respectively, for each of the years from 1892 to 1938 (See Appendix I). The Fittings Trend was derived from a weighting of couplings and clamps and other materials, in the ratios of 89, 5½ and 5½ percent, respectively, and the Line-Pipe Trend from the arithmetical average of the cost per ton each of 2, 3, 4, 6, and 8 inch pipe. Since the Line-Pipe Trend is given a weighting nearly equal to seven-eighths of the whole, its examination is of uppermost importance.

The Line-Pipe Trend for the period prior to the year 1900 was based upon the price of wrought iron pipe; for the period 1900 to 1902, upon the price of steel pipe; and for the years subsequent to 1902, upon the price of steel screw pipe, f. o. b. destination. Where possible the prices used were those paid by the Hope company, but in many instances they were not, as a photostatic copy of the work sheet for 2-inch pipe reproduced here as Appendix J, shows. The company purchased no 2-inch pipe after 1915, yet a price for that size of pipe continued to be used in developing the yearly trend factor for the years 1915 to 1938. That price was the price paid by Peoples Natural Gas Company, an affiliate of the Hope company, or a price developed by interpolation.

The trending of Mains-Equipment, being a trending of material costs, presented a somewhat different problem for examination than the trending of Producing Gas Wells-Well Construction and Mains-Construction. In the case of those accounts the ques-
44 tion raised was that the man-hours expended in years prior to 1938 were not the equivalent of the man-hours of 1938 and that, therefore, those accounts should not be trended by factors based upon hourly wage-rates alone. A question similar to that, as to whether the material purchased in the years prior to 1938 is the equivalent of material purchased in 1938, might also be raised (The United States Steel Corporation indicate a substantial improvement has been accomplished in the making of steel pipe—See Appendix K), but it is not susceptible of quantitative proof

and has not been pursued. The examination into the propriety of the factors used to trend Mains-Equipment has been confined to the question of whether the prices of the sizes upon which the Line-Pipe Trend were predicated are representative of pipe actually charged to the account.

Table 15 shows that about 5 percent of the cost in the Mains-Equipment Account represent mains 8 inches or less in diameter and that the remaining 95 percent of the cost represents mains ranging from 10 to 20 inches in diameter (Appendix L). Since the Line-Pipe Trend is based on averages of the price of 2, 3, 4, 6, and 8 inch pipe only, it clearly is not representative of the account. Notwithstanding this fact, the trend might nevertheless be acceptable if prices for all sizes of pipe had fluctuated throughout the years in unison and to the same degree, but this does not appear to have been the case.

45 TABLE 15.—*Mains—Equipment—Main line 8 inches and less in diameter and greater than 8 inches in diameter, as at Dec. 31, 1938—Total book cost and reproduction cost new per Rhodes' appraisal*

	Book cost [1]	
	Amount	Percent
Lines 8 inches and less	$433,943	5.2
Lines greater than 8 inches	7,833,825	94.8
	8,267,768	100.0
	Rhodes' appraisal [2]	
	Amount	Percent
Lines 8 inches and less	$487,781	5.6
Lines greater than 8 inches	8,161,815	94.4
	8,649,596	100.0

[1] For details see Appendix 1.
[2] For details see pp. 260-2, Part D, Exhibit 16.

46 *Comparison of Prices Paid for Pipe.—Trended with Prices per Rhodes' Appraisal.*

Table 16 is a comparison of the price per foot of pipe 10 to 20 inches in diameter as determined from actual purchases, trended per Exhibit No. 20, and as shown in the company's Reproduction Cost New Appraisal presented by Mr. Rhodes (Exhibit No. 16, Part D). In this table are listed, in the aggregate

amount of $7,808,500, sixty important purchases of pipe, of which the earliest was made in 1902 and the latest in 1936. The price per foot of each purchase trended is compared individually with the price for the same size and kind of pipe as shown in the Rhodes' Appraisal.

The price per foot trended per Exhibit No. 20 was obtained by dividing the average actual cost per foot for pipe, f. o. b. destination, with the Line-Pipe Trend factor (Appendix I) for the year in which the purchase was made. The Line-Pipe Trend factor is precisely appropriate for this purpose since it is the component of the composite trend factor used in Exhibit No. 20 that reflects the changes in pipe prices.

The comparison shows that the actual cost trended is higher than the Rhodes' price in all instances save one. The exception was a purchase made at a special discount. As Column L of Table 16 indicates, the excess of cost trended over the Rhodes' price is in most instances a large one.

47 TABLE 16.—*Mains—Equipment.—Cost of important purchases of main line pipe trended to 1938 prices by means of Exhibit No. 20 line-pipe trend factors and then compared with Rhodes' reproduction cost new appraisal prices 1902–36*

[Source of basic data: Work sheets underlying Exhibit No. 20]

Source		Year of purchase	Size and type of pipe			Number of feet	Cost f. o. b. destination		Exhibit No. 20 line-pipe trend factor (Appendix I)	Average cost per foot trended	Pipe cost per foot f. o. b. destination per Rhodes reproduction cost, new appraisal	Excess of pipe cost per foot as trended over Rhodes price per foot	
			Diameter		Weight per foot in pounds		Total	Average cost per foot				Amount	In percent of Rhodes appraisal prices
Book	Page		(Inches)	Type [1]									
(A)		(B)	(C)		(D)	(E)	(F)	(G) (F÷E)	(H)	(I) (G÷H)	(J)	(K) (I−J)	(L) (K÷J)
1	28	1902	10	Screw	41.85	11,692.5	$14,095.97	$1.2051	70.1	$1.7191	$1.4650	$0.2541	17
1	31	1902	12	PE	49.56	35,777.9	49,015.43	1.3700	70.1	1.9544	1.6420	.3124	19
1	45	1903	10	Screw	41.85	73,721.9	91,183.57	1.2369	68.1	1.8163	1.4650	.3513	24
1	49	1903	12	PE	49.56	55,908.8	76,979.64	1.2769	68.1	2.0219	1.6420	.3799	23
1	48	1902	18	PE	70.58	117,600.11	301,058.14	2.5600	70.1	3.6519	2.5090	1.1429	46
1	65	1903	16	PE	62.57	281,080.0	520,864.91	1.8531	68.1	2.7211	2.1960	.5251	24
1	81	1903	18	PE	70.58	121,612.11	310,876.18	2.5563	68.1	3.7537	2.5090	1.2447	50
1	055	1904	10	PE	40.48	174,369.0	190,010.37	1.0897	61.6	1.7690	1.2980	.4710	36
1	067	1904	16	PE	62.57	147,493.4	265,401.88	1.7994	61.6	2.9211	2.1960	.7251	33
1	076	1904	18	PE	70.58	93,642.3	228,954.30	2.4450	61.6	3.9692	2.5090	1.4602	58
2	044	1907	10	Screw	41.85	45,481.8	52,131.95	1.1462	59.3	1.9329	1.4650	.4679	32
2	045	1907	12	PE	49.56	10,017.4	13,924.04	1.3900	59.3	2.3440	1.6420	.7020	43
2	057	1907	18	PE	70.58	98,599.14	226,777.47	2.3000	59.3	3.8786	2.5090	1.3696	55
3	52	1909	10	PE	40.48	33,826.0	37,546.84	1.1100	57.8	1.9204	1.2980	.6224	48
3	54	1909	12	PE	49.56	5,464.8	7,067.16	1.2932	57.8	2.2373	1.6420	.5953	36
3	117	1910	10	PE	22.86	107,358.6	57,488.58	.5355	55.3	.9684	.7910	.1774	22
3	121	1910	10	PE	34.24	51,408.8	48,984.32	.9528	55.3	1.7230	1.1020	.6210	56
3	128	1910	10	PE	40.48	64,142.9	70,159.39	1.0938	55.3	1.9779	1.2980	.6799	52
3	135	1910	16	PE	42.05	11,912.3	13,802.54	1.1587	55.3	2.0953	1.5320	.5633	37
3	145	1910	20	PE	65.70	117,356.4	190,117.42	1.6200	55.3	2.9295	2.3380	.5915	25
4	76	1911	10ID	PE	34.24	13,527.11	11,784.10	.8711	55.4	1.5724	1.1020	.4704	43
4	89	1911	12ID	PE	43.77	48,088.3	51,867.30	1.0785	55.4	1.9468	1.4570	.4898	34

4	95	1911	20	PE	65.70	8,521.8	13,805.11	1.6200	55.4	2.9242	2.3380	.5862	25
5	59	1912	10	PE	28.03	83,990.7	49,535.02	.5898	50.3	1.1726	.9710	.2016	21
5	71	1912	16	PE	42.05	110,554.5	84,697.47	.7661	50.3	1.5231	1.5320	[2].0089	
5	72	1912	16	PE	52.35	5,650.9	6,324.66	1.1193	50.3	2.2252	1.8370	.3882	21
5	78	1912	20	PE	65.70	43,240.2	67,943.03	1.5713	50.3	3.1239	2.3380	.7859	34
6	76	1913	10¾OD	PE	28.03	38,118.2	21,645.73	.5679	51.0	1.1125	.9710	.1425	15
6	83	1913	10	PE	40.48	36,372.4	29,762.06	.8183	51.0	1.6046	1.2980	.3066	24
6	93	1913	12	Screw	51.15	16,382.8	18,243.93	1.1136	51.0	2.1835	1.8450	.3385	18
6	120	1913	20	PE	65.70	56,592.3	79,792.39	1.4100	51.0	2.7647	2.3380	.4267	18
6	125	1913	20	Screw	90.00	3,546.0	10,607.75	2.9915	51.0	5.8657	4.5350	1.3307	29
7	33	1914	10¾OD	PE	28.03	12,002.6	6,000.24	.4999	49.2	1.0161	.9710	.0451	05
7	19	1915	10¾OD	PE	28.03	14,380.8	7,305.36	.5080	47.5	1.0695	.9710	.0985	10
48 7	21	1915	10ID	PE	28.035	31,527.11	16,541.79	.5240	47.5	1.1032	.9710	.1322	14
8	236	1916	10¾	PE	28.035	212,900.7	165,232.74	.7761	62.7	1.2378	.9710	.2668	27
8	266	1916	16	PE	42.05	32,975.8	51,576.85	1.5641	62.7	2.4946	1.5320	.9626	63
8	272	1916	20	PE	65.70			2.2000	62.7	3.5088	2.3380	1.1708	50
9	152	1917	10¾	PE	28.035	54,257.3	61,686.75	1.1369	87.0	1.3068	.9710	.3358	35
9	168	1917	16	PE	42.05	5,319.0	8,417.09	1.5825	87.0	1.8190	1.5320	.2870	19
10	116	1918	10	PE	28.03	166,797.4	251,488.59	1.5078	112.8	1.3367	.9710	.3657	38
11	16	1920	20	PE	65.70	4,747.1	16,926.12	3.5656	112.2	3.1779	2.3380	.8399	36
11	21	1921	16	PE	52.35	151,627.6	324,826.41	2.1437	111.5	1.9226	1.8370	.0856	05
11	17	1923	12¾	PE	41.51	54,010.8	102,170.83	1.8917	99.4	1.9031	1.3650	.5381	39
11	19	1923	16	PE	62.57	32,020.2	86,567.23	2.7035	99.4	2.7198	2.1960	.5238	24
11	12	1924	10¾	PE	34.24	60,060.8	87,751.50	1.4610	96.2	1.5187	1.1020	.4167	38
11	28	1924	12¾	PE	41.51	215,177.0	342,447.68	1.5907	96.2	1.6535	1.3650	.2885	21
11	37	1924	20	PE	65.70	94,020.0	283,000.80	3.0104	96.2	3.1293	2.3380	.7913	34
11	18	1925	10¾	PE	34.24	31,544.1	40,626.21	1.2879	93.2	1.3819	1.1020	.2799	25
11	26	1925	12¾	PE	41.51	36,435.1	54,642.40	1.4997	93.2	1.6091	1.3650	.2441	18
11	47	1925	16	PE	52.35	161,734.3	343,523.50	2.1240	93.2	2.2790	1.8370	.4420	24
11	94	1925	20	PE	65.70	490,485.3	1,375,730.10	2.8048	93.2	3.0094	2.3380	.6714	29
11	6	1927	10¾	PE	34.24	4,510.7	5,443.58	1.2068	89.7	1.3454	1.1020	.2434	22
11	10	1927	18	PE	70.58	5,385.10	14,578.61	2.7068	89.7	3.0176	2.5090	.5086	20
11	11	1928	12¾	PE	41.51	25,006.6	34,270.22	1.3705	84.4	1.6238	1.3650	.2588	19
11	10	1929	10¾	PE	34.24	80,408.8	85,767.75	1.0666	87.7	1.2162	1.1020	.1142	10

[1] Lap-weld pipe, unless otherwise noted.

[2] Due to 2½%—discount.

47 TABLE 16.—*Mains—Equipment.—Cost of important purchases of main line pipe trended to 1938 prices by means of Exhibit No. 20 line-pipe trend factors and then compared with Rhodes' reproduction cost new appraisal prices 1902–36*—Continued

[Source of basic data: Work sheets underlying Exhibit No. 20]

Source		Year of purchase	Size and type of pipe		Weight per foot in pounds	Number of feet	Cost f. o. b. destination		Exhibit No. 20 line-pipe trend factor (Appendix I)	Average cost per foot trended	Pipe cost per foot f. o. b. destination per Rhodes reproduction cost, new appraisal	Excess of pipe cost per foot as trended over Rhodes price per foot	
			Diameter										
Book	Page		(Inches)	Type			Total	Average cost per foot				Amount	In percent of Rhodes appraisal prices
(A)		(B)	(C)		(D)	(E)	(F)	(G) (F÷E)	(H)	(I) (G÷H)	(J)	(K) (I−J)	(L) (K÷J
11	18	1929	16	PE	52.35	7,511.10	$13,999.62	$1.8637	87.7	$2.1250	$1.8370	$0.2880	16
11	20	1929	18	PE	70.58	3,813.4	9,322.09	2.4446	87.7	2.7875	2.5090	.2785	11
11	23	1929	20	PE	78.59	1,534.8	4,355.92	2.8383	87.7	3.2364	2.7930	.4434	16
12	34	1936	12¾	PE [3]	41.51	131,571.4	178,010.22	1.3530	91.6	1.4771	1.4210	.0561	4
12	57	1936	12¾	PE [3]	49.56	377,364.11	623,840.92	1.6532	91.6	1.8048	1.7100	.0948	6

[3] Seamless, Penola coated.

The three sections of this report that immediately precede this one are devoted to three of the eight plant accounts listed in Table 1; this section is devoted to the remaining five, which represent plant of an Original Cost of $30,980,563 that was trended to $42,243,237. No analysis of these five accounts was made. A brief explanation of the basis upon which they were trended follows.

Producing Gas Wells—Well Equipment.

Producing Gas Wells—Well Equipment was increased in the amount of $2,495,792 by trending, from an Original Cost of $8,168,191 to $10,663,983. The series of factors employed to trend the account were composites made up of a Casing and Tubing Trend and a Closing-in Equipment Trend weighted in the ratios of .957 and .043, respectively. The trending for casing and tubing from 1902 to 1938 was based on the arithmetical average trend of a ton each of 2- and 3-inch tubing and 6⅝-, 8¼-, and 10-inch casing as determined primarily from the average delivered prices paid by the company. Where prices were not available from company records, supplementary prices were used.

Field Lines—Construction.

50 $2,962,099 by trending, from an Original Cost of $4,076,871 to $7,038,970. The factors used to trend this account are the same as those used to trend Mains—Construction.

Field Lines—Equipment.

Field Lines—Equipment was increased in the amount of $2,225,387 by trending, from an Original Cost of $8,279,885 to $10,505,272. Like the factors used to trend Mains-Equipment, the factors developed for this account are composites consisting of Pipe Trends and Fittings Trends weighted in the ratios of .865 and .135, respectively. The Pipe Trends are the same as those used to develop the Trend Factor for Mains-Equipment; the Fittings Trends are different. The composite trend factors for both accounts are similar in amounts. For the years subsequent to 1910 they never vary more than 1.0%, except for 1913 when the difference between them is 1.1%.

Compressor Station Structures.

Compressor Station Structures was increased in the amount of $686,840 by trending, from an Original Cost of $1,811,605 to

$2,498,445. This account includes both labor and material costs in proportions not readily ascertainable. Its trend factors are predicated upon the pricing of four structures, each typical of a different kind of construction, priced for each year to reflect the prevailing labor and material costs of that year.

51 *Compressor Station Equipment.*

Compressor Station Equipment was increased in the amount of $2,892,556 by trending, from an Original Cost of $8,644,011 to $11,536,567. This account includes both labor and material costs in proportions not readily ascertainable. Its trend factors are predicated upon a pricing of equipment in five stations, each typical of a different kind of equipment, priced for each year to reflect the prevailing labor and material prices of that year.

52 Summary

The Original Cost revised of the company's plant as presented in Exhibit No. 20, which amounts to $69,735,637, is trended in that Exhibit by means of factors to $105,101,912, purportedly for the purpose of translating it into its equivalent at "1938 prices." Most of the increase, which amounts to $35,366,275, is contained in several of the company's thirty-two plant accounts and three of them were chosen for detailed examination. Two of the three selected contain labor costs and one material costs, and combined they account for more than two-thirds of the increase due to trending. Other large accounts were also examined, cursorily, and they were found to have been trended in much the same manner as the three to which greater attention was paid.

The trend factors of the three accounts chosen for examination were first studied to get a full understanding of their formulation and composition and then the accounts themselves were analyzed. The study of the trend factors revealed that their application, in each instance, might produce quite distorted results and the analyses of the accounts were undertaken to obtain data for tests by means of which it could be determined whether or not this was so.

Five tests embracing substantial amounts of construction were made and are here presented. They thoroughly demonstrate that the trend factors far overreach reasonable bounds. In the
53 case of Producing Gas Wells-Well Construction and Mains-Construction which are labor cost accounts, their unreli-

ability was found to rest in their predication upon hourly wage-rates only, to the neglect of hourly productivity which is greater in 1938 than in earlier years. In the case of Mains-Equipment, a material cost account, their unreliability rests in their being based upon the cost of material not representative of the materials actually charged to the account. The trending of the labor costs capitalized, at 1938 hourly wage-rates, many more man-hours than would actually be expended to construct the property in 1938, in the manner and with the personnel of that year. The trending of the material costs produced too high a result because the material trend factors were based upon the prices of materials whose prices had risen relatively higher by 1938 than had the prices of the materials truly representative of the items actually charged to the accounts.

All of the tests presented were prepared from data compiled from Exhibit No. 20, the working papers and records that support it, or from Rhodes' Appraisal. This implies that the figures for 1938 which have been used in the comparisons are from these sources also, and they are. Their use in the circumstances was desirable and necessary; it does not signify their acceptance as a true guide to value or for any other purpose.

Finally it should be noted that if the intangible production costs previously charged to expense by the company do not represent a proper element of original cost, they do not represent a proper element of original cost trended. Many millions of dollars of such items are included in the trended figures.

54 VICTOR G. GOUGH,
Victor G. Gough,
Chief Examiner of Accounts.

WASHINGTON, *March 31, 1941.*

Approved:

CHAS. W. SMITH,
Chas. W. Smith,
Chief, Bureau of Accounts, Finance, and Rates.

[Appendix pages 55 to 78 omitted.]

1 EXHIBIT NO. 74-A.—TREND OF ORIGINAL COST COMPARED WITH INDICES OF WHOLESALE PRICES, F. P. C. WITNESS GOUGH

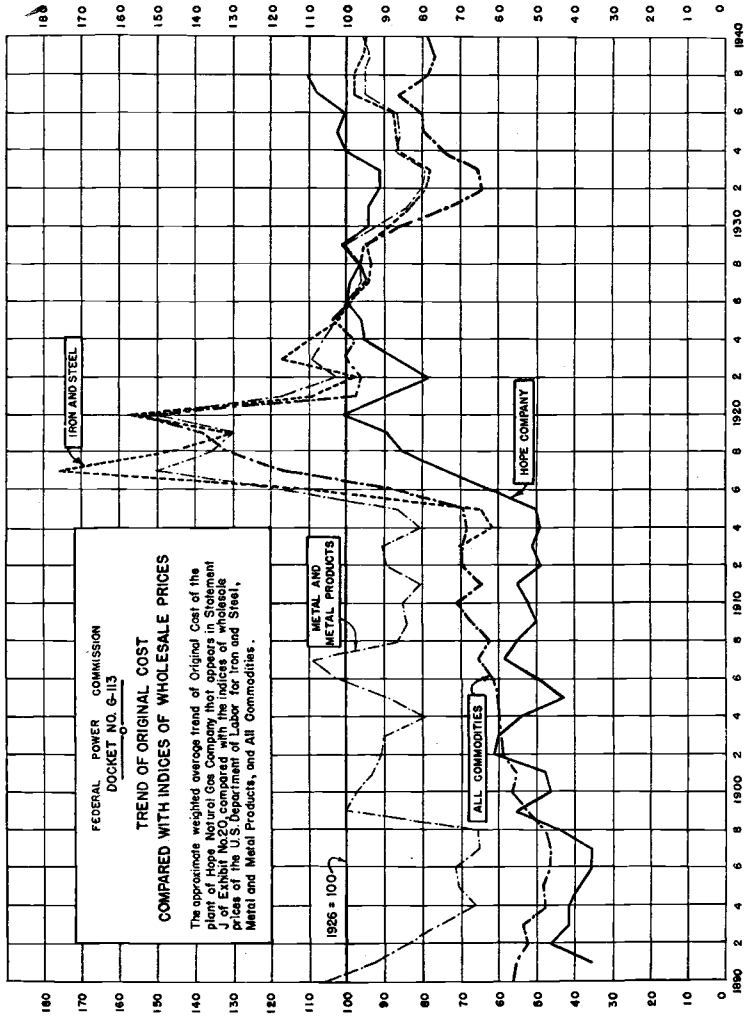

EXHIBIT NO. 43.—ESTIMATED RECOVERABLE GAS RESERVES AND PAST PRODUCTION OF THE HOPE NATURAL GAS COMPANY AS OF DEC. 31, 1938, VOLUME I, F. P. C. WITNESS ROSS

[Pages I to III omitted]

WRITTEN STATEMENT

INTRODUCTION

This report presents an estimate of the developed, recoverable natural gas reserves and past production of the operated fee lands and leaseholds of the Hope Natural Gas Company as of December 31, 1938. It consists of three volumes.

Volume I comprises a statement of the conclusions drawn from an exhaustive study of the recoverable gas reserves and past production of the company, the source of the data used, and the procedure followed, with sample illustrations.

Volume II is primarily a statistical section containing a summary in which are given by geographical pool or producing areas: (1) The estimated production prior to 1913, (2) the production by years from 1913 to 1938, inclusive, and (3) the estimated future recoverable gas reserves. This summary is preceded by a recapitulation showing the same information in very condensed form.

Volume III contains summaries in which are analyzed in detail by geographical sand pools the estimated gas reserves which are recoverable from (A) present drilled wells, (B) from deeper sands in present drilled wells, (C) from additional locations on operated acreage, and (D) from additional locations on "In Lieu of Drilling" acreage.

There is included as an appendix of Volume I a tabulation entitled "Present Drilled Wells" showing a list of present drilled wells of the company as of December 31, 1938, included in this estimate of the remaining gas reserves.

There is also included as an appendix of Volume I, a similar tabulation entitled "Dead Wells on Active Acreage," showing a list of those wells of the company, which had been either sold

or abandoned prior to December 31, 1938, but which were located on acreage that was still operated on December 31, 1938.

2 Affixed to Volume III as Appendix i of this exhibit is a tabulation "Summary of the Operations of Gas Storage Projects."

DATA USED IN THE STUDY

Source of Data.

The operating records of the Hope Natural Gas Company were the principal source of the information used in the preparation of this exhibit. These records include well data cards maintained by the engineering department, production and pressure data filed in the production department, well pockets containing field tickets, and miscellaneous information kept in the general files, and a report compiled by Mr. Ralph E. Davis in 1924. Reference has also been made to the records and maps of the United States Geological Survey and certain West Virginia State agencies.

Well Data.

Basic factual information concerning annual production, rock pressures, and general history of each sand that produced gas in each well was transcribed separately from the company's records to a well-data sheet prepared by engineers of the Federal Power Commission. A sample form of this sheet is illustrated on the following page. On this data-sheet were entered such information as the name of the company's operating district, county, well number, farm name, lease number, map index, producing formations, total depth, date of completion or purchase, date of abandonment, elevation of well if known, initial production and initial rock pressure. Deepening or plugging-back data and other pertinent information, appearing on the back of the well cards, were entered under "Remarks." The compilation of these data by sands or casing or tubing strings involved some 14,000 pages of basic information pertinent to the gas reserve study.

Production Data.

As a general rule, the Hope Natural Gas Company does not meter the production of gas from its wells or leases. The company does have, however, a number of leases in which

4 [page 3 omitted] the royalty payments are made on a volumetric basis and from which gas is metered.

In the absence of meters the company calculates the production of its wells by the "minute-rise" formula. This method of gas measurement, which is used generally throughout the Appalachian region, is predicated on the theory that the rise in pressure per minute after a producing well is closed indicates the rate at which gas was producing in that well prior to closing it in. This method uses the volume of the casing or tubing as a unit of measure and, with the application of Boyle's law, reflects the volume of gas produced under operating conditions at the time of the test.

Although the company began taking minute-rise tests in 1913 of all its wells, the volumes were not computed until 1924, when Mr. Ralph E. Davis, Consulting Engineer and Geologist, was engaged to establish depletion and depreciation rates of the producing properties for Federal income tax purposes. Since 1924 the company has calculated production annually.

Since the annual calculated production of all wells of the Hope Natural Gas Company represents the only available information as to volumes of gas produced, these volumes of calculated production have been accepted by engineers and geologists of the Federal Power Commission as being based upon minute-rise tests, and utilized by them in the computation of the gas reserves. These volumes were transcribed from the company's record to the well-data sheets previously described, by years, from 1913 through 1938. There was also tabulated in connection with the production the number of days that each well was open to the pipeline system, which represents the utilization of each well.

Rock Pressures.

The Hope Natural Gas Company recorded the rock pressures or well-head pressures of its wells once a month and made an annual rock pressure test on all wells during periods of minimum production. Generally, these annual tests were made during the latter part of August or the fore part of September. A study of the rock pressure histories indicated that the annual tests more closely reflected the actual reservoir pressures, because at the time of the year these tests were made, the wells had experienced a longer shut-in period, thus allowing for a more perfect equalization of pressure in the producing formations.

Furthermore, as stated by representatives of the company, greater care was exercised in making the annual tests than those made during the year when the wells were being operated at

greater capacity. For these reasons the annual rock pressures were utilized in estimating the gas reserves. In a few instances, however, where the annual pressures were not available, or appeared unreasonable, the monthly tests were used or the pressures were determined by interpolation.

Maps.

All maps used in the preparation of this report are based upon those provided by the Hope Natural Gas Company. These included principally a set of leasehold maps showing the location of operated and unoperated leaseholds and all wells ever owned by the company, and a set of working district maps showing pipe lines and well locations. Both sets of maps are of the approximate scale of two inches to one mile and show the company's coordinate grid system which provides an index to the well locations. The company's leasehold maps, reduced by photographic reproductions to a scale of approximately one inch to one mile, were used for working maps in the preparation of this exhibit.

General Geology.

The geology of West Virginia has been amply treated in the geological literature, particularly in the county reports of the State Geological Survey of West Virginia. Therefore this subject will be discussed here only briefly.

The natural gas fields of West Virginia are a part of the Appalachian field, which occupies a major geosyncline lying between the Appalachian Mountains on the east and the Cincinnati Arch on the west and extending continuously from the State of New York southwestward to Alabama. The sedimentary beds lying within this geosyncline have been subjected to intense folding which has resulted in the formation of anticlines and synclines whose axes are roughly parallel and extend in a general northeast, southwest direction. The West Virginia gas fields are closely related to the fields of Pennsylvania, Ohio, Kentucky, and Tennessee in that the mode of occurrence and accumulation of gas is largely similar, and the formations or horizons that produce gas are common to these states.

6 The major gas-producing horizons in West Virginia are of Pennsylvania, Mississippian, and Devonian age. The principal productive horizons from which the Hope Natural Gas Company obtains gas are the Salt, Maxon, Big Injun, Gantz, Berea, Fifty Foot, Thirty Foot, Gordon Stray, Gordon, Fourth,

Fifth, Speechley, and Benson Sands. Possibly with the exception of the Big Injun these sands are lenticular in character and exhibit considerable variation in porosity and permeability. Largely because of this and because of the absence of water generally, the gas occurs in synclines and on terraces as well as on the flanks and crests of anticlines. In fact, porosity and permeability are perhaps the two most important factors controlling the accumulation and production of gas from producing sands of West Virginia. This condition is characteristic of the producing formations of the Appalachian region and accounts in a large measure for the "spotted" areas of production.

PROCEDURE OF ESTIMATING GAS RESERVES

Although the majority of the Hope Natural Gas Company's wells are located in the northern half of the oil and gas producing region of the State of West Virginia, these wells are scattered throughout that area and do not form any one, single, continuous block of property. The producing properties of the company have ranged, and do range, in occurrence from one single well isolated miles from the nearest company well to groups of contiguous wells ranging in number from 2 to more than 500.

From a careful preliminary examination of the company's leasehold and operating maps and of the records of the wells drilled thereon, it was found impracticable to estimate the reserves underlying the company's properties as a unit, not only because of the scattered geographical location of the wells referred to above, but also because there are some 30 producing sands in West Virginia and very few of these sands extend continuously or are productive throughout the entire area or areas in which the company's properties are located.

Accordingly, it was deemed expedient for the practical purpose of preparing this reserve study to make a reasonable territorial grouping and segregation of portions of the State of West Virginia encompassing the company's producing properties into 27 units or areas. These 27 units have been termed "pool sheets." The basis underlying the division of the company's producing territory into these 27 "pool sheets" is purely one of convenience with the label meaning only that such area is involved in the determinations covered by this exhibit.

The company's gas-producing areas in each of these 27 territorial divisions were carefully studied. The producing horizons were identified from the company well records and the existence

of gas was determined from information customarily kept by natural gas producing companies, such as rock pressures, open flow tests, and records of production. During the course of these investigations it was found that the existence of producing wells proved that certain productive horizons extended over greater areas than others, that the limits of the production of gas in a given horizon had been defined in certain directions by the drilling of nonproductive wells. It was further found that in other directions the horizon had proved productive of gas at one or more other locations on company acreage. The occurrence of conditions of common pressures, and common characteristics of production existing in the wells in these areas and common formations providing the source of supply for the company's wells established a sound basis for a careful geological study of the areas adjacent to those wells.

It was found that there were many correlative characteristics pertaining to the wells in certain areas. Those wells had as their common dominant characteristic the fact that they depended upon the same sand or sands for their supply of gas and were dependent in varying degrees upon the same source of gas. The configurations of the "sand pools" were thereby defined by the natural occurrence of the supply of gas for the wells of the Hope Natural Gas Company.

As the investigations of the wells, producing horizons, and areas progressed, it was found that during the course of drilling for and production of gas from various sand pools, such operations had resulted in developing through one well the supply of gas in more than one sand pool. These investigations developed that those sand pools at different horizons were not coextensive one with another, but in some instances overlapped in varying degrees and extended over different areas. This situation gave rise to a further natural grouping of the company wells and acreage into productive areas of greater extent. These larger groupings conformed to the gas-producing areas which have been termed "pool areas."

It was considered that one-half mile was the maximum effective drainage limit of wells in West Virginia, and that the use of this distance was not unreasonable for the purpose of estimating weighted average rock pressures by the isobaric method. Accordingly the wells of the Hope Natural Gas Company were grouped in designated geographical areas or "pool areas," the principal determining factor being distance between well locations.

8

Any well geographically located further than one-half mile from a "pool area" was considered an "Individual Well." And those wells located within the boundary of "pool areas" that have no other wells in that "pool area" producing from the same sand or sands were also considered "Individual Wells." Further, those wells located within the boundary of a "pool area" but further than one-half mile from a "sand pool," were also considered "Individual Wells."

In classifying these wells as "Individual Wells," separately from pool areas, consideration was given to such factors as location, producing sands, geological conditions, producing characteristics, rock pressure histories, and production histories. In the reserve study, each "Individual Well" was treated as a gas-producing unit.

The map presented as part of the proceedings in this case entitled "Map Showing Working Districts, Gas Wells, Pipe Lines, and Compressor Stations as of December 31, 1938," shows in color the designation, geographical location, and extent of each of these "pool areas," together with the location of other productive wells called "Individual Wells." "Sand pools" are not shown on this map because of the mechanical difficulty of reproduction on one map.

Rock Pressure—Production Decline Method

The proven gas reserves of the Hope Natural Gas Company were estimated by means of the rock pressure-production decline method. This method follows closely an application of Boyle's law for gases, which can briefly be stated as follows: The quantity of gas in a given volume is directly proportional to the absolute pressure, temperature being constant. Its application reflects the future recoverable reserves in underground sand reservoirs by extrapolating the decline of well pressure versus cumulative production.

9

This method of estimating gas reserves is particularly applicable to West Virginia because of the erratic and lenticular character of the producing sands in that State, and also because of the absence of fluids which ordinarily would affect the accuracy of the method. Furthermore, the volumes of gas produced annually from each sand or sands were available by wells from 1913 to 1938, inclusive, and the annual rock pressures taken at the wellhead were also available for the corresponding sands.

The adoption of this method was made after a careful study of the available basic factual data, and of the applicability of other methods for estimating gas reserves.

For purposes of this reserve study, rock pressure data for the years 1913, 1914, 1921, 1922, 1927, 1928, 1932, 1933, 1937, and 1938 were used. Since these were years of minimum production and therefore minimum utilization for the majority of the wells of the company, the annual rock pressures for these years reflected more accurately the underground reservoir conditions than did the pressures taken during the intervening years.

The producing wells and acreage of the Hope Natural Gas Company are intermingled with those of other companies and are located both in individual areas constituted of single wells and in groups constituted of contiguous wells. In this study, wells and areas, whose locations were relatively close, were grouped according to geographical pools; and each sand pool was treated as a unit of natural gas reserve, since the gas could be withdrawn through the various wells in that area according to the methods of operation. The grouping of wells in this manner reflected underground reservoir conditions more truly than if each of the contiguous wells in that pool were treated individually. For those single wells which did not have sufficient contiguous production for the same sand, however, the gas reserves were computed for the "Individual Well" based upon a study of the rock pressures and a study of the production of that "Individual Well," or from comparable sand pool history.

10 *Sand Pools*

The first step in estimating gas reserves was the grouping of contiguous wells producing from common reservoirs into sand pools. A common reservoir has been considered to be one or more sands in a gas area, so interconnected through the bore hole of wells in that area as to permit equalization of pressures. As many as five or six sands may be producing through one string of casing, whereas originally each had been produced through a separate string of casing or tubing. Thus, by equalization of pressures through the well bore, the sands became a common sand reservoir.

Since any given well may produce through the casing from a single sand or through separate strings of casing or tubing within the well bore from one or more sands, the term "well" is used in this exhibit to denote a sand well producing through a string

of casing or tubing. For this reason, a well may appear in one or more sand pools.

The grouping of wells into sand pools involved the examination and classification of approximately 14,000 well data sheets. A sample sand pool map is illustrated on the following page. This map shows the location and serial number of all wells drilled by the company to the Gordon Sand in sand pool 2–1 Gordon.

[Page 11 omitted.]

12 *Isobaric Maps.*

The weighted average rock pressure during each of the ten years for each sand pool was determined by the use of isobaric maps. These maps were designed to show by lines of equal pressure the conditions in the sand reservoir. They were prepared by first plotting, accurately, the wells on base maps, which were drawn on a scale of approximately one inch to one mile. These base maps were prepared from photographic reproductions of the company's leasehold maps. Next, the current rock pressure of each year was plotted at the point the well is located on these maps, for each sand pool, and lines of equal pressure (isobars) were drawn to determine the areal extent of each pressure. Each area betwen the isobars was then carefully measured by means of a planimeter and the measured area thus obtained was multiplied by the mean pressure of the area to determine the weighted average pressure for each sand pool for each of the indicated years. Over 500 isobaric maps were prepared in the manner described. A sample isobaric map is illustrated on a following page. The annual rock pressures shown on this map are for 1938.

The annual calculated production was cumulated for all of the wells considered in each sand pool. This cumulative production and the weighted average pressures, together with the number of producing sand wells, were tabulated to facilitate the construction of rock pressure-production decline graphs. A sample tabulation is shown on the page following the sample isobaric map.

Rock Pressure—Production Decline Graphs.

A rock pressure-production decline graph was constructed for each sand pool. The weighted average rock pressure, for each of the ten years indicated, was plotted on coordinate graph paper and the rock pressure decline drawn by connecting these points. On the same graph paper the cumulative production at the end

of each year was plotted as abscissas, and against this was plotted as ordinates, the weighted average rock pressure at the end of the corresponding year as determined by the rock pressure decline graph. An example of a rock pressure-production decline graph is shown on a following page. This graph represents the rock pressure-production decline for "sand pool" 2–1–Gordon.

Examination of the graphs thus constructed disclosed that considerable variation existed in the rate of decline of pressure when plotted against production over the period extending from 1913 through 1938. In general there seemed to be a more rapid rate of decline of pressure for the volumes of gas produced

16 [pages 13 to 15 omitted]

between 1913 and 1920 than between 1920 and 1930. Since the most recent operations reflect what the company may expect in the near future and since a ten-year history is considered a reasonable period of time for establishing reserves, the period from 1929 to 1938, inclusive, was used for extrapolating the curves to determine the future recoverable gas reserves. From an abandonment study of all wells abandoned by the company, it was found that 30 pounds was a reasonable average abandonment pressure for all wells producing from sands other than the Speechley and Benson sands. For the Speechley and Benson sands, which lie at considerably greater depths than the other sands, 100 pounds was considered a reasonabel abandonment pressure. Accordingly, the points of production for the last ten years which were in alignment, were extrapolated to these abandonment pressures for the purpose of estimating the recoverable gas reserves.

The gas reserves of "Individual Wells" located outside of sand pools were estimated by the construction of individual rock pressure-production decline graphs on which the rock pressures were plotted against the cumulated production of each well and the resultant graph extrapolated to the abandonment pressures mentioned above.

Estimated Recoverable Gas Reserves of Present Drilled Wells as of December 31, 1938.

By the method just described, the estimated recoverable gas reserves of the present drilled wells of the Hope Natural Gas Company as of December 31, 1938, were found to total 436,361,755 MCF. This figure is on a calculated production basis of measurement. Estimates of the recoverable gas reserves by sand-pools and individual locations are given in detailed summaries in Part A, Volume III of this exhibit.

Estimated Recoverable Gas Reserves From Deeper Sands in Present Drilled Wells as of December 31, 1938.

The Hope Natural Gas Company contemplates that deeper sands in 119 of the company's present drilled wells will be productive of gas and will yield additional reserves if these wells are deepened and the deeper sands therein exploited.

After a careful study was made of each of these wells, the gas reserves recoverable from the prospective deeper sand or sands in each well were estimated by multiplying the estimated present useful rock pressure of each deeper sand by the volume in MCF of gas produced per well per pound pressure-decline for the sand pool in which the deeper sand is located. The estimated present useful rock pressure of each deeper sand was based upon the present rock pressures of nearby wells producing from the same sand.

17

By the above described method, the total estimated gas reserves recoverable from deeper sands in these 119 present drilled wells was found to be 28,285,256 MCF. This volume is based upon a calculated production basis of measurement. The estimated recoverable gas reserves from deeper sands in each of these wells are tabulated in Part B of Volume III of this exhibit.

Estimated Recoverable Gas Reserves From Additional Locations on Operated Acreage as of December 31, 1938.

The Hope Natural Gas Company contemplates 78 additional well locations on certain of the company's operated acreage.

The procedure of estimating the recoverable gas reserves underlying these additional locations was similar to that used in estimating the reserves from deeper sands in present drilled wells. The estimated present useful rock pressure of the prospective sand underlying each location was multiplied by the volume in MCF of gas produced per well per pound pressure decline for the sand pool in which the well site is located to determine the estimated recoverable reserves. The present useful rock pressure of the prospective sand was based upon the present rock pressures of nearby wells producing from the same sand.

The total estimated recoverable gas reserves from these additional locations on operated acreage was found to be 20,962,230 MCF. This volume is on a calculated production basis of measurement. The list of leases on which the additional locations are contemplated and the estimated gas reserves recoverable from

each of these additional locations are given in Part C of Volume III of this exhibit.

Estimated Recoverable Gas Reserves from Additional Locations on In Lieu of Drilling Acreage as of December 31, 1938.

The Hope Natural Gas Company contemplates 23 additional well locations on certain of the company's leaseholds on which there were no wells but upon which the company was paying
18 royalties in lieu of drilling. The company contemplates drilling a well on each of these locations in order to recover fully the gas reserves which cannot be recovered from adjacent drilled wells.

The recoverable gas reserves underlying each of these additional locations on in lieu of drilling acreage were estimated in a manner similar to that employed in estimating the recoverable gas reserves from additional locations on operated acreage. The estimated present useful rock pressure of the prospective sand underlying each location was multiplied by the volume in MCF of gas produced per well per pound pressure-decline for the sand pool in which the well site is located to arrive at the estimated recoverable reserves. The estimated present useful rock pressure of the prospective sand was based upon the rock pressures of nearby wells producing from the same sand.

The total gas reserves recoverable from the 23 well sites designated by the company as additional locations or in lieu of drilling leases was estimated to be 6,072,299 MCF. This volume is on a calculated production basis of measurement. The list of "in lieu of drilling leases" upon which it is contempated these additional locations will be made and the estimated gas reserves recoverable from each of the additional locations are given in Part D of Volume III of this exhibit.

Past Production of the Company—1913 to 1938, Inclusive.

As mentioned previously in this statement, the annual calculated production for all of the wells of the Hope Natural Gas Company was available from 1913 to 1938, inclusive, and was transcribed to well-data sheets for purposes of this exhibit. The annual production of all wells was totaled by "Sand Pools" and "Pool Areas" and "Individual Wells" for use in the reserve study.

The total annual volume of calculated production from all of the wells in each pool area has been so classified and summarized as to reflect for each of the years 1913 to 1938, inclusive, the portion of such production in each pool which was recovered from

the present drilled wells of the company, the portion recovered from the dead wells on active acreage, and the portion recovered from the dead wells on dead acreage. The annual production so classified is presented in Volume II of this exhibit. Those tables show that the total quantity of calculated production from all company wells during the years 1913 to 1938, inclusive, amounted to 1,129,600,832 MCF.

19 *Method of Estimating Calculated Production Prior to 1913.*

Since the calculated production for all wells of the Hope Natural Gas Company was not available until 1913, the calculated production prior to 1913 had to be estimated.

The method here employed for estimating production prior to 1913 used the decline in rock pressure experienced by the wells that had produced gas in the period prior to that date and the volume in MCF of gas produced per pound pressure-decline experienced by the same wells or contiguous wells after that date. The original rock pressures, where available from the company's records, were transcribed to data sheets. Where original rock pressures were not available or were questionable, they were estimated from the rock pressure histories of nearby company wells or obtained from other company records. In the case of purchased wells which had produced gas prior to the date of purchase, the recorded or estimated rock pressure as of the approximate date of purchase was used.

The volume in MCF of gas produced per well per pound pressure-decline for each sand pool for the period 1913 to 1921 was determined from the rock pressure-production decline graphs previously described. The volume in MCF of gas produced per well per pound pressure-decline was obtained by dividing the cumulative production for the selected interval of years (between 1913 and 1921) by the product of the average number of wells producing gas during that interval and the pounds of pressure decline for the sand pool during that interval. This volume in MCF per pound pressure-decline was then applied as a multiplier to the pounds of pressure-decline experienced by each of the wells which produced from the same sand or sands prior to 1913, to determine the production of gas prior to that date. Since this volume-pressure multiplier was determined upon the basis of calculated production, the estimated production prior to 1913 likewise is on a calculated production basis of measurement.

An illustration of the information used in estimating the calculated production prior to 1913 is presented in the sample work-

ing sheet which appears on the following page. It will be observed that the adopted volume in MCF of gas produced per well per pound decline in pressure for the interval of years after 1913 appears at the top of the sheet and is applied as a multiplier to the net pounds of (pressure) decline to obtain the estimated production given in the last column.

[Page 20 omitted.]

21 The estimated production prior to 1913 is given by geographical location in the summary contained in Volume II of this exhibit. The total calculated production prior to 1913 has been estimated as 403,797,000 MCF. This figure includes the volumes of gas produced by all wells owned by the company since 1899 through 1912.

Conversion of Calculated Production to Actual Production

All volumes expressed in this exhibit are based upon calculated production. It is recognized, however, that the calculated volumes of gas produced from individual wells do not represent the volumes that would have been recorded had they been metered. Therefore, to convert the volumes shown in the various summaries and parts of this report to volumes that are comparable to metered production, it is necessary to apply conversion factors or multipliers developed by engineers of the Federal Power Commission from a study of the company's past production. These conversion factors are given in the tabulation "Recapitulation of Estimated Recoverable Gas Reserves and Past Production," Volume II, page 4 of this exhibit.

Since the conversion factor for the 21-year period immediately prior to 1938 was found by Commission engineers to be consistently 0.70, it was reasonable to assume that this same factor was applicable to the future recoverable gas reserves. Accordingly, as a final step in the presentation of the results of this gas reserve study, the total volumes of recoverable gas reserves have been translated to actual volumes by the application of this 0.70 conversion factor.

22 Conclusion

The recoverable gas reserves from the present operated acreage of the Hope Natural Gas Company as of December 31, 1938, expressed as actual volumes in MCF, by the application of 0.70 conversion factor, are as follows:

	Estimated recoverable gas reserves as of Dec. 31, 1938, in MCF
Present drilled wells	305, 453, 229
Deeper sands in present wells	19, 799, 679
Additional locations on operated acreage	14, 673, 561
Additional locations on in lieu of drilling acreage	4, 250, 609
Total	344, 177, 078

Signed JOHN S. Ross,
John S. Ross.

Date, February 3, 1941, at Washington, D. C.

[Pages 23 to 48 omitted.]

EXHIBIT NO. 51-A.—ESTIMATED RECOVERABLE GAS RESERVES AND PAST PRODUCTION OF THE HOPE NATURAL GAS COMPANY AS OF DEC. 31, 1939, F. P. C. WITNESS ROSS

	Calculated production (4 oz.+14.4 lbs.)	Conversion factor	Actual production (8 oz.+14.4 lbs.)
Production, 1939, in MCF:			
Present drilled wells	23,443,355	0.70	16,410,348
Dead wells on active acreage	38,981	.70	27,287
Dead wells on dead acreage (in pools)	131,067	.70	91,747
Dead wells on dead acreage (outside pools)	24,068	.70	16,848
Total, 1939	23,637,471		16,546,230
Past production in MCF:			
Total, 1899–1938 (Exhibit No. 43A)	1,533,397,832		1,268,972,545
Total, 1899–1939	1,557,035,303		1,285,518,775
Estimated recoverable gas reserves in MCF:			
Present drilled wells	413,287,713	.70	289,301,399
Deeper sands in present wells	28,241,537	.70	19,769,076
Additional locations on operated acreage	20,289,460	.70	14,202,622
Additional locations on in lieu of drilling acreage	6,072,299		4,250,609
Total	467,891,009		327,523,706
Probable total recovery in MCF	2,024,926,312		1,613,042,481

1 **EXHIBIT NO. 65.—DETERMINATION OF COMPOSITE SERVICE LIVES OF THE HOPE NATURAL GAS COMPANY PROPERTY BY PRIMARY ACCOUNTS, F. P. C. WITNESS FRENCH**

WITNESS' POSITION AND EXPERIENCE

Position: Engineer-Rate Investigator.

Education: High School, Ceredo, W. Va.; Lane Technical High School, Chicago, Illinois; Marshall College, Huntington, W. Va.; Ohio State University, Columbus, Ohio.

Experience:

1938 to date: Member of the staff of the Federal Power Commission, with title of Engineer-Rate Investigator. During this period have made numerous investigations and reports on natural gas utility properties. Have consulted with State Regulatory Commissions in the preparation of exhibits and testimony relating to natural gas properties, on depreciation and all other phases of rate-making.

1932 to 1938: Employed by the Railroad Commission of Texas as Chief Engineer of the Gas Utilities and Oil Pipe Line Division, in charge of all valuation and engineering reports and investigations relating to the operations of those companies in the State of Texas which were under the jurisdiction of that commission.

2 During this period valuations and reports were made on approximately 12,000 miles of gas production and transmission lines, 28,000 miles of oil pipe lines and 250 gas distribution systems. The total cost of these properties was in excess of one-half billion dollars. In the preparation of reports and exhibits on these properties it was necessary to determine depreciation rates on all classes of gas plant property. Approximately 7,000 bell-hole pipe inspections were made either personally or under my direction. From these inspections various data were listed in the determination of the extent and causes of underground corrosion of steel pipe and other factors leading to the ultimate retirement of pipe. Retirement studies of all classes of gas plant property were made from the records of all the companies investigated and the results analyzed.

When the Interstate Commerce Commission initiated its active regulation of interstate oil pipe line carriers during 1934 and 1935, I assisted that Commission's staff in setting up their method of inventory and inspection of oil pipe line carrier facilities, and accompanied Dr. Logan of the United States Bureau of Standards during the course of their inspection of oil pipe lines in the State of Texas.

During my employment as Chief Engineer of the Texas Railroad Commission, there were prepared, under my supervision, numerous engineering studies and reports on gas and oil properties, among which are listed the following major companies involved:

3 Natural Gas Production and Transmission Systems

United Gas Pipe Line Company.
Northern Texas Utilities Company.
West Texas Gas Company.
Lone Star Gas Company.
Public Service Corporation of Texas.
Rio Grande Valley Gas Company.
Tex-Mex Natural Gas Company.
Houston Gulf Gas Company.
El Paso Natural Gas Company.
Ankansas-Louisiana Gas Company.
City Gas Company.
Brazos River Gas Company.
M. & M. Pipe Line Company.
Southern Gas Utilities Company.
Texas Gas Utilities Company.
Producers Utilities Company.

Natural Gas Distribution Systems

San Antonio.
Ft. Worth.
El Paso.
Waco.
Community Natural Gas Co. (190 towns).
Miscellaneous small towns (60 towns).

Oil Pipe Line Carriers

Texas Pipe Line Company.
Atlantic Pipe Line Company.

Sinclair Prairie Pipe Line Company.
Humble Oil Company.
Texas Empire Pipe Line Company.
Sun Oil Company.
Gulf Pipe Line Company.
Shell Pipe Line Company.
Sinton Pipe Line Company.
Magnolia Pipe Line Company.
Barnsdall Pipe Line Company.
Numerous smaller properties.

On the above listed properties it was necessary to prepare inventory and appraisals, and in a number of instances, prepare exhibits and testify thereon.

I also prepared engineering studies relating to the determination of service lives of the several classes of natural gas property, the causes of removal of gas plant from service, and the frequency of replacement of natural gas pipe lines from all causes.

During this period, engineering studies were prepared under my supervision, for the purpose of determining the cost of natural gas service, which included allocation studies necessary for the determination of the cost of service at "city gates" and to individual consumers.

It was also my responsibility to appear and testify a number of times on matters relating to proceedings before the Commission and appear as a witness for the Commission in the Appellate Courts of Texas in cases involving the determination of rate base, depreciation, allocation, and other phases of complete gas rate investigations.

Under my supervision, time studies were made in the field of actual labor performances, during the course of construction, on practically all major gas and oil pipe lines constructed in Texas over a five-year period beginning in 1933. This construction exceeded 1,000 miles of pipe lines of various sizes ranging from two to twenty inches in diameter.

In carrying out the duties and responsibilities of the engineering work of the division there were from six to twenty-five engineers employed under my supervision, the number varying with the amount of work in progress.

1927 to 1932: Employed by the City of Amarillo, Texas, as Assistant City Engineer and Water Superintendent. During this period I was in charge of all design, specifications, and estimates on municipal projects constructed by the City. Construction work

completed during this period included sanitary sewerage system, storm sewers, several railroad underpasses, sewage disposal plant, several hundred miles of water mains, and other municipal improvements. I designed and prepared specifications on a proposed $1,000,000.00 municipal natural gas plant for the City of Amarillo, part of which was constructed and placed in operation before leaving the service of the City. I assisted Black
6 and Veach, Consulting Engineers, in the preparation of a valuation of the properties of the Amarillo Gas Company. During this period I was also employed by the United States Bureau of Mines in connection with the construction of a helium extraction plant near Amarillo, Texas.

1925 to 1927: Employed by the Pacific Coast Steel Company in Seattle, Washington, as designer, detailer, and sales engineer of reinforced concrete structures.

1923 to 1925: Employed by the Consolidation Coal Company at Van Lear, Kentucky, as office engineer doing general engineering work.

1923: Employed by the American Rolling Mills Company in their steel plant located at Ashland, Kentucky, as detailer and mechanical draftsman.

Prior to 1923: Employed on various engineering work between school terms, and with the United States Army in France for one and a half years, during 1918 and 1919.

I am a member of the National Society of Professional Engineers, American Society of Civil Engineers, and a Licensed Professional Engineer in the State of Texas.

7 WRITTEN EXPLANATORY STATEMENT

INTRODUCTION

This exhibit sets out in detail by primary accounts the depreciation, depletion, or amortization method used and its application to the properties of the Hope Natural Gas Company.

Certain terms used herein are defined as follows:

"Depreciation," as applied to depreciable gas plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of gas plant in the course of service, from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy,

obsolescence, changes in the art, changes in demand and requirements of public authorities and, in the case of natural gas companies, the exhaustion of natural resources.

"Depletion," as applied to natural gas producing land and land rights, means the loss in service value incurred in connection with the exhaustion of the natural resource in the course of service.

"Service Life" is the period during which a particular unit of property is used or performs a useful function in the rendering of service by the utility; likewise the period of service between the installation of a unit of property and its retirement from service.

8 "Service Capacity" means the total output of utility plant realizable during its service life, measured either in number of years of service, number of work operations performed, or other production factor, as appropriate.

"Service Value" means the difference between original cost and the net salvage value of gas plant.

"Salvage Value" means the amount received for property retired, less any expenses incurred in connection with the sale or in preparing the property for sale, or, if retained, the amount at which the material recoverable is chargeable to Account 131, Materials and Supplies, or other appropriate account.

"Cost of Removal" means the cost of demolishing, dismantling, tearing down, or otherwise removing gas plant, including the cost of transportation and handling incidental thereto.

"Net Salvage Value" means the salvage value of property retired less the cost of removal.

"Property Retired" as applied to gas plant, means property which has been removed, sold, abandoned, destroyed, or which for any cause has been withdrawn from gas service.

"Retirement Units" means those items of gas plant which, when retired, with or without replacements, are accounted for by crediting the book cost thereof to the gas plant account in which included.

"Life Cycle" is the period of service life comprehended in the period of usefulness of a unit of property in a given position. The service life of a unit may be comprised of one or more

9 life cycles; these need not be consecutive, but may never overlap. When a unit of property has a second cycle of life, it is second-hand or reused.

"Average Service Life" is the average of a substantial number of individual service lives of similar units of property.

"Composite Service Life" is the weighted average service life of two or more groups of property; likewise that period of service life within which a uniform depreciation or depletion accrual will amount to the sum of the service values of the individual units of property in one or more primary plant accounts or principal plant divisions to which the composite rate is applied.

"Unit of Production" is one unit, on a uniform basis of measurement, of the produced or delivered principal service or commodity which the property is devoted to produce or deliver.

"Production Method" is a method of depreciation or depletion computation in which the loss in service value of property is spread over its service life uniformly in proportion to its units of commodity produced or service delivered without regard to time.

"Straight-Line Method" is the depreciation or depletion plan under which the service value of property is charged to operation expense or other accounts in equal, as nearly as may be, periodic amounts throughout its service life. Thus, under this method, the annual depreciation charge is obtained by dividing the estimated service value by the number of years of estimated service life.

10 Scope of Exhibit

This exhibit describes the methods which have been used and the studies that were made in connection with the determination of average service lives and composite service lives applied to the gas plant of the Hope Natural Gas Company. It also describes the method employed to determine the necessary annual rates for depletion.

General Statement

The gas plant in service of the Hope Natural Gas Company (exclusive of distribution plant and properties used to transport coke oven gas) after having been grouped in accordance with the functional divisions of operations, consisted of several major classes of property as at December 31, 1938. These classes are listed in the following tabulation in accordance with the depletion and depreciation method which has been applied. (While a distinction is sometimes made between depletion and depreciation for the purposes of the following discussion, the word "depreciation" is intended to include "depletion" where appropriate.)

Production Method.

Natural Gas Producing Lands and Leaseholds.
Field Line Construction and Rights-of-way.
Gas Well Construction.

Straight-Line Method.

Structures (Production, Transmission, and General).
Measuring and Regulating Station Equipment (Production and Transmission).
Gas Well Equipment.
Field Line Equipment.
Main Transmission Line Construction, Equipment and Rights-of-way.
Compressor Station Equipment.
Communication Equipment.
Other Equipment (Production, Transmission, and General.

Clearing Accounts.

Drilling and Cleaning Equipment.
Transportation Equipment.

It is to be understood in the subsequent discussions that the items above designated are intended to reflect the costs of all materials, installation, and all other expenditures that would be lost by retirement of the property.

Comprehensive engineering studies and detailed field inspections have been made of all classes of property in order that a rational application of the basic principals of depreciation might be applied to the depreciable property of the Hope Natural Gas Company as of December 31, 1938.

The property of the Hope Natural Gas Company consists of several types of physical property having various mortality characteristics. In the determination of the proper service lives for each group of property, consideration has been given to not only the type of property, but also to the character of service that these units are called upon to render and the service conditions under which they operate and render service.

The properties that are subject to removal or retirement due to the exhaustion of the supply of gas, which they were designed and constructed to produce or gather, have been grouped in the several producing areas, designated by Federal Power Commission geologists, and was depreciated on a unit of production basis. The annual rates of accruals have then been determined upon the basis

of units of production ratably in proportion to the annual production of gas with the rate in each year determined to be the ratio of the annual production to the remaining recoverable gas reserves.

In a few instances property in more than one of the present primary property accounts has been grouped and a composite rate determined for the combined property for which accurate experience data were available.

During the course of the determination of the average service lives of this property, numerous and detailed inspections were made of all classes of property in the system. This includes an inspection of all visible property subject to examination such as structures and compressing station equipment and sample inspections at many points of the underground pipe and buried property comprising the pipeline system. I also made analyses to determine the property retirement experience of the company covering property whose service life had been terminated and the depreciation realized and a review of the maintenance policy and operating practices over the forty-year history of the company.

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In addition, a study was made of the service age of the principal identifiable units of the company's property. (Service age is the period of time between the date when property is first placed in service and the date of the investigation.) Careful consideration and effect was also given to all of the relevant facts determinable concerning the probable future life expectancy of the principal physical units of property. In addition to the extensive inspection and study of the company's property, there was available during the process of determining the average service lives for all classes of this property, considerable relevant data from the following sources:

1. Interstate Commerce Commission, Bureau of Valuation determinations of service lives for oil pipeline properties in the United States, including lives determined for systems located in the same general territory.

2. Bureau of Internal Revenue determinations of service lives for various classes of gas corporation property.

3. Conferences on the service lives of gas plant equipment with manufacturers and users of such equipment.

4. A study of the service lives adopted by various Commissions and courts in proceedings involving the determination of service lives for all types of utility property, including natural gas companies;

5. Numerous public utility service-life studies, including natural gas companies, prepared by prominent engineers; and

14 6. Numerous service-life studies of natural gas companies made under my direction while Chief Engineer of the Texas Railroad Commission.

An examination of the voluminous and comprehensive working papers underlying the determinations of average and composite service lives in this exhibit will indicate the careful consideration that has been given to the many factors involved in these determinations.

The summary attached to this written explanatory statement sets forth, by primary accounts and groups of accounts, the composite service lives and the annual rates of depreciation which I have determined to be reasonable and applicable to the gas plant of the Hope Natural Gas Company. Each primary account or group of accounts is discussed below in the same order as the accounts are listed on the attached statement of composite service lives.

SERVICE LIFE DETERMINATION BY ACCOUNTS

Natural Gas Producing Lands (330–1).

This account includes lands owned in fee on which are located producing gas wells. Since these lands were purchased primarily for the production of gas and would be an entire loss to the company at the end of their production period, the original investment was grouped by producing areas and depletion computed on a unit of production basis. A study made to determine what portion of its cost the company would be expected to recover

15 through the sale at the end of the lands' useful gas production life, and the amount was found to be negligible.

Leaseholds (330–2).

Leases included in this account have been segregated, by Federal Power Commission geologists, into (a) operated acreage held for the production of gas, and (b) unoperated acreage. All leases under the classification of operated acreage were segregated further into their respective gas producing areas and depletion has been provided on the basis of the units of production from each area.

Other Production System Land and Land Rights (330–5).

Property in this account consists of tracts of land owned in fee upon which it appears the company can realize at the end of

its useful life an amount approximating in the aggregate the original cost. This land has therefore been considered nondepreciable and no allowance has been provided for losses attributable to its use in gas service.

Field Line Rights-of-way and Field Line Construction (330–4) (333–1).

Included in this account grouping are the rights-of-way for all of the field lines, together with the labor and construction costs for field lines, both "field trunk" and "field gathering." No physical property is involved in these accounts,
16 as the expenditures relate to installation costs and the securing of easements and rights-of-way. Since this property will have no further service value after the exhaustion of the available gas supply, and unlike pipe and other materials, cannot be used again at other locations, it has been determined that it is proper to measure the service capacity of this property by the life of the supply and provide for its depreciation upon the basis of the use of the property measured by the production of gas. This property has therefore been depreciated on a production basis. However since this property had more than one use, it has been segregated into three groups as follows:

(1) Field Trunk and Gathering Lines.
(2) Local Marketing Lines.
(3) Lines receiving gas purchased under contracts.

The property included in group (1) was further segregated into the several designated gas production areas and depreciated upon a unit of production basis. Property included in groups (2) and (3) was depreciated on a unit of production basis, using over-all production as the base.

Local Marketing lines are defined as production system lines now devoted principally to the serving of towns and villages in West Virginia. A study made to determine whether such lines would be abandoned or removed from their present locations at the time of the exhaustion of the gas supply from the
17 Company's own production indicated that these local consumers would probably be supplied with gas service through pipe-lines laid in a more direct route to the main transmission lines. Since these towns and communities are scattered over the entire system of the Company, it was decided that the most accurate method of determining the service capacity and providing for the depreciation of the properties in this grouping would be on an over-all production basis.

Since data relating to the remaining value of gas reserves available to the Company from the purchase gas contracts were not available, it has been determined that the most equitable depreciation treatment for these lines would be similar to that for local marketing lines and such method has been adopted.

Production System Structures (331–2) (331–3).

Included in this account grouping are Field Measuring and Regulating Station Structures (331–2) and Other Production System Structures (331–3). Included under Field Measuring and Regulating Station Structures are approximately 590 regulator and meter houses. These structures are wood frame, metal sides and metal roof in construction. There are also included 1,480 free consumers' boxes. These structures are used to house equipment for the measurement of purchased gas. Most of these structures are small and portable.

Other Production System Structures include such struc-
18 tures as warehouses, district offices, pipe yards, machine shops, garages and miscellaneous smaller structures. These structures are located in the various operating districts and are for the most part of wood frame construction with metal sides and roof. There are several hundred of these structures, all of which I inspected in the field recording appropriate data, such as location, condition of maintenance, type of construction, type of foundation and age. A study was made of the Company's retirement experience on structures during the forty-year history of the Company. After giving consideration to all relevant depreciation factors causing the ultimate retirement of such property, both functional and physical, a composite service life of 24 years was determined to be reasonable and applicable to the Company's Production System Structures.

Gas Well Construction (332–1).

Well construction expenditures were grouped into designated gas producing areas and depreciated on a unit of production basis. There is no material included in this account for these well construction expenditures, such as labor and indirect expenses, and therefore they have no value after the exhaustion of the related gas supply.

Gas Well Equipment (332–2).

This account includes casing and tubing and other well equipment such as closing-in equipment, packers, pumping
19 equipment and storage facilities.

From the records of the company a study was made of all natural gas wells both drilled and acquired since the beginning of operations. This study was segregated into two parts, wells presently active and wells which have been abandoned. From this study the average age of the present active wells and the average age of wells abandoned was determined.

When pipe casing, tubing, or other equipment, not bearing a serial number or other identifying mark is moved from one location and is returned to the ware house, it loses its identity. It therefore is impossible in the case of this company to determine the actual age of any specific section of such pipe, casing, or tubing which is reused and is in other than its first cycle of use.

It was determined, after making the foregoing studies and a consideration of all relevant facts, that casing and tubing would be used in more than one gas well during their physical service lives.

It was found that the Company does not recover all of the materials in the well at the time of its abandonment, and it was necessary to consider this fact in the determination of service life of such property. Studies were made of the past retirement experience of the Company, and data were tabulated showing the percent of materials not recoverable from wells at the time of abandonment. Other studies were made from the records of the Company to ascertain the average cost to abandon gas
20 wells in accordance with the requirements of the laws of West Virginia. Data were secured on the average cost of abandonment of a gas well from other gas utility companies operating in the same area to check the accuracy of the average costs obtained from the study based on the current experience of the Hope Company.

During the spring and summer of 1939, engineers for the Federal Power Commission made numerous inspections in the field of casing and tubing as they were recovered from wells abandoned during that period. Much of this recovered casing and tubing had been previously used before being placed in these wells, which made it impossible to determine with any degree of exactness the age of the pipe in service, and therefore it was not

practicable to use this inspection data to establish the service life of casing and tubing.

In the absence of reliable data pertaining to the service lives of gas well casing and tubing, it has been necessary to utilize the service lives developed in connection with the transmission and field line pipe of comparable wall thicknesses, adjusted to give effect to losses other than physical.

In addition, a study was made of the Hope Company's experience in the retirement of all gas well equipment during the forty-year history of the Company.

After giving consideration to all relevant factors, it was determined that a service life of 40 years would be reasonable for gas well equipment.

21 *Field Line Material (333–1), Field Measuring and Regulating Station Equipment (333–2), Other Production System Equipment (337).*

Field Line Material (333–1) includes pipe and material in all field trunk and gathering pipe lines.

The principal use of these lines is for the collecting and gathering of gas from the well mouth to point of entry into the transmission system.

During the spring and summer of 1939, engineers for the Federal Power Commission made numerous individual inspections of pipe in these lines in the presence of engineers employed by the Company, at locations selected by the Company's representatives. There were 253 locations where inspections were made on field trunk and field gathering pipe lines.

From a study of the records of the Company, it was determined that the greater portion of the pipe included in this account had completed its first cycle of use and was reused or second hand pipe when it was installed at its present location. It was further found from an examination of the Company's records that it was impossible to determine with any degree of accuracy the age of this used field line pipe for it had lost its identity upon entering the warehouse after the first cycle of use, and no record was available from which the information could be secured. However, it was found that in some instances, where inspections were made that the pipe was new when installed. The data secured from the inspec-
22 tions of that portion of this pipe which was found to be in its first cycle of use, together with similar data on pipe inspected on transmission lines of known ages, were used in the study of service life.

After consideration of the available data on all pipe, it was determined to use the same service life for field trunk and field gathering pipe as was used for transmission pipe of comparable wall thickness. In so doing it was necessary of course to make adjustments for losses that would occur due to the shifting of the field pipe from one location to another.

The average service life that has been determined for this pipe gave consideration to the portion of the life of the pipe and equipment which had been consumed in service prior to its acquisition by the Company. A more complete discussion of the data collected and the methods used in the determination of service lives for all pipe is presented in connection with the determination of service lives of the main transmission line material, Account (353).

A study was made of the Company's retirement experience of field trunk and field gathering pipe lines, and information secured from this study was also given due consideration in the determination of service lives for this pipe.

Field Measuring and Regulating Station Equipment (333–2) includes equipment such as orifice meters, positive meters and gauges used principally to measure gas purchased by the Company, free gas to lessors and gas used in the Company's operations, and is located throughout the entire system. Field inspections were made of representative parts of this property, and a study was made of the retirement experience of the Company relative to the class of equipment included in this account.

Other Production System Equipment (337), includes items such as small gas engines, pumps, tools, etc., located at various points in the operating districts. A study was made of the retirement experience of the company relative to the class of property included in this account.

After giving consideration to all factors, both functional and physical, involved in the determination of the service life of this property, it was determined that a composite service life of 45 years would be reasonable for property grouped in these three accounts.

Drilling and Cleaning Equipment (334).

Investigation by the Commission's accounting examiners has revealed that depreciation of drilling and cleaning equipment is accounted for on the books of the Company through a clearing account, and is charged to gas plant or the operating expense accounts as appropriate. After considering the Company's expe-

rience in the retirement of drilling and cleaning equipment, it was found unnecessary to adjust the rates used by the Company for this account.

24 *Transmission System Land (351–12).*

This account includes tracts of land owned in fee and used principally as compressor station sites. No provision has been made for depreciation of these lands, for they are considered non-depreciable for it appears that there will be no losses in the aggregate attributable to their use in gas service.

Transmission System Rights-of-way (351–23) and Transmission Line Construction (353).

Transmission System Rights-of-way (351–23) includes the cost of easements and rights-of-way for all of the main transmission lines. Transmission Line Construction (353) represents the labor and indirect costs of construction of all transmission lines. The methods used in arriving at the service life of these accounts will be discussed later in connection with the determination of the service life of Main Transmission Line Material. These two accounts were kept separate in order to utilize the Company's recorded experience in the retirement of this classification of property. The average service life for the combined property in these two accounts has been determined to be the same as that of Transmission pipe line material, namely 64 years.

TRANSMISSION SYSTEM STRUCTURES

Compressor Station Structures (352–2), Transmission System Measuring and Regulating Station Structures (352–3), Other Transmission System Structures (352–4).

Compressor Station Structures (352–2) includes struc-
25 tures and improvements located at the several compressor stations. A field inspection was made by engineers of the Federal Power Commission of each of the forty-seven compressor stations of the Company. At each station data, such as the location, type of construction, size, condition of maintenance, kind of foundations and age, etc., were recorded for each of the many structures at each station. A careful study was made of the experience of the Company relative to the retirement of compressor station structures to ascertain the actual history of the Company in this matter. Further, a study was made from the records of the company to secure data relating to the cost of

abandoning compressor station structures and the percent of salvageable materials that had been recovered upon retirement.

It was found that the service life of the structures located at several compressor stations of the Company will be determined by the exhaustion of the available supply of gas which the station was constructed to compress. Consideration has been given in the determination of the service life of these structures to give proper effect to this known condition.

Transmission System Measuring and Regulating Station Structures (352–3), include structures such as measuring stations located at wholesale delivery points such as Clarington, Round Bottom, Bates and Wade, etc. All of these structures were inspected in the field and data were tabulated similar to that for compressor station structures. Studies were made of the
26 Company's retirement experience relating to structures under this classification.

Other Transmission System Structures (352–4) includes structures used by the transmission line operating personnel at various points on the transmission system. These structures consist of warehouses, pipe sheds, and pressure control houses, etc. These structures were also inspected in the field and appropriate notes made and data tabulated. A study was also made of retirements occurring to property of this class included under this account to develop the experience of the Company with similar property.

After giving weight to all relevant factors, both functional and physical, contributing to the ultimate retirement of this class of property, it was determined that a composite service life of 40 years is reasonable, proper, and applicable to the transmission system structures in these three accounts.

Transmission Line Material (353), Transmission System Measuring and Regulating Station Equipment (354–3), Other Transmission System Equipment (354–4).

Transmission Line material (353) includes pipe and fittings on all transmission lines. During the spring and summer of the year 1939, engineers for the Federal Power Commission made careful inspections of pipe in the field at approximately 297 locations on transmission pipelines and 253 locations on field pipelines. The locations of the inspections were selected by
27 Company engineers who were present at the time of these inspections.

The Federal Power Commission engineers made inspections and recorded data independent of that of the representatives of the

Company. Each inspection "bell-hole" was dug approximately six feet square with sufficient depth to completely uncover the pipe and permit an inspection of the bottom of the pipe as well as its sides and top. Data, such as the depth of the external pitting of the pipe (never less than ten pits on each 18-inch inspected section), location of pits, outside diameter of pipe, general characteristics of corrosion, kind of soil and topography were recorded. There was added in addition, information from the records of the company indicating the normal wall thickness of the pipe and its age in the position of installation. At practically all of the inspection locations samples were taken of the soil at points near the bottom and top of the pipe and also at the ground level. Corrosivity tests were made of representative samples of these soils, in Washington, D. C., under the direction of the United States Bureau of Standards and the results were correlated with the pit data recorded in the field by Commission engineers.

It is the general consensus of opinion that the average of the deepest pits that will be found in pipe will increase as the inspected area is increased. The method used by the Company engineers to determine the pit-depth area relationship, for the pipe of the Company, was found to be similar to that which
28 has been derived by the United States Buerau of Standards during the course of their study relating to the effect of underground corrosion of pipe. Using this same method, calculations have been made by Commission engineers to compute the average of the deepest pits in areas greater than those inspected in the field during the course of this investigation.

Upon completing the field inspections, the data secured were tabulated and analyzed and those inspections which appeared to have been made of pipe of an unknown age were omitted from the study of pitting rates as related to the age of the pipe. All of the remainder of the tabulated inspection data were analyzed and made a part of these studies. It was found that there has been a definite retardation in the rate of pitting of pipe, left undisturbed in the ground, with the passage of time. In the course of the studies analyzing this inspection data, calculations were made using several methods, and the results were plotted graphically to obtain the variation in service life of pipe using several terminal service conditions. All of these studies were used as guides in the determination of average service lives of pipe.

Members of the staff of the Underground Soil Corrosion Section of the United States Bureau of Standards, familiar with soil corrosion, were consulted to secure a further check on the Commission engineers' methods of analysis of available corrosion data.

In addition, a study was made from the records of the Company of the pipe retirements that have been experienced by
29 the Company during the entire history of its operations, and this information was also given consideration in the final determination of the average service lives of pipe.

One of the determinations resulting from the studies and investigations is that, with conditions comparable, the wall thickness of pipe is one of the principal factors controlling its service life. Consequently the service lives which have been determined give proper consideration and effect to the wall thickness of the pipe. The average service lives determined to be reasonable and proper ranged from 35 to 75 years.

Transmission System Measuring and Regulating Station Equipment (354–3), includes meters, regulators, pipe and fittings located principally in the Clarington, Round Bottom, Bates and Wade measuring stations of the Company. All of this equipment was inspected in the field and appropriate engineering data recorded. Likewise, a study was made of the retirement experience of the Company throughout its history for this class of equipment.

Other Transmission System Equipment (354–4) includes items of property such as pumps, tanks, tools, and miscellaneous equipment located principally in transmission line warehouses. A study was made of the Company's retirement experience for this class of equipment.

After an exhaustive study and careful consideration of all relevant facts involved in the determination of the service lives of this property, it has been determined that a composite
30 service life of 64 years would be reasonable and proper for the classes of property combined in these three accounts.

Compressor Station Equipment (354–2).

This account includes equipment, such as gas engines, compressors, pumps, motors, pipe, and fittings, located in the forty-seven compressor stations owned by the Hope Natural Gas Company. Detailed inspections were made in the field by engineers of the Federal Power Commission of all of the compressor station equipment and appropriate data such as type, size, kind, class, and manufacture of the equipment and its age, condition of maintenance, use, etc., were recorded. The operating record was compiled for each

of the nearly 200 compressing units in the system for each day of the calendar years 1934 to 1939 inclusive. This record contained for each unit the engine-hours operated, hours-down for repairs, volume of gas pumped in MCF, the suction pressures and discharge pressures, which provided a large volume of statistical data relating to the operation of this property. Data were also tabulated showing the major repairs and alterations of gas engines and compressors during this period, and in some cases prior years. The cost of maintenance of each station was also studied for a period of nearly 20 years where it had been in existence for that time, and for the complete period of its existence where it was of lesser age.

31 Gas compressor engines and their associated equipment can not be used economically unless they possess a high degree of performance in comparison with their capacity when new. Thus, when the time comes for such units to be retired, their service life is terminated and they are retired at net salvage value, even though the physical condition would enable them to continue to render service.

It has been found that equipment located at several of the compressor stations will not serve their total potential physical service lives at their present locations for the reason that the exhaustion of the gas supply in those related local areas which provide the supply of gas pumped by the station will terminate the service life of the components of material, labor, and indirect costs of the equipment for such locations. The engines, compressors, and other recoverable compressor station material may likely be transferred to another location and enter another cycle of use to complete its service life. Appropriate adjustments were made in the average service lives indicating the occurrence of this known functional condition to give effect to these causes of depreciation. A study was made of the retirement experiene of the Company during its forty-year history. Several major manufacturers of gas engines and gas compressors were consulted and data relating to service lives of such equipment was discussed to secure an additional check upon the proper average service lives.

32 After giving consideration to all the factors entering into the ultimate retirement of this class of property, both functional and physical and the factors involved in the determination of service lives of this class of property, it was determined that the compressor station equipment of this Company would have a composite service life of 39 years.

General Land And Land Rights (370).

This account includes tracts of land on which are located the general structures of the Company, such as offices, warehouses, machine shops and garages. No provision has been made for depreciation of these lands, for it appears that there will be no loss in the aggregate attributable to their use in gas service.

General Structures And Improvements (371).

Included in this account are the general office buildings, warehouses, machine shops and garages of the Company. A field inspection was made of all of this property and appropriate data were recorded for each structure. A study of the retirement experience of the Company for this class of property revealed that to date few retirements had been made. It was further found there were two distinct classes of structures in this account, one class of structure being brick or fire-resisting and the other class being structures of less durable materials. This fact made it necessary to determine the average service lives of each class separately.

After consideration was given to all factors involved in the determination of the service life of this property, it was
33 determined that 50 years would be the proper service life for the general office building and general garage, and that 35 years would be proper for all other less durable structures, with the composite service life of all of these structures and improvements being 46 years.

Furniture and Fixtures (372).

This account includes all of the furniture and fixtures of the Company located in its general offices. A study was made of Company experience to give consideration to retirement losses on this class of property.

After a consideration of all relevant factors involved in the determination of the service life of this property, it was determined that a service life of 25 years would be reasonable and proper for office furniture and fixtures.

OTHER GENERAL EQUIPMENT

Stores Equipment (374), Shop Equipment (375), Laboratory Equipment (376), Tools and Work Equipment (377), Miscellaneous Equipment (379).

Stores Equipment (374), includes items of property such as benches, racks, bins, platforms, etc.

Shop Equipment (375), includes items of property such as drill presses, power saws, lathes, grinding machines, etc.

Laboratory Equipment (376), includes property used for testing gas, gas density apparatus, etc.

34 Tools and Work Equipment (377), includes items of property such as transits, levels, and other surveying instruments.

Miscellaneous Equipment (379), includes minor items of property such as time clocks, carbon monoxide detectors, etc.

Studies were made of the retirement experience of the Company on these classes of property, and after giving consideration to all factors it was determined that a composite service life of 27 years would be proper.

Communication Equipment (378).

Communication Equipment includes all general telephone and telegraph equipment in the communication system of the Company. There was no reliable mortality data available for this class of equipment from the property records of the Company, as the cost of practically all replacements had been charged currently as incurred to the maintenance expense account, and the true retirement losses were not reflected in the Company's property records.

Field inspections were made of this property by Commission engineers and appropriate data as to the type, kind, size and character of the construction were recorded.

After a consideration of all available relevant information and factors involved in the determination of the service life of this property, an average service life of 26 years was found to be reasonable and proper for Communication Equipment.

35 *Transportation Equipment (373).*

Transportation Equipment includes automobiles, trucks and garage equipment of the Company. The investigations of the Commission's accounting examiners reveals that the depreciation for this property is accounted for by the Company through a clearing account, and is charged to gas plant or the appropriate operating expense account as the equipment is used. After considering the Company's experience in the retirement of Transportation Equipment and the rates it uses, it is determined to be unnecessary to revise the annual depreciation rate used by the Company.

Summary by methods

Classification	Adjusted original cost 12-31-38	Composite service life (years)	Annual straight line rate (percent)
Straight line method	$40, 229, 028. 04	46. 73	2. 14
Production method	9, 959, 683. 46		
Land and land rights	280, 901. 94	Non-Depreciable.	
Drilling and cleaning equipment, and transportation equipment	728, 007. 20	Clearing Account.	
Total	51, 207, 620. 64		

Signed FRANK S. FRENCH,
Frank S. French,
Engineer—Rate Investigator.

Date, March 14, 1941, Washington, D. C.

36 *Statement of Composite Service Lives Determined for Gas Plant of Hope Natural Gas Company*

[Exclusive of Distribution Plant and Property Used to Transport Coke Oven Gas]

Account number and title	Adjusted book cost 12-31-38	Service life (years)	Annual straight line rate percent
PRODUCTION SYSTEM			
330-1 Producing lands	$3, 319. 84	Production method.	
330-2 Leaseholds	1, 599, 004. 86	Production method.	
330-5 Land and land rights	21, 008. 52	Nondepreciable.	
Field line rights-of-way and field line labor:			
330-4 Rights-of-way	645, 391. 47		
333-1 Field line labor	3, 622, 489. 58		
Total	4, 267, 881. 05	Production method	
Production system structures:			
331-2 Field measuring and regulating station structures	21, 138. 92		
331-3 Other production system structures	191, 188. 81		
Total	212, 327. 73	24	4. 17
332-1 Gas well construction	4, 089, 477. 71	Production method.	
332-2 Gas well equipment	7, 610, 509. 75	40	2. 50
Field line material and field measuring and regulating station equipment:			
333-1 Field line equipment	7, 674, 251. 82		
333-2 Field measuring and regulating station equipment	184, 385. 03		
337 Other production system equipment	75, 532. 21		
Total	7, 934, 169. 06	45	2. 22
334 Drilling and cleaning equipment	595, 692. 71	Clearing account.	

Statement of Composite Service Lives Determined for Gas Plant of Hope Natural Gas Company—Continued

[Exclusive of Distribution Plant and Property Used to Transport Coke Oven Gas]

Account number and title	Adjusted book cost 12-31-38	Service life (years)	Annual straight line rate percent
37 TRANSMISSION PLANT			
351-12 Land	162,912.21	Nondepreciable.	
Transmission rights-of-way and transmission line labor:			
351-23 Rights-of-way	391,242.69		
353 Main line labor	4,705,495.99		
Total	5,096,738.68	64	1.56
Transmission system structures:			
352-2 Compressor station structures	1,441,882.38		
352-3 Transmission system measuring and regulating station structures	8,207.21		
352-4 Other transmission system structures	6,775.69		
Total	1,456,865.28	40	2.50
Transmission line material and measuring and regulating station equipment:			
353 Main line material	9,426,578.73		
354-3 Transmission system measuring and regulating station equipment	17,615.91		
354-4 Other transmission system equipment	21,015.55		
Total	9,465,210.19	64	1.56
Compressor station equipment: 354-2 Compressor station equipment	7,683,671.99	39	2.56
38 GENERAL PLANT			
370 Land and land rights	96,981.21	Nondepreciable.	
General structures and improvements:			
371 Office and garage	174,907.46		
371 Other structures	50,980.32		
Total	225,887.78	46	2.17
372 Furnitures and fixtures	178,683.34	25	4.00
Other equipment:			
374 Stores equipment	5,106.76		
375 Shop equipment	104,185.17		
376 Laboratory equipment	1,003.40		
377 Tools and work equipment	4,545.33		
379 Miscellaneous equipment	1,147.84		
Total	115,988.50	28	3.57
378 Communication equipment	248,975.74	26	3.85
Transportation equipment: 373 Autos and trucks	142,314.49	Clearing account.	
Total	51,207,620.64		

1 **EXHIBIT NO. 61.—DEPRECIATION AND DEPLETION OF GAS PLANT AS AT DECEMBER 31, 1938, F. P. C. WITNESSES SMITH AND DUNN**

WRITTEN STATEMENT

The Federal Power Commission, under date of October 14, 1938, issued an order of investigation into and concerning all rates, charges, classifications, rules, regulations, practices, or contracts of Hope Natural Gas Company. In accordance therewith, an examination of the accounts and records of Hope Natural Gas Company has been made, and, as a result, this report on the annual and accrued depreciation and depletion, as related to the original cost of the gas plant of the company, is submitted.

Purpose and Scope of this Study.

The purpose of this study is to determine the proper annual operating expense for depreciation and depletion and the proper amount of accrued depreciation and depletion as of December 31, 1938.

This study covers the period 1898 to 1938, inclusive, which is the entire corporate existence of the company to this date. It includes the original cost of plant accounts and additions, retirements, and adjustments thereto; property acquisitions and reserves acquired thereby; the losses from property retired and sundry matters affecting depreciation accounting.

Plant costs which are subject to loss in service value from causes described in the definition of depreciation, item 14, in the Uniform System of Accounts, have been depreciated at the
2 rates determined from service life estimates determined by the Bureau of Engineering. Plant costs, which are subject to loss in service value primarily as a result of exhaustion of natural gas resources, are depleted at rates derived from the annual production and natural gas reserves as determined by the Bureau of Engineering.

The depreciation and depletion expense is computed, and shown in the exhibit, by years, in order to give immediate effect to plant changes and retirement losses. All plant costs and retirement losses have been considered in this exhibit.

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Depreciation Accounting as Practiced by Hope Natural Gas Company.

Throughout its existence, the Company has recorded in its accounts depreciation expense and the accumulated reserves. As shown in Schedule No. 6, the accrued reserves amounted to $40,759,450.48 as at December 31, 1938. In order to discuss briefly the depreciation accounting, the following tabulations are submitted:

Balance in reserves as of Dec. 31, 1938		$40,759,450.48
Less reserves for:		
Operated acreage	$489,034.48	
Unoperated acreage	231,299.52	
Cost of abandoning	3,001.58	
Contracts for gas	813.44	
Surplus property available for sale	80,456.25	
Appreciation—Clarksburg Lights & Heat Company	45,431.90	
		850,037.17
Reserve for depreciation		39,909,413.31

3 The components of this reserve are summarized as follows:

Provisions	$45,425,185.45
Reserves acquired	2,164,107.45
Total credits	47,589,292.90
Charges	7,679,879.59
Balance, Dec. 31, 1938	39,909,413.31

Reserve Provisions.

The provisions have been computed at widely varying rates and on various classifications of property. In general the provisions have been far in excess of requirements as proved by the large reserve balance in relation to plant accounts and the fact that the company has made two retroactive adjustments of depreciation expense, resulting in large credits to the Surplus Account. The first of these adjustments was recorded on Voucher D 136, 1908, in the amount of $1,651,600.82. The second adjustment was recorded pursuant to an authorization granted by the West Virginia Public Service Commission dated December 18, 1934 in the amount of $5,901,317.53. Of this latter amount, $1,083,126.75 was a debit adjustment of the Reserve for Amortization of Drilling

Costs. The accounting for well drilling costs is summarized briefly in order to emphasize the Company's practices concerning these costs as they have an important part in this case.

From the inception of the Company until 1923, only materials (casing, tubing, equipment, etc.) of producing properties were capitalized. Drilling costs were charged to operations through the following expense accounts:

Years 1898–1907, inclusive, Account 6, Drilling wells (construction).

Years 1908–1920, inclusive, Account 16, Drilling new wells (construction).

Years 1921–1922, inclusive:

Account 2A, Gas well labor.

Account 2B, Gas well supplies and expense.

Beginning in 1923 (effective date of the first West Virginia system of accounts) it became the policy of the Company to capitalize the well drilling costs (intangibles). However, concurrently with the charge to plant accounts, a reserve in equal amount was set up by a charge to Account 62E—Retirement and Depletion Expense—Drilling Costs, and a credit to a reserve account, Amortization of Drilling Costs. In 1932 the reserve balance was transferred to an account Retirement and Depletion Reserve—Drilling Costs. Otherwise the procedure remained the same until 1934 when the above-mentioned adjustment of $1,083,126.75 was recorded to restate the reserve on a production basis. The balance in the reserve was transferred to the Reserve for Depreciation—Gas Well Construction.

Reserves Acquired.

It has been the accounting policy of Hope Natural Gas Company to enter in its records the book cost and book reserve for depreciation in the case of property acquired from affiliated companies or properties purchased in their entirety. In the cases of property acquired from nonaffiliated public utility companies, the original cost has been recorded by Hope Natural Gas Company, in accordance with its own accounting practice, that is, to record as fixed capital all material cost and the direct construction cost, except well construction. The difference between the amount recorded in the plant account and the purchase price (purchase price is generally less than original cost) has been taken as the measure of accrued depreciation existing in

the property and, therefore, credited to the reserve for depreciation.

The reserve balances thus acquired have been considered in the examiners' report schedules and are shown on line 49 of Schedule No. 1. Schedule No. 1 shows the total of $2,389,561.09, which is identified with the total per books as follows:

Total reserves acquired, per books at Dec. 31, 1938		$2,164,107.45
Items not included in line 49 of Schedule No. 1:		
Drilling and cleaning equipment	$16,870.60	
Teaming	223.62	
Autos and trucks	24,817.61	
Distribution plant	165,041.79	
Other property	16,152.65	
		223,106.27
		1,941,001.18
Items added to line 49 of Schedule No. 1:		
Drilling and cleaning equipment	303,996.37	
Teaming	42,020.98	
Autos and trucks	102,542.56	
		448,559.91
Total		2,389,561.09

Examiners' adjusting entry No. 303, shown in the original cost study, reduces the capitalized cost and the acquired reserves in the amount of $412,186.80 as explained in that entry. The charge to the reserve is included in the depreciation report schedules as shown in Subschedule No. 7A.

6 *Reserve Charges.*

A summary of charges to the depreciation reserve is shown, by years, as follows:

Year:	*Amount*	*Note*
1920	$95,679.06	(1)
1921	524,880.79	(1)
1922	388,491.61	(1)
1923	205,090.31	(2)
1924	166,248.13	(2)
1925	150,662.04	(1)
1926	195,875.40	(1)
1927	183,727.52	(3)
1928	241,289.01	(3)
1929	191,551.64	(3)
1930	253,816.71	(3)
1931	236,287.30	(3)
1932	192,895.90	(3)
1933	120,664.38	(2)
1934	184,494.87	(2)

Year:	Amount	Note
1934 Adj	$205,034.27	(a)
1935	215,605.44	(2)
1936	336,149.86	(2)
1937	407,843.61	(2)
1938	392,460.61	(2)
	4,888,748.46	
Adjustment from reserve for amortization of drilling costs	2,791,131.13	
Total charges	$7,679,879.59	

There were no charges made to the depreciation reserve until 1920. Prior to 1920, property retirements were handled through an account called Depreciation and Adjustment account, which in turn was closed to surplus. From 1920 to 1938 the reserve was charged as described in the following notes:

1. Reserve charged with the computed amount of depre-
7 ciation accruals on the property retired. The profit or loss on retirements, computed on the ratio of the reserve to the investment at the beginning of the year, was charged or credited to surplus.

2. Reserve charged with the excess of book cost over salvage value of property retired.

3. Reserve charges computed as in (1) but corrected by (a). As corrected represents excess of cost over salvage.

In order to determine the past loss on property retired, detailed analyses of the depreciation reserve, surplus, and other accounts have been made by the Federal Power Commission examiners and the Company. The Company has further classified the losses sustained by the property groups shown in the examiners' report schedules. These studies made by the Company and the examiners have been reconciled for the entire period. The results of the studies are set forth in Schedule No. 7 of this exhibit and applied to the report schedules as shown on line 53 of Schedule No. 1.

Costs Subject to Depreciation and Depletion.

Plant accounts have been summarized from the various depreciation schedules in order to bring out, in condensed form on the report schedules, the fact that all plant costs, from the inception of the Company have been considered in the depreciation and depletion calculations.

Line Nos. 1 to 5, inclusive, of Schedules Nos. 1 to 5, inclusive, show certain totals which are explained by the five captions, as follows:

8 Line No. 1—Original charges per books.

Line No. 2—Adjustments by examiners.

Line No. 3—Adjusted total cost subject to depreciation and depletion.

Line No. 4—Retirements.

Line No. 5—Adjusted book cost, December 31, 1938.

The adjusted book cost at December 31, 1938, agrees with the total shown in the exhibit on the original cost of gas plant accounts (excluding the specific distribution property), in the amount of $51,207,620.64, shown on Line No. 5 of Schedule No. 1.

Line No. 4 of Schedule No. 1 shows the accumulated credits to plant costs, for property retired, in the amount of $21,341,265.64. A related amount, the retirements less salvage value, is shown on line No. 53 as a charge to the accrued reserve.

Line No. 3 sets forth the total original cost subject to depreciation and depletion after giving effect to the examiners' adjustments, but before retirements are deducted.

Line No. 2 shows examiners' adjustments applied to the original charges per books. The examiners' adjustments referred to are those set forth in the exhibit on the original cost of gas plant accounts in the amount of $2,099,171.81. This amount is reconciled as follows:

Examiners' adjustments:	
Schedule No. 2—Depletable property	$ 694,604.21
Schedule No. 3—Depreciable production property	*283,903.35*
Schedule No. 4—Transmission property	*889,079.68*
Schedule No. 5—General property	*521,191.25*
Schedule No. 1—Nondepreciable plant	*43,759.37*
Schedule No. 1—Summary	*1,043,329.44*
9 Other Accounts:	
Unoperated leaseholds	104,811.48
Coke oven gas property	186,320.44
Unoperated leaseholds transferred	*584,382.23*
Coke oven gas property transferred	*762,592.06*
Total other accounts	*1,055,842.37*
Total plant adjustments	*2,099,171.81*

Line No. 1, Original Charges Per Books, represents the book charges of the Company's gross additions to plant accounts.

For the purpose of spreading the loss in service value as equitable as possible over the service life, the plant costs, adjustments, retirements, etc., have been classified by property groups and years. The classification is in accordance with a study made by the Company, certain details of which are set forth in Company Exhibit No. 24. These property groups are shown in detail on Schedules 2 to 5, inclusive. They are listed below:

Property group	Basis of depreciation and depletion	Service life in years
1. Operated acreage	Annual production	
2. Field line R/W and construction cost	Annual production	
3. Gas well construction	Annual production	
4. Cost of abandoning gas wells	Annual production	
5. Production system structures	Group service life	24
6. Field line material, measuring and regulating station equipment.	Group service life	45
7. Gas well equipment	Group service life	40
8. Drilling and cleaning equipment	Clearing accounts at company rates.	
9. Main line R/W and labor	Group service life	64
10. Transmission structures	Group service life	40
11. Main line material, measuring and regulating station equipment.	Group service life	64
12. Compressor station equipment	Group service life	39
13. General structures	Group service life	46
14. Office furniture and equipment	Group service life	25
15. Other general equipment	Group service life	27
16. Communication system	Group service life	26
17. Autos and trucks	Clearing accounts at company rates.	

Items 1, 2, 3, and 4 above are further subdivided into Production Areas, which areas are shown in an exhibit prepared by the Commission geologists, and certain miscellaneous groups. In order to reduce the number of columns in this report the 73 Production Areas have been summarized by the pool sheet numbers as shown on Subschedules 2A, 2B, 2C, and 2D.

Depreciation and depletion expense has been computed year by year and this annual charge is shown on lines 6 to 47 of Schedule No. 1. It is computed on the average investment for the year. Lines 48 to 54 show how the annual expense is directly related to the reserve.

Following this statement are the examiners' adjusting entries to give effect to the annual and accrued depreciation and deple-

tion, as determined by the examiners and submitted in the accompanying schedules.

The purpose and contents of the entries are described, briefly, in order:

Entry No. 1 removes certain amounts in the Reserves for Depreciation and Depletion as recorded on the Company's
11 books at December 31, 1938. These reserves are admittedly overstated. In the explanation of the entry, certain amounts, which have not been adjusted by the examiner, are listed and described.

Entry No. 2 sets up the accrued Reserve for Depreciation and Depletion as determined by the examiner. One effect of these entries is to increase the earned surplus approximately $15,-800,000.00.

Entry No. 3 is to remove depreciation and depletion expense, as recorded by the Company, from the income account for the years 1937, 1938, and 1939. Details of the provisions removed, and certain provisions not removed, are shown in the explanation of the entry.

Entry No. 4 removes the charges to the Reserve for Cost of Abandoning, representing the actual costs incurred during the years 1937 and 1938, and includes them as an operating expense item in the income account.

The reserve for abandoning property, as computed by the Company, has been eliminated in the examiners' study. The largest part of this charge is cost of abandoning gas wells. The examiners have provided a reserve for the cost to abandon all gas wells in service at December 31, 1938, based on an average cost to abandon of $1,007.40 per well, computed on the Company's production. The reserve maintained by the Company has little significance in that the provisions and charges thereto are practically equal.

12 Entry No. 5 removes the charges to the Reserve for Unoperated Acreage, representing the actual abandonments as recorded during the years 1937, 1938, and 1939 and includes them in Exploration and Development Costs.

The Reserve for Unoperated Acreage has been eliminated in the examiners' study. The Company has computed provisions at varying rates, beginning in 1920. The rate from 1927 to 1938 was 8% per annum on the balance in the account.

Entry No. 6 is an adjustment relating to the original cost study. In that study entry No. 324 credited the reserve for Unoperated

Acreage in the amount of $104,811.48. Since the reserve has been discontinued, this amount is transferred to earned surplus as it represents an over-abandonment of lease costs in the past. In the study of Exploration and Development Cost this amount has been prorated to all leases surrendered to December 31, 1938. The costs in the income statement are adjusted for the years 1937 and 1938.

Entry No. 7 is to record the depreciation and depletion expense, as determined by the examiner, in the income account. Details of this expense for the year 1939 will be presented in a supplemental statement, as the present study ends at December 31, 1938.

Clarksburg, West Virginia, March 18, 1941.

EDWARD L. DUNN,
Edward L. Dunn,
Examiner in Charge, of Field Assignment.

Approved:

W. E. BAKER,
W. E. Baker,
Chief Accountant.
CHAS. W. SMITH,
Chas. W. Smith,
Chief, Bureau of Accounts, Finance and Rates.

[Pages 13 to 22 omitted.]

HOPE NATURAL GAS COMPANY

Summary of annual and accrued depreciation and depletion of gas plant in service (exclusive of distribution plant) as at Dec. 31, 1938

Line No.	Particulars	Total plant	Total depletable plant	Depreciable plant				Nondepreciable plant
				Total	Production plant	Transmission plant	General plant	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	Cost subject to depletion and depreciation:							
1	Original charges per books	$73, 592, 215. 72	$10, 990, 583. 23	$62, 273, 651. 34	$32, 120, 155. 02	$27, 654, 279. 04	$2, 499, 217. 28	$327, 981. 15
2	Adjustments by examiners	*1, 043, 329. 44*	694, 604. 21	*1, 694, 174. 28*	*283, 903. 35*	*889, 079. 68*	*521, 191. 25*	*43, 759. 37*
3	Adjusted total cost, subject to depletion and depreciation	72, 548, 886. 28	11, 685, 187. 44	60, 579, 477. 06	31, 836, 231. 67	26, 765, 199. 36	1, 978, 026. 03	284, 221. 78
4	Less retirements	21, 341, 265. 64	1, 728, 823. 82	19, 612, 441. 82	15, 483, 552. 42	3, 062, 713. 22	1, 066, 176. 18	----------
5	Adjusted book cost, Dec. 31, 1938	51, 207, 620. 64	9, 956, 363. 62	40, 967, 035. 24	16, 352, 699. 25	23, 702, 486. 14	911, 849. 85	284, 221. 78
	Depletion and depreciation computed annually:							
6	1898	44. 75	----------	44. 75	28. 26	----------	16. 49	----------
7	1899	674. 88	----------	674. 88	477. 70	163. 94	33. 24	----------
8	1900	3, 347. 29	----------	3, 347. 29	1, 963. 44	1, 347. 54	36. 31	----------
9	1901	5, 622. 47	----------	5, 622. 47	3, 216. 56	2, 363. 46	42. 45	----------
10	1902	24, 828. 18	----------	24, 828. 18	17, 191. 25	7, 356. 05	280. 88	----------
11	1903	59, 662. 11	----------	59, 662. 11	36, 022. 27	22, 918. 82	721. 02	----------
12	1904	90, 392. 08	----------	90, 392. 08	46, 582. 69	42, 869. 33	940. 06	----------
13	1905	108, 938. 97	----------	108, 938. 97	53, 956. 10	53, 974. 34	1, 008. 53	----------
14	1906	118, 075. 86	----------	118, 075. 86	58, 051. 47	58, 913. 81	1, 110. 58	----------
15	1907	132, 783. 20	----------	132, 783. 20	64, 795. 93	66, 585. 42	1, 401. 85	----------
16	1908	146, 325. 83	----------	146, 326. 83	73, 144. 76	71, 284. 39	1, 897. 68	----------
17	1909	166, 956. 08	----------	166, 956. 08	84, 605. 82	80, 093. 51	2, 256. 75	----------
18	1910	209, 318. 02	----------	209, 318. 02	106, 454. 35	100, 021. 94	2, 841. 73	----------
19	1911	258, 247. 61	----------	258, 247. 61	131, 564. 19	122, 686. 69	3, 996. 73	----------

20	1912	292,178.46		292,178.46	150,256.49	136,578.60	5,343.37	
21	Prior to 1913	973,743.15	973,743.15					
22	1913	471,329.40	145,615.61	325,713.79	167,343.33	151,880.19	6,490.27	
23	1914	511,499.04	151,055.19	360,443.85	185,413.24	167,987.58	7,043.03	
24	1915	551,056.38	169,231.80	381,824.58	199,155.06	175,460.50	7,209.02	
25	1916	741,736.90	337,934.30	403,802.60	215,634.34	180,333.48	7,834.78	
26	1917	786,306.83	344,001.31	442,305.52	244,183.48	189,031.80	9,090.24	
27	1918	780,256.11	296,376.30	483,879.81	268,364.27	204,675.51	10,840.03	
28	1919	800,994.56	281,037.14	519,957.42	286,074.81	221,771.35	12,111.26	
29	1920	890,210.01	343,465.93	546,744.08	298,594.86	233,376.05	14,773.17	
30	1921	774,284.96	207,809.45	566,475.51	298,640.41	248,783.25	19,051.85	
31	1922	804,471.36	225,894.91	578,576.45	295,055.66	262,466.91	21,053.88	
32	1923	894,395.40	306,841.06	587,544.34	297,596.98	268,667.13	21,280.23	
33	1924	950,159.53	337,604.14	612,555.39	305,198.65	285,851.83	21,504.91	
34	1925	1,021,168.32	340,540.29	680,628.03	315,102.59	342,671.56	22,853.88	
35	1926	1,089,323.96	331,396.44	757,927.52	326,881.05	405,158.72	25,887.75	
36	1927	1,046,450.70	250,185.72	796,264.98	343,110.53	424,954.56	28,199.89	
37	1928	1,066,241.20	255,957.30	810,283.90	352,245.80	429,069.42	28,978.68	
38	1929	1,123,521.69	287,660.79	835,860.90	365,101.63	437,712.57	33,046.70	
39	1930	1,094,074.67	225,997.93	868,076.74	378,821.33	553,304.42	35,950.99	
40	1931	1,069,704.61	195,362.87	874,341.74	377,705.36	459,893.30	36,743.08	
41	1932	994,636.30	123,679.86	870,956.44	375,889.81	459,190.77	36,875.86	
42	1933	1,015,814.61	146,726.08	869,088.53	373,728.39	458,271.62	37,088.52	
43	1934	1,075,933.90	197,768.81	878,165.29	382,107.72	458,380.50	37,677.07	
44	1935	1,229,133.06	342,212.91	886,920.15	390,376.63	458,427.95	38,115.57	
45	1936	1,400,203.72	500,651.84	899,551.88	389,083.57	471,973.10	38,495.21	
46	1937	1,361,475.07	446,640.10	914,834.97	388,735.58	486,660.03	39,439.36	
47	1938	1,268,747.62	351,515.17	917,232.45	388,006.13	488,400.38	40,825.94	
48	Total annual accruals	27,404,259.85	8,116,906.20	19,287,353.66	9,036,462.49	9,590,502.52	660,388.84	
49	Add—Reserves acquired	2,389,561.09	136,809.23	2,252,751.86	1,696,405.95	416,235.61	140,110.30	
50	Total accruals and reserves acquired	29,793,820.94	8,253,715.43	21,540,106.51	10,732,868.44	10,006,737.93	800,499.14	

Summary of annual and accrued depreciation and depletion of gas plant in service (exclusive of distribution plant) as at Dec. 31, 1938—Con.

Line No.	Particulars	Total plant	Total depletable plant	Depreciable plant				Nondepreciable plant
				Total	Production plant	Transmission plant	General plant	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	Less—Retirement losses:							
51	Loss on retirements per books as reclassified	$4,653,815.77	$1,681,601.07	$2,972,214.70	$1,711,799.33	$1,133,907.21	$126,508.16	
52	Loss on retirements per examiners' adjusting entries	1,638,649.37	*40,265.57*	1,678,914.94	347,833.26	1,093,540.87	237,540.71	
53	Total retirement losses	6,292,465.14	1,641,335.50	4,651,129.64	2,059,632.59	2,227,448.18	364,048.87	
54	Total reserves for depletion and depreciation of gas plant in service, as adjusted Dec. 31, 1938	23,501,355.80	6,612,379.93	16,888,975.87	8,673,235.85	7,779,289.75	436,450.27	
	Net adjusted book cost, Dec. 31, 1938:							
55	Adjusted original book cost	51,207,620.64	9,956,363.62	40,967,035.24	16,352,699.25	23,702,486.14	911,849.85	$284,221.78
56	Adjusted depreciation reserves	23,501,355.80	6,612,379.93	16,888,975.87	8,673,235.85	7,779,289.75	436,450.27	
57	Net book cost	27,706,264.84	3,343,983.69	24,078,059.37	7,679,463.40	15,923,196.39	475,399.58	284,221.78

Italic figures denote decrease.

[Page 24 omitted.]

HOPE NATURAL GAS COMPANY

Schedule No. 2

Summary of Annual and Accrued Depletion Production Plant—Depletable Property as at Dec. 31, 1938

Line No.	Particulars (a)	Total (b)	Operated acreage (c)	Field line right-of-way and construction cost (d)	Gas well construction (e)	Cost of abandoning gas wells (f)
	Cost subject to depletion:					
1	Original charges per books	$10,990,583.23	$1,723,573.48	$4,089,799.13	$5,177,210.62	
2	Adjustments	694,604.21	267,904.31	707,834.98	*281,135.08*	
3	Adjusted total cost subject to depletion	11,685,187.44	1,991,477.79	4,797,634.11	4,896,075.54	
4	Less retirements	1,728,823.82	392.472.93	529,753.06	806.597.83	
5	Adjusted book cost, Dec. 31, 1938	9,956,363.62	1,599.004.86	4,267,881.05	4,089,477.71	
	Depletion, computed annually:					
6	Prior to 1913	973,743.15	262,458.92	395,208.33		$316,075.90
7	1913	145,615.61	37,119.67	60,189.61		48,306.33
8	1914	151,055.19	34,719.12	61,339.37		54,996.70
9	1915	169.231.80	38 706.49	67,275.55		63,249.76
10	1916	337,934.30	72,891.60	135,740.96		129.301.74
11	1917	344,001.31	66,277.40	149,985.00		127,738.91
12	1918	296,376.30	55,055.49	128,702.88		112,617.93
13	1919	281,037.14	46,793.12	132,796.32		101,447.70
14	1920	343,465.93	54,904.83	165,144.68		123,416.42
15	1921	207,809.45	30,363.83	103,907.84		73,537.78
16	1922	225,894.91	32,008.22	114,069.64		79,817.05
17	1923	306,841.06	29,669.55	118,047.24	82,321.65	76,802.62
18	1924	337,604.14	27,325.32	117,279.91	116,664.31	76,334.60
19	1925	340,540.29	20,620.93	112,355.97	143,454.36	64,109.03
20	1926	331,396.44	23,139.83	110,459.16	137,331.23	60,466.22
21	1927	250,185.72	16,314.45	84,074.17	107,747.47	42,049.63

Summary of Annual and Accrued Depletion Production Plant—Depletable Property as at Dec. 31, 1938—Continued

Line No.	Particulars	Total	Operated acreage	Field line right-of-way and construction cost	Gas well construction	Cost of abandoning gas wells
	(a)	(b)	(c)	(d)	(e)	(f)
	Depletion, computed annually—Continued.					
22	1928	$255,957.30	$18,067.46	$84,231.18	$105,548.54	$48,110.12
23	1929	287,660.79	23,504.77	96,699.61	110,588.29	56,868.12
24	1930	225,997.93	18,657.37	72,898.86	89,429.54	45,012.16
25	1931	195,362.87	16,550.67	65,728.81	71,477.85	41,605.54
26	1932	123,679.86	11,007.07	39,756.70	45,614.70	27,301.39
27	1933	146,726.08	11,573.17	49,444.63	55,076.56	30,631.72
28	1934	197,768.61	17,532.07	58,729.54	83,692.91	37,814.09
29	1935	342,212.91	30,253.68	92,860.63	165,335.81	53,762.79
30	1936	500,651.84	42,932.85	144,724.05	229,111.26	83,883.68
31	1937	446,640.10	40,703.86	131,847.14	198,255.61	75,833.49
32	1938	351,515.17	31,407.84	98,836.35	165,101.37	56,169.61
33	Total annual accruals to Dec. 31, 1938	8,116,906.20	1,110,559.58	2,992,334.13	1,906,751.46	2,107,261.03
34	Add—reserves acquired	136,809.23		136,809.23		
35	Total accruals and reserves acquired	8,253,715.43	1,110,559.58	3,129,143.36	1,906,751.46	2,107,261.03
	Less—Retirement losses:					
36	Loss on retirements per books as reclassified	1,681,601.07	392,472.93	482,530.31	806,597.83	
37	Loss on retirements per examiners' adjusting entries	*40,265.57*	*252,752.18*	212,486.61		
38	Total retirement losses	1,641,335.50	139,720.75	695,016.92	806,597.83	
39	Total reserves for depletion of gas plant in service, as adjusted, Dec. 31, 1938	6,612,379.93	970,838.83	2,434,126.44	1,100,153.63	2,107,261.03
	Net adjusted book cost, Dec. 31, 1938:					
40	Adjusted original book cost	9,956,363.62	1,599,004.86	4,267,881.05	4,089,477.71	
41	Adjusted depletion reserves	6,612,379.93	970,838.83	2,434,126.44	1,100,153.63	2,107,261.03
42	Net book cost	3,343,983.69	628,166.03	1,833,754.61	2,989,324.08	*2,107,261.03*

Italic figures denote decrease.

[Pages 26 to 33 omitted.]

Schedule No. 3

HOPE NATURAL GAS COMPANY

Annual and Accrued Depreciation Production Plant—Depreciable Property as at Dec. 31, 1938

Line No.	Particulars	Total	Structures	Field line material measuring and regulating station equipment	Gas well equipment	Drilling and cleaning equipment
	(a)	(b)	(c)	(d)	(e)	(f)
	Costs subject to depreciation:					
1	Original charges per books	$32,120,155.02	$259,355.32	$11,418,271.21	$16,175,156.74	$4,267,371.75
2	Adjustments by examiners	*283,903.35*	1,017.24	*209,962.42*	*283,095.55*	208,137.38
3	Adjusted total cost subject to depreciation	31,836,251.67	260,372.56	11,208,308.79	15,892,061.19	4,475,509.13
4	Less—Retirements	15,483,552.42	48,044.83	3,274,139.73	8,281,551.44	3,879,816.42
5	Adjusted book cost, Dec. 31, 1938	16,352,699.25	212,327.73	7,934,169.06	7,610,509.75	595,692.71
	Depreciation, computed annually		4.17%	2.22%	2.50%	
6	1898	28.26		28.26		See note
7	1899	477.70	2.20	170.45	305.05	
8	1900	1,963.44	6.04	946.12	1,011.28	
9	1901	3,216.56	11.18	1,752.98	1,452.40	
10	1902	17,191.25	76.98	8,720.27	8,394.00	
11	1903	36,022.27	154.67	17,329.48	18,538.12	
12	1904	46,582.69	190.07	21,948.52	24,444.10	
13	1905	53,956.10	210.38	24,343.14	29,402.58	
14	1906	58,051.47	210.79	24,548.96	33,291.72	
15	1907	64,795.93	219.26	26,935.22	37,641.45	
16	1908	73,144.76	250.16	30,556.08	42,338.52	
17	1909	84,605.82	265.00	34,562.60	49,778.22	
18	1910	106,454.35	297.65	43,536.18	62,620.52	
19	1911	131,564.19	393.90	54,009.69	77,160.60	
20	1912	150,256.49	487.01	59,132.43	90,637.05	

Annual and Accrued Depreciation Production Plant—Depreciable Property as at Dec. 31, 1938—Continued

Line No.	Particulars	Total	Structures	Field line material measuring and regulating station equipment	Gas well equipment	Drilling and cleaning equipment
	(a)	(b)	(c)	(d)	(e)	(f)
	Depreciation, computed annually—Con.					
21	1913	$167,343.33	$541.27	$62,017.56	$104,784.50	
22	1914	185,413.24	625.37	65,302.72	119,485.15	
23	1915	199,155.06	692.89	68,507.25	129,954.92	
24	1916	215,634.34	830.00	73,604.19	141,200.15	
25	1917	244,183.48	1,028.24	84,960.09	158,195.15	
26	1918	268,364.27	1,353.29	95,643.73	171,367.25	
27	1919	286,074.81	1,643.81	105,200.85	179,230.15	
28	1920	298,594.86	1,961.44	115,211.87	181,421.55	
29	1921	298,640.41	2,549.33	119,106.26	176,984.82	
30	1922	295,055.66	2,974.63	119,905.55	172,175.48	
31	1923	297,596.98	3,183.92	123,152.86	171,260.20	
32	1924	305,198.65	3,544.12	128,853.55	172,800.98	
33	1925	315,102.59	4,005.41	136,612.98	174,484.20	
34	1926	326,881.05	4,400.48	144,247.47	178,233.10	
35	1927	343,110.53	4,776.78	153,541.15	184,792.60	
36	1928	352,245.80	4,994.78	159,864.60	187,386.42	
37	1929	365,101.63	5,220.09	167,551.04	192,330.50	
38	1930	378,821.33	5,464.91	175,038.87	198,317.55	
39	1931	377,705.36	5,556.78	174,573.63	197,574.95	
40	1932	375,889.81	5,561.49	174,034.12	196,294.20	
41	1933	373,728.39	5,563.24	173,535.65	194,629.50	
42	1934	382,107.72	7,079.74	176,637.43	198,390.55	
43	1935	390,376.63	8,592.87	179,413.21	202,370.55	
44	1936	389,083.57	8,612.09	179,237.98	201,233.50	
45	1937	388,735.58	8,763.59	179,949.69	200,022.30	
46	1938	388,006.13	8,859.54	180,626.84	198,519.75	
47	Total annual accruals to Dec. 31, 1938	9,036,462.49	111,155.39	3,864,851.52	5,060,455.58	

48	Add—Reserves acquired	1,696,405.95	48,422.99	780,416.21	563,570.38	$303,996.37
49	Total accruals and reserves acquired	10,732,868.44	159,578.38	4,645,267.73	5,624,025.96	303,996.37
	Less—Retirement losses:					
50	Loss on retirements per books as reclassified	1,711,799.33	30,939.04	608,958.79	1,071,901.50	Note 1
51	Loss on retirements per examiners' adjusting entries	347,833.26	35,328.29	190,741.68	169,421.67	*47,658.38*
52	Total retirement losses	2,059,632.59	66,267.33	799,700.47	1,241,323.17	*47,658.38*
53	Total reserves for depreciation of production plant as adjusted, Dec. 31, 1938	8,673,235.85	93,311.05	3,845,567.26	4,382,702.79	351,654.75
	Net adjusted book cost, Dec. 31, 1938:					
54	Adjusted original book cost	16,352,699.25	212,327.73	7,934,169.06	7,610,509.75	595,692.71
55	Adjusted depreciation reserves	8,673,235.85	93,311.05	3,845,567.26	4,382,702.79	351,654.75
56	Net book cost—Production plant	7,679,463.40	119,016.68	4,088,601.80	3,227,806.96	244,037.96

Italic figures denote decrease.

NOTE.—Depreciation expense on drilling and cleaning equipment is distributed through clearing accounts. Therefore, it is not practicable to revise the company's depreciation accounting. This reserve balance is the same as shown on the company's records as at Dec. 31, 1938.

HOPE NATURAL GAS COMPANY

Annual and accrued depreciation transmission plant—as at Dec. 31, 1938

Line No.	Particulars	Total	Right-of-way and main line labor	Structures	Mains material and measuring and regulating station equipment	Compressor station equipment
	(a)	(b)	(c)	(d)	(e)	(f)
	Cost subject to depreciation:					
1	Original charges per books	$27,654,279.04	$5,787,107.56	$1,893,329.35	$10,378,015.97	$9,595,826.16
2	Adjustments by examiners	*889,079.68*	*467,733.56*	*269,165.84*	48,152.28	*200,334.56*
3	Adjusted total cost subject to depreciation	26,765,199.36	5,319,374.00	1,624,165.51	10,426,168.25	9,395,491.60
4	Less—Retirements	3,062,713.22	222,635.32	167,300.23	960,958.06	1,711,819.61
5	Adjusted book cost, Dec. 31, 1938	23,702,486.14	5,096,738.68	1,456,865.28	9,465,210.19	7,683,671.99
	Depreciation, computed annually		1.56%	2.50%	1.56%	2.56%
6	1898					
7	1899	163.94	142.38		21.56	
8	1900	1,347.54	629.24		718.30	
9	1901	2,363.46	954.84	1.48	1,407.14	
10	1902	7,356.05	1,558.94	334.35	5,462.76	
11	1903	22,918.82	4,769.87	948.92	17,200.03	
12	1904	42,869.33	11,141.71	923.52	29,474.14	1,329.96
13	1905	53,974.34	15,991.68	648.50	34,541.43	2,792.73
14	1906	58,913.81	17,337.11	1,180.02	35,093.23	5,303.45
15	1907	66,585.42	19,017.32	1,692.15	38,192.67	7,683.28
16	1908	71,284.39	20,852.93	1,757.88	40,736.61	7,936.97
17	1909	80,093.51	21,749.36	2,951.52	41,730.22	13,662.41
18	1910	100,021.94	24,339.01	4,844.05	48,158.79	22,680.09
19	1911	122,686.69	30,466.49	5,760.55	59,503.98	26,955.67

20	1912	136,578.60	34,900.13	6,272.85	66,029.70	29,375.92
21	1913	151,880.19	38,428.12	7,798.18	68,856.76	36,797.13
22	1914	167,987.58	42,063.61	9,350.70	72,204.02	44,369.25
23	1915	175,460.50	42,847.30	10,428.58	72,541.54	49,643.08
24	1916	180,333.48	43,333.82	10,898.55	72,327.82	53,773.29
25	1917	189,031.80	44,550.12	11,653.78	73,533.72	59,294.18
26	1918	204,675.51	45,327.83	13,788.25	75,857.75	69,701.68
27	1919	221,771.35	44,812.31	16,113.32	79,927.24	80,918.48
28	1920	233,376.05	42,719.63	18,702.89	80,502.02	91,451.51
29	1921	248,783.25	42,924.70	21,344.32	82,541.72	101,972.51
30	1922	262,466.91	44,898.09	22,604.56	86,828.16	108,136.10
31	1923	268,667.13	46,188.33	22,966.87	88,809.13	110,702.80
32	1924	285,851.83	49,896.19	23,963.23	95,317.45	116,674.96
33	1925	342,671.56	63,020.73	29,089.77	114,014.88	136,546.18
34	1926	405,158.72	73,861.54	37,024.63	128,507.67	165,764.88
35	1927	424,954.56	74,055.59	41,355.77	129,017.62	180,525.58
36	1928	429,059.42	74,214.46	42,554.32	129,428.10	182,862.54
37	1929	437,712.57	74,729.12	43,399.86	130,706.88	188,876.71
38	1930	453,304.42	75,457.66	44,764.50	132,458.90	200,623.36
39	1931	459,893.30	75,620.71	45,683.46	131,978.19	205,610.94
40	1932	458,190.77	75,476.72	45,700.37	132,859.57	204,154.11
41	1933	458,271.62	75,481.80	45,506.97	132,897.20	204,385.65
42	1934	458,380.50	75,485.75	45,447.46	132,945.73	204,501.56
43	1935	458,427.95	75,486.98	45,516.72	132,966.02	204,458.23
44	1936	471,973.10	80,625.03	45,274.13	139,717.87	206,356.07
45	1937	486,660.03	86,539.44	45,000.02	146,777.37	208,343.20
46	1938	488,400.38	87,322.17	44,921.20	146,989.64	209,167.37
47	Total annual accruals to Dec. 31, 1938	9,590,502.32	1,799,218.76	818,168.20	3,229,783.53	3,743,331.83
48	Add—Reserves acquired	416,235.61		90,220.83	39,552.03	286,462.75
49	Total accruals and reserves acquired	10,006,737.93	1,799,218.76	908,389.03	3,269,335.56	4,029,794.58

Annual and accrued depreciation transmission plant—as at Dec. 31, 1938—Continued

Line No.	Particulars	Total	Right-of-way and main line labor	Structures	Mains material and measuring and regulating station equipment	Compressor station equipment
	(a)	(b)	(c)	(d)	(e)	(f)
	Less—Retirement losses:					
50	Loss on retirements per books as reclassified	$1,133,907.21	$181,331.43	$127,049.06	$318,886.82	$506,639.90
51	Loss on retirements per examiners' adjusting entries	1,093,540.97	301,197.24	285,508.72	87,498.90	419,336.11
52	Total retirement losses	2,227,448.18	482,528.67	412,557.78	406,385.72	925,976.01
53	Total reserves for depreciation of transmission plant, as adjusted, Dec. 31, 1938	7,779,289.75	1,316,690.09	495,831.25	2,862,949.84	3,103,818.57
	Net adjusted book cost, Dec. 31, 1938:					
54	Adjusted original book cost	23,702,486.14	5,096,738.68	1,456,865.28	9,465,210.19	7,683,671.99
55	Adjusted depreciation reserves	7,779,289.75	1,316,690.09	495,831.25	2,862,949.84	3,103,818.57
56	Net book cost—Transmission plant	15,923,196.39	3,780,048.59	961,034.03	6,602,260.35	4,579,853.42

Italic figures denote decrease

HOPE NATURAL GAS COMPANY

Annual and accrued depreciation general plant—as at Dec. 31, 1938

Line No.	Particulars	Total	Structures and improvements	Office furniture and equipment	Other equipment	Communication system	Autos and trucks
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Cost subject to depreciation:						
1	Original charges per books	$2,499,217.28	$266,206.11	$326,735.16	$670,225.48	$290,453.28	$945,597.25
2	Adjustments by examiners	*521,191.25*	*36,717.52*	*61,505.98*	*354,366.85*	*0*	*68,800.92*
3	Adjusted total cost subject to depreciation	1,978,026.03	229,488.59	265,429.18	315,858.65	290,453.28	876,796.33
4	Less—Retirements	1,066,176.18	3,600.81	86,745.84	199,870.15	41,477.54	734,481.84
5	Adjusted book cost, Dec. 31, 1938	911,849.85	225,887.78	178,683.34	115,988.50	248,975.74	142,314.49
	Depreciation, computed annually		2.86% 1898-1929 2.17% 1930-1938	4.00%	3.57%	3.85%	
6	1898	16.49			16.49		
7	1899	33.24			33.24		See note.
8	1900	36.31			36.31		
9	1901	42.45			42.05	.40	
10	1902	280.88	.40	67.52	209.42	3.54	
11	1903	721.02	1.52	157.68	542.18	19.64	
12	1904	940.06	6.84	204.16	692.87	36.19	
13	1905	1,008.53	18.33	242.40	706.18	41.62	
14	1906	1,110.58	25.17	277.96	763.37	44.08	
15	1907	1,401.85	28.57	480.80	840.31	52.17	
16	1908	1,897.68	99.70	719.52	952.87	125.59	
17	1909	2,256.75	168.65	836.32	1,057.51	194.27	
18	1910	2,841.73	178.26	1,158.28	1,197.31	307.88	
19	1911	3,996.73	152.81	1,487.40	1,267.78	1,088.74	
20	1912	5,343.37	198.43	1,636.68	975.11	2,533.15	

Annual and accrued depreciation general plant—as at Dec. 31, 1938—Continued

Line No.	Particulars	Total	Structures and improvements	Office furniture and equipment	Other equipment	Communication system	Autos and trucks
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Depreciation, computed annually—continued.						
21	1913	$6,490.27	$283.63	$1,794.20	$780.58	$3,631.86	
22	1914	7,043.03	289.29	1,890.88	856.01	4,006.85	
23	1915	7,209.02	296.50	1,964.56	867.08	4,080.88	
24	1916	7,834.78	322.87	2,305.12	991.50	4,215.29	
25	1917	9,090.24	342.00	2,813.20	1,461.49	4,473.55	
26	1918	10,840.03	593.22	3,351.72	1,967.32	4,927.77	
27	1919	12,111.26	845.73	3,807.88	2,196.16	5,261.49	
28	1920	14,773.17	847.05	4,296.28	5,056.12	4,573.72	
29	1921	19,051.85	847.05	4,885.40	9,086.94	4,232.46	
30	1922	21,053.88	848.96	5,112.12	10,476.38	4,616.42	
31	1923	21,280.23	850.88	5,186.32	10,614.29	4,628.74	
32	1924	21,504.91	850.88	5,380.20	10,448.93	4,824.90	
33	1925	22,853.88	854.40	5,701.80	10,460.46	5,837.22	
34	1926	25,887.75	973.54	6,516.20	10,853.16	7,544.85	
35	1927	28,199.89	1,147.78	7,273.32	11,230.83	8,547.96	
36	1928	28,978.68	1,206.32	7,565.08	11,410.15	8,797.13	
37	1929	33,046.70	3,959.10	8,051.88	11,957.07	9,078.65	
38	1930	35,950.99	5,281.24	8,537.72	12,830.12	9,301.91	
39	1931	36,743.08	5,511.28	8,707.92	13,163.95	9,359.93	
40	1932	36,875.86	5,543.98	8,860.68	13,123.71	9,347.49	
41	1933	37,088.52	5,535.30	8,932.56	13,264.12	9,356.54	
42	1934	37,677.07	5,535.00	9,032.48	13,738.54	9,371.05	
43	1935	38,115.57	5,534.67	9,216.84	13,981.69	9,382.37	
44	1936	38,495.21	5,534.67	9,265.92	14,267.47	9,427.15	
45	1937	39,439.36	5,534.67	9,361.00	15,055.40	9,488.29	
46	1938	40,825.94	5,616.61	9,522.80	16,141.99	9,544.54	
47	Total annual accruals to Dec. 31, 1938	660,388.84	65,865.30	166,602.80	245,614.46	182,306.28	

48	Add—Reserve acquired	140,110.30	9,860.03	13,209.58	10,863.39	3,634.74	102,542.56
49	Total accruals and reserves acquired	800,499.14	75,725.33	179,812.38	256,477.85	185,941.02	102,542.56
	Less—Retirement losses:						
50	Loss on retirements per books as reclassified	126,508.16	3,522.81	55,023.13	60,752.89	7,209.33	See note.
51	Loss on retirements per examiners' adjusting entries	237,540.71	5,489.65	61,305.98	173,353.73	0	*2,608.65*
52	Total retirement losses	364,048.87	9,012.46	116,329.11	234,106.62	7,209.33	*2,608.65*
53	Total reserves for depreciation of general plant, as adjusted, Dec. 31, 1938	436,450.27	66,712.87	63,483.27	22,371.23	178,731.69	105,151.21
	Net adjusted book cost, Dec. 31, 1938:						
54	Adjusted original book cost	911,849.85	225,887.78	178,683.34	115,988.50	248,975.74	142,314.49
55	Adjusted depreciation reserves	436,450.27	66,712.87	63,483.27	22,371.23	178,731.69	105,151.21
56	Net book cost—General plant	475,399.58	159,174.91	115,200.07	93,617.27	70,244.05	37,163.28

NOTE.—Depreciation expense on autos and trucks and teaming is not distributed through clearing accounts. It is not considered necessary to revise the company's depreciation accounting. The reserve balance is the same as shown on the company's records as of Dec. 31, 1938.

Italic figures denote decrease.

HOPE NATURAL GAS COMPANY

Depreciation and Depletion Reserves, Per Books from Jan. 1, 1937, to Dec. 31, 1938

Plant accounts	Reserve balance Jan. 1, 1937	Provisions 1937		Reserve charges	Reserve balance Dec. 31, 1937	Provisions 1938		Reserve charges	Reserve balance Dec. 31, 1938	Transferred to new accounts as of Jan. 1, 1939		
		Rate	Amount			Rate	Amount			250-1	Other accounts	
											No.	Amount
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
Production system:												
Operated acreage	$418,197.54	Depletion	$58,465.39	$7,940.81	$468,722.12	Depletion	$30,722.15	$10,409.79	$489,034.48		250-2	$489,034.48
Unoperated acreage	231,589.64	8%	40,683.22	19,824.10	252,448.76	8%	40,678.77	61,828.01	231,299.52		250-3	231,299.52
Gas well equipment	5,393,989.67	Depletion	166,565.24	56,640.45	5,503,914.46	Depletion	86,716.27	[2] *2,485.79* 73,839.53	5,519,276.99	$5,519,276.99		
Gas well construction	2,357,360.29	Depletion	132,741.57	95,643.72	2,394,458.14	Depletion	74,045.35	127,406.38	2,341,097.11	2,341,097.11		
Other field investment	9,805,545.57	4%	[1] *100,598.87* 460,573.12	41,763.92	10,123,755.90	3%	342,977.93	84,991.74	10,381,742.09	10,381,742.09		
Leases and easements	456,930.39	4%	21,008.55	1,989.27	475,949.67	3%	15,828.17	2,729.83	489,048.01	489,048.01		
Total production system	18,663,613.10		779,438.22	223,802.27	19,219,249.05		590,968.64	358,719.49	19,451,498.20			
Transmission system:												
Equipment	16,628,078.28	3½%	[1] 100,598.87 844,990.69	156,788.06	17,416,879.78	3%	731,771.43	25,378.02	18,123,273.19	18,123,273.19		
Leases and easements	359,196.54	3½%	18,825.52	104.52	377,917.54	3%	16,458.98		394,376.52	394,376.52		
Total transmission system	16,987,274.82		964,415.08	156,892.58	17,794,797.32		748,230.41	25,378.02	18,517,649.71			

Distribution system:												
Equipment	1,165,152.03	3%	80,038.65	10,897.25	1,234,293.43	3%	81,737.72	18,043.52	1,297,987.63	1,297,987.63		
Leases and easements	7,146.44	3%	517.19	14.18	7,649.45	3%	529.78		8,179.23	8,179.23		
Total distribution system	1,172,298.47		80,555.84	10,911.43	1,241,942.88		82,267.50	18,043.52	1,306,166.86			
General property:												
General structures	89,824.01	3%	7,651.68		97,475.69	3%	7,742.55		105,218.24	105,218.24		
Office equipment	196,255.29	5%	11,641.96	3,915.33	203,981.92	5%	11,875.66	1,487.94	214,369.64	214,369.64		
Drilling and cleaning equipment	351,660.92	5%		16,068.52	335,592.40	5%		31,596.03	303,996.37	303,996.37		
Other	338,636.46	5%		1,662.52	336,973.94	2%	9,020.02	3,846.95	342,147.01	342,147.01		
Teaming	50,859.39	12½%		5,643.21	45,216.18	5%	3,177.63	6,372.83	42,020.98	42,020.98		
Telephone and telegraph lines	244,521.06	5%		171.89	244,349.17	5%		211.43	244,137.74	244,137.74		
Autos and trucks	87,574.35	25%	26,191.45	16,540.77	97,225.03	25%	21,873.94	16,556.41	102,542.56	102,542.56		
Total general property	1,359,331.48		45,485.09	44,002.24	1,360,814.33		53,689.80	60,071.59	1,354,432.54			
Cost of abandoning	2,316.58	(2)	73,000.00	72,848.07	2,468.51	(2)	82,700.00	82,166.93	3,001.58	3,001.58		
Contracts for gas						Depletion	813.44		813.44		251	813.44
Surplus property available for sale	67,193.85	5%	6,631.20		73,825.05	5%	6,631.20		80,456.25		253	80,456.25
Patents, rights, and licenses							6,611.56	6,611.56				
Miscellaneous—Clarksburg Light & Heat Co.	35,950.46	5%	4,740.72		40,691.18	5%	4,740.72		45,431.90		258–6	45,431.90
Total	38,287,978.76		1,954,266.15	508,456.59	39,733,788.32		1,576,653.27	550,991.11	40,759,450.48	39,912,414.89		847,035.59

[1] To transfer portion of reserve from reserve for other field investment to reserve for equipment—Transmission system, to correspond with transfer of investment between these accounts.

[2] Estimated cost of abandoning expense for the year. [3] Reserves acquired.

Italic figures denote decrease.

HOPE NATURAL GAS COMPANY

Total loss on property retired, per books, as reclassified by the Company by years 1898 to 1938, inclusive, showing examiners' adjustments as at Dec. 31, 1938, from original cost study

Account	Total 1898–1938 per books reclassified	Examiners' adjustments	Total charges to adjusted depreciation and depletion reserves	Reference to— Examiners' schedule No. column	Reference to— Company exhibit No. 24 table	Remarks
(a)	(b)	(c)	(d)	(e)	(f)	(g)
Production plant:						
Rights-of-way and field line labor	$482,530.31	$212,486.61	$695,016.92	2 (d)	H	
Operated acreage	392,472.93	*252,752.18*	139,720.75	2 (c)		
Gas well construction [1]	774,448.31	32,149.52	806,597.83	2 (e)		
Structures	30,939.04	35,328.29	66,267.33	3 (c)	G	
Field line material, measuring, and regulating station equipment	608,958.79	190,741.68	799,700.47	3 (d)	H	
Gas well equipment	1,071,901.50	169,421.67	1,241,323.17	3 (e)		
Drilling and cleaning equipment [2]	234,811.04	*47,658.38*	*47,658.98*	3 (f)		
Total	3,596,061.92	339,717.21	3,700,968.09			
Transmission plant:						
Rights-of-way and main line labor	181,331.43	301,197.24	482,528.67	4 (c)	J	
Structures	127,049.06	285,508.72	412,557.78	4 (d)	I	
Main line material, measuring and regulating station equipment	318,886.82	87,498.90	406,385.72	4 (e)	J	
Compressor stations	506,639.90	419,336.11	925,976.01	4 (f)	K	
Total	1,133,907.21	1,093,540.97	2,227,448.18			
General plant:						
Structures and improvements	3,522.81	5,489.65	9,012.46	5 (c)	L	
Office furniture and equipment	55,023.13	61,305.98	116,329.11	5 (d)	M	
Other equipment	60,752.89	173,353.73	234,106.62	5 (e)	N	
Telephone and telegraph system [3]	*6,247.49*	13,456.82	7,209.33	5 (f)		

Teaming [2]	168,805.54			5	(g)		
Autos and trucks [2]	424,224.14	*2,608.65*	*2,608.65*	5	(g)		
Total	706,081.02	250,997.53	364,048.87				
Total production, transmission and general (schedule 1, line 53)	5,436,050.15	1,684,255.71	6,292,465.14				
Reconciliation to Exhibit 24, table B, column 2:							
Deduct retirement losses on:							
Gas well construction	774,448.31						
Gas well equipment	1,071,901.50						
Operated acreage	392,472.93						
Drilling and cleaning equipment	234,811.04						
Telephone and telegraph system	*6,247.49*						
Teaming	168,805.54						
Autos and trucks	424,224.14						
Total of above	3,060,415.97						
Total per Exhibit 24, table B, column 2	2,375,634.18						

[1] In order to set up retired gas wells by production areas the examiners went through the gas well ledgers, listing the capitalized construction cost of each retired well which resulted in the amount of $806,597.83.

[2] Depreciation reserve not adjusted for teaming, autos and trucks, drilling and cleaning equipment. The retirements, per books, are not shown on the examiners' schedules for these items, hence the total retirement losses amount to $7,120,305.86 as follows:

Total, column (d)	$6,292,465.14
Drilling and cleaning equipment	234,811.04
Teaming	168,805.54
Autos and trucks	424,224.14
Total	7,120,305.86

[3] The total loss on property retired from 1898 to 1938 shows a credit of $6.247.49, as a result of a credit made to the depreciation reserve on voucher A-168, 1921, in the amount of $13,465.82 for an adjustment of telephone lines. It is the opinion of the examiners that the costs adjusted by vouhcer A-168 were originally charged to maintenance rather than to plant, and, consequently, the adjustment should be a credit to surplus rather than the depreciation reserve.

Italic figures denote decrease.

[Pages 39 to 40 omitted.]

1 EXHIBIT NO. 89.—ESTIMATED COST OF ABANDONING, F. P. C. WITNESS DUNN

Property classification	Gross retirement	Deferred retirement	Total retirements	Cost of abandoning	
				Rate	Amount
Production system structures	$48,044.83	$35,328.29	$83,373.12	10	$8,337.31
Field-line material	3,274,139.73	190,741.68	3,464,881.41	19.67	681,542.17
Gas-well equipment					
Transmission right-of-way and labor transmission structures	167,300.23	285,508.72	452,808.95	10	45,280.90
Transmission main maintenance, M. & R. station equipment	960,958.06	87,498.90	1,048,456.96	19.97	209,376.85
Compressor station equipment	1,711,819.61	419,336.11	2,131,155.72	10	213,115.57
General structures	3,600.81	5,489.65	9,090.46	10	909.05
Communication equipment	41,477.54		41,477.54	10	4,147.75
	6,207,340.81	1,023,903.35	7,231,244.16		1,162,709.60

EXHIBIT NO. 124.—COMPARISON OF COMPANY'S AND F. P. C. EXAMINERS' CLAIMS AS TO COST OF PRODUCTION, TRANSMISSION, AND GENERAL PLANT AS OF DEC. 31, 1938, HOPE WITNESS SULLIVAN

Account No.	Description	Company's reproduction cost (from exhibits 16, 21, 22, 36, 37, 38, and 39)			Company's original cost (from exhibit 20)	Company's original cost trended to 1938 prices (from exhibit 20)	F. P. C. examiners' adjusted book cost (from exhibits 57, 61, 62, and 90)		
		New	Percent condition	Less depreciation			Adjusted book cost	Net book cost	
								Percent of adjusted book cost	Amount
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Natural gas production plant:								
330-1	Natural gas producing lands	$2,275	100.0	$2,275	$2,370	$2,370	$3,320	100.0	$3,320
330-2	Natural gas producing leaseholds:								
	Operated acreage	1,684,636	28.6	482,311	1,684,636	1,684,636	1,599,005	39.3	628,166
	Unoperated acreage	681,882	100.0	681,882	681,882	681,882	[1] 584,382	100.0	[1] 584,382
330-5	Other land and land rights	21,045	100.0	21,045	22,126	22,126	21,008	100.0	21,008
	Production structures:								
331-1	Gas well structures	11,912	56.0	6,671					
331-2	Field measuring and regulating station structures	58,222	51.0	29,693	40,773	41,799	21,139	56.1	119,017
331-3	Other production system structures	374,267	57.0	213,332	291,872	348,145	191,189		
	Total production structures	444,401	56.2	249,696	332,645	389,944	212,328	56.1	119,017
	Gas wells:								
332-1	Producing gas wells—well construction	19,321,139	31.3	6,047,517	17,783,637	34,384,320	4,089,478	73.1	2,989,324
332-2	Producing gas wells—well equipment	10,874,199	56.4	6,133,048	8,168,192	10,663,983	7,610,510	42.4	3,227,807
	Cost of abandoning wells								*2,107,861*
	Total gas wells	30,195,338	40.3	12,180,565	25,951,829	45,048,303	11,699,988	35.1	4,109,870

[1] F. P. C. Exhibit No. 90 includes "6% interest on unoperated acreage" applied to this amount in examiners' rate adjustments.

Italic figures denote decrease.

	Field line right of way and construction costs:								
330-4	Rights of way	772,814	100.0	772,814	701,556	701,556	645,391	43.0	1,833,754
333-11	Field lines—construction	8,841,306	70.7	6,247,131	4,056,915	7,010,622	3,622,489		
	Total field line right of way and construction costs	9,614,120	73.0	7,019,945	4,758,471	7,712,178	4,267,880	43.0	1,833,754
	Field line material:								
333-12	Field lines—equipment	8,441,006	77.5	6,541,780	8,244,966	10,455,671	7,674,252	51.5	4,088,602
333-2	Field measuring and regulating station equipment	307,222	79.0	242,705	267,099	284,212	184,385		
337	Other production equipment	112,910	72.0	81,295	89,102	105,335	75,532		
	Total field line material	8,861,138	77.5	6,865,780	8,601,167	10,845,218	7,934,169	51.5	4,088,602
334	Drilling and cleaning equipment	1,028,888	73.0	751,088	604,936	601,353	595,693	41.0	244,038
	Total natural gas production plant	52,533,723	53.78	28,254,587	42,640,062	66,988,010	26,917,773	43.21	11,632,157
2	Transmission Plant:								
351-12	Land	155,842	100.0	155,842	164,105	164,105	162,912	100.0	162,912
	Transmission structures:								
352-2	Compressor station structures	1,957,473	72.0	1,409,381	1,725,945	2,380,293	1,441,883	66.0	961,034
352-3	Measuring and regulating station structures	14,842	59.0	8,757	11,988	17,955	8,207		
352-4	Other transmission system structures	12,507	70.0	8,755	11,509	12,865	6,776		
	Total transmission structures	1,984,822	71.9	1,426,893	1,749,442	2,411,113	1,456,866	66.0	961,034
	Transmission mains:								
351-23	Rights-of-way	554,352	100.0	554,352	442,394	442,394	391,243	71.3	10,382,309
353	Mains	16,500,288	79.0	13,035,228	15,180,596	22,581,997	14,132,075		
354-3	Measuring and regulating station equipment	30,731	73.0	22,434	26,713	41,021	17,616		
354-4	Other transmission system equipment	30,795	73.0	22,480	23,042	26,049	21,015		
	Total transmission mains	17,116,166	79.7	13,634,494	15,672,745	23,091,461	14,561,949	71.3	10,382,309
354-2	Compressor station equipment	9,874,271	81.0	7,998,160	8,313,531	11,095,337	7,683,672	59.6	4,579,854
	Total transmission plant	29,131,101	79.69	23,215,389	25,899,823	36,762,016	23,865,399	67.40	16,086,109
	General Plant:								
370	Land and land rights	75,018	100.0	75,018	98,188	98,188	96,981	100.0	96,175
371	Structures and improvements	297,298	73.0	217,028	274,427	306,129	225,888	70.5	159,981

EXHIBIT NO. 124.—COMPARISON OF COMPANY'S AND F. P. C, EXAMINERS' CLAIMS AS TO COSTS OF PRODUCTION, TRANSMISSION, AND GENERAL PLANT AS OF DEC. 31, 1938, HOPE WITNESS SULLIVAN—CONTINUED

Account No.	Description	Company's reproduction cost (from exhibits 16, 21, 22, 36, 37, 38, and 39)			Company's original cost (from exhibit 20)	Company's original cost trended to 1938 prices (from exhibit 20)	F. P. C. examiners' adjusted book cost (from exhibits 57, 61, 62, and 90)		
		New	Percent condition	Less depreciation			Adjusted book cost	Net book cost	
								Percent of adjusted book cost	Amount
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
372	Office furniture and equipment	$210,047	70.0	$147,033	$195,911	$217,548	$178,684	64.5	$115,200
373	Transportation equipment	166,990	56.0	93,514	148,540	151,163	142,314	26.1	37,163
378	Communication equipment	419,860	68.0	285,505	347,639	394,638	248,976	28.2	70,244
	Other equipment:								
374	Stores equipment	10,304	75.0	7,728	9,466	10,514	5,107		
375	Shop equipment	189,110	77.0	145,615	114,706	166,830	104,185		
376	Laboratory equipment	3,971	85.0	3,375	1,070	1,070	1,003	80.7	93,618
377	Tools and work equipment	5,365	85.0	4,560	4,634	4,634	4,545		
379	Miscellaneous equipment	1,488	75.0	1,116	1,172	1,172	1,148		
	Total other equipment	210,238	77.2	162,394	131,048	184,220	115,988	80.7	93,618
	Total general plant	1,379,451	71.08	980,492	1,195,753	1,351,886	1,008,831	56.74	572,381
	Undistributed construction costs	14,296,099	76.34	10,913,139	(Incl. Above)	(Incl. Above)			
	Total exclusive of working capital	97,340,374	65.09	63,363,607	69,735,638	105,101,912	51,792,003	54.62	28,290,647
	Working capital including materials and supplies	2,997,230		2,997,230	2,997,230	2,997,230	2,100,000		2,100,000
	Total	100,337,604	66.14	66,360,837	72,732,868	108,099,142	53,892,003	56.39	30,390,647

1 EXHIBIT NO. 142.—COMPARISON OF DEPRECIATION AND RETURN RESULTING FROM RHODES AND FRENCH DEPRECIATION RATES, F. P. C. WITNESS DUNN

Classification	Original cost plant account balances at 12-31-38	Average dollar years 1898-1938	Rates of depreciation			Difference in net property	6% return on difference in reserve balance	Difference in depreciation expense	Difference in expense and return
			French rate	Rhodes rate	Difference in rates				
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Production plant:			*Percent*	*Percent*	*Percent*				
R-of-W and field line labor	$4,267,881.05	$69,873,412.65	Depl.	2.04					
Structures	212,327.73	2,665,592.62	4.17	4.52	(.35)	$(9,330)	$(560)	$743	$183
Field line material, M. & R. sta. equip	7,934,169.06	174,092,406.61	2.22	2.04	.18	313,366	18,802	(14,282)	4,520
Operated acreage	1,599,004.86	32,075,770.78	Depl.	Depl.					
Gas well equipment	7,610,509.75	202,418,225.61	2.50	Depl.					
Gas well construction	4,089,477.71	47,976,891.15	Depl.	Depl.					
Drill and cleaning equip	595,692.71	15,501,695.53							
Total	26,309,062.87						18,242	(13,539)	4,703
Transmission plant:									
R-of-Way and main line labor	5,096,738.68	114,714,564.66	1.56	1.28	.28	321,201	19,272	(14,271)	5,001
Structures	1,456,865.28	31,436,895.95	2.50	2.64	(.14)	(44,012)	(2,641)	2,040	(601)
Mains material, M. & R. sta. equip	9,465,210.19	207,037,410.48	1.56	1.28	.28	579,705	34,782	(26,503)	8,279
Compressor sta. equip	7,683,671.99	140,328,446.29	2.56	1.76	.80	1,122,628	67,358	(61,469)	5,889
Total	23,702,486.14	493,517,317.38					118,771	(100,203)	18,568

EXHIBIT NO. 142.—COMPARISON OF DEPRECIATION AND RETURN RESULTING FROM RHODES AND FRENCH DEPRECIATION RATES, F. P. C. WITNESS DUNN—Continued

Classification	Original cost plant account balances at 12-31-38	Average dollar years 1898-1938	Rates of depreciation			Difference in net property	6% return on difference in reserve balance	Difference in depreciation expense	Difference in expense and return
			French rate	Rhodes rate	Difference in rates				
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
General:			*Percent*	*Percent*	*Percent*				
Structures and improvements	$225,887.78	$2,854,735.82	[1] 2.31	2.59	(.28)	$(7,993)	$(480)	$632	$152
Office furniture and equip	178,683.34	4,165,073.61	4.00	3.41	.59	24,574	1,474	(1,054)	420
Other equipment	115,988.50	6,879,956.99	3.57	3.29	.28	19,264	1,156	(325)	831
Communication equip	248,975.74	4,735,229.42	3.85	4.00	(.15)	(7,103)	(426)	373	(53)
Teaming									
Autos and trucks	142,314.49	2,820,649.96							
Total	911,849.85						1,724	(374)	1,350
Grand total	50,923,398.86					2,312,300	138,737	(114,116)	24,621

[1] $\frac{65,865.30}{2,854,736}$=2.31 percent average annual rate.

Sources of figures:

Column (b), Exhibit 76, page 6, Column (b).
Column (c), Examiners' work papers supporting Exhibit 61.
Column (d), Exhibit 65, pages 36, 37, and 38.
Column (e), Exhibit 24, Table A, page 19.

Explanations:

Figures in () in Column (g) indicate lower rate due to increase in reserve balance.
Figures in () in Column (h) indicate amount available for reduction due to decrease in rate base at 6 percent rate of return.
Figures out of () in Column (i) indicate increase in expense due to increase in depreciation rate, and consequently a decrease in amount available for reduction.
Figures out of () in Column (j) indicate decrease in amount available for reduction due to all factors involved in change of depreciation rate.

2 Docket G-113

HOPE NATURAL GAS COMPANY

Comparison of depletion and return—Operated leaseholds

Line No.	Operated leaseholds (a)	F. P. C. examiners' accounting method (b)	Rhodes' percent condition method (c)	Increased cost as recommended by F. P. C. examiners (d)
1	Original cost as at Dec. 31, 1938	$1,599,005	$1,684,636	
2	Accrued depletion as at Dec. 31, 1938	970,839	1,202,325	
3	Net original cost as at Dec. 31, 1938	628,166	482,311	$145,855
4	6% return on net original cost	37,690	28,939	8,751
5	Depletion expense—average 1937-40	41,492	26,069	15,423
6	Amount of depletion and return	79,182	55,008	24,174

Source of figures:

	Exhibit	Page
Line 1, column (b)	61	25
Line 1, column (c)	37	50
Line 2, column (b)	61	25
Line 2, column (c)	Line 1 minus line 3.	
Line 3, column (b)	61	25
Line 3, column (c)	37	46
Line 5, column (b)	78	54
Line 5, column (c)	126	1

1 **EXHIBIT NO. 118.—ESTIMATED CAPITAL EXPENDITURES FOR PRODUCTION SYSTEM, TRANSMISSION SYSTEM, AND GENERAL PLANT DURING THE YEARS 1941–1943, INCLUSIVE, HOPE WITNESS TONKIN**

Summary of estimated capital expenditures for production system, transmission system, and general plant during years 1941 to 1943, inclusive

Item	1941	1942	1943	Total 1941–43
(1)	(2)	(3)	(4)	(5)
Production system	1, 479, 000	1, 745, 000	1, 435, 000	4, 659, 000
Transmission system	1, 394, 500	785. 000	1, 803, 000	3, 982, 500
General plant	100, 000	105, 000	110, 000	315, 000
Total	2, 973, 500	2, 635, 000	3, 348, 000	8, 956, 500

[Pages 2 to 4 omitted.]