1-8-85

Phila

RQS

Q. IR-OCA-11-9. Please provide any and all analyses which support the appropriateness of the Company's present rate blockings for Rates R and RH.

A. IR-OCA-11.9. Rate R has a single price block in the eight winter months and two price blocks in the four summer months - 0 to 500 kWh and over 500 kWh. The average monthly use of Rate R customers is approximately 500 kWh. Use in excess of this amount in the summer months is likely be air cooling load; therefore, the price for use in excess of 500 kWh is set at a higher value to send appropriate price signals to the customer.

Rate RH customers are similar to Rate R customers except that they use electric energy for space heating. The same pricing blocking as for Rate R is appropriate except for the use in excess of 500 kWh in the eight winter months. It is likely that such use is for electric space heating; therefore the price in this block must be set lower to reflect the lower unit cost to serve the Rate RH customers.

Responsible Witness: R. C. Williams, Manager, Rate Division

1-8-85

Phila.

IR-OCA-23-6

Please provide the date of construction permits, by month and year, for each unit in the sample which received its permit in 1972, 1973, and 1974.

Answer

Unit	Construction Permit Date
Farley 1	August 1972
Farley 2	August 1972
Fermi 2	September 1972
Hatch 2	December 1972
Arkansas Nuclear One 2	December 1972
Midland 1	December 1972
Midland 2	December 1972
Watts Bar 1	January 1973
Watts Bar 2	January 1973
McGuire 1	February 1973
McGuire 2	February 1973
Summer	March 1973
WPPSS 2	March 1973
Shoreham	April 1973
LaSalle 1	September 1973
LaSalle 2	September 1973
San Onofre 2	October 1973
San Onofre 3	October 1973
Susquehanna 1	November 1973
Susquehanna 2	November 1973
Beaver Valley 2	May 1974
Vogtle 1	June 1974
Vogtle 2	June 1974
Limerick 1	June 1974
Limerick 2	June 1974
Nine Mile Point 2	June 1974
Millstone 3	August 1974
Grand Gulf 1	September 1974
Grand Gulf 2	September 1974
Hope Creek	November 1974
Waterford 3	November 1974
Comanche Peak 1	December 1974
Comanche Peak 2	December 1974
Bellefonte 1	December 1974
Bellefonte 2	December 1974

Responsible Witness: Dr. Lewis J. Perl
National Economic Research Associates, Inc.

1-8-85

Plib

LIMERICK INTERROGATORIES
SET XXIII
CORRECTIONS TO ADDENDUM TO TESTIMONY OF LEWIS J. PERL

In the course of responding to the interrogatories, we uncovered errors in estimating costs for four plants in the data base. These included Susquehanna 2, St. Lucie 2, Grand Gulf 1 and McGuire 2. We have corrected these values and reestimated the equation. The effect of these corrections is to lower Limerick 1's predicted capital cost and the average standardized capital cost to $2,752 and $2,791 per kilowatt from the original addendum figures of $2,818 and $2,860 per kilowatt, respectively. Thus, the ratio of Limerick 1's actual cost to predicted cost is 1.042 and the ratio of the actual cost to the standardized cost is 1.028. The revised equation and the standardized values for each comparison plants are attached.

The sources of the errors which we corrected are as follows. First, for Susquehanna the estimates in the September 1985 survey reflect a 50-50 split of common between units 1 and 2. In the original addendum we used the revised figures for Susquehanna 2 but retained the original figures for Susquehanna 1 resulting in an overall estimate for the plant which was too high. We have modified this to use the September 1985 TVA values for the Susquehanna plant, but in splitting costs between units 1 and 2, we reallocated costs to include 100 percent of common with unit 1.

The other changes are all more minor. For McGuire we used an incorrect on-line date (February 1986) in the original analysis. Correcting this to February, 1984 raised costs from $798 to $857 per kW. For St. Lucie, the costs were reported as $1,747 but should be $1,778 and for Grand Gulf costs were reported as $2,100 but should be $2,155.

The following interrogatory responses use the amended data. The new addendum equation is attached.

NUCLEAR CAPITAL COSTS FOR POST-1971 PLANTS
STANDARDIZED TO LIMERICK 1
(Without Limerick Plant, with Construction Permit Date variable)

Plant	Actual Direct Cost	Standardized Direct Cost
	(1984 $/kW)	
St. Lucie 2	1778	1897
Hatch 2	952	1929
Hope Creek	3254	2072
Arkansas Nuclear One 2	922	2195
McGuire	896	2289
Clinton 1	3071	2399
LaSalle	1328	2462
Palo Verde	1852	2470
Perry	1727	2474
Braidwood	1366	2475
Marble Hill	1700	2488
Wolf Creek	2020	2558
Callaway	2062	2583
Summer	1557	2603
Farley	1312	2615
Susquehanna	1774	2622
Waterford 3	2524	2718
Millstone 3	2714	2748
Commanche	1814	2753
Riverbend	3424	2760
WPPSS 2	3029	2800
Catawba	1404	2840
Byron	1561	2866
Limerick 1	2868	2868
Nine Mile Point 2	3804	2869
Beaver Valley 2	3457	2889
San Onofre	2022	2892
Grand Gulf	1898	2930
Seabrook	2455	2940
South Texas	2449	2995
Bellafonte	1559	3075
Shoreham	4378	3249
Fermi 2	3076	3337
Harris	2128	3340
Watts Bar	1447	3477
Midland	2454	3595
Vogtle	2915	3915
Average, Excluding Limerick 1	2035	2791

UPDATED NUCLEAR CAPITAL COST REGRESSION BASED ON TVA 85 DATA
BASED ON POST-71 CPD UNITS W/OUT LIM PLANT
WITH CPD7273, NO COOL

13:50 TUESDAY, DECEMBER 24, 1985

VARIABLE: LNCOSTR4 LOG OF COST PER KW IN 1984 DOLLARS

CE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
L	7	7.565413	1.080773	32.602	0.0001
R	49	1.624355	0.033150		
TAL	56	9.189767			

ROOT MSE	0.182072	R-SQUARE	0.8232
DEP MEAN	7.538263	ADJ R-SQ	0.7980
C.V.	2.4153		

ABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	STANDARDIZED ESTIMATE	VARIABLE LABEL
RCEP	1	7.883812	0.053180	148.247	0.0001	0.000000	INTERCEPT
SO	1	-0.395570	0.052069	-7.597	0.0001	-0.483323	SUBSEQUENT UNIT INDICATOR
ROCK	1	-0.169488	0.057939	-2.925	0.0052	-0.205444	COMPOSITE ROCK FOUND. INDICATOR
BWR	1	0.286621	0.083591	3.429	0.0012	0.234289	SINGLE UNIT BWR INDICATOR
IND	1	0.248043	0.154248	1.608	0.1142	0.108562	LOG OF MEANS WAGE INDEX
ST	1	0.217896	0.072351	3.012	0.0041	0.197880	NORTHEAST INDICATOR
CMX	1	-0.224581	0.061516	-3.651	0.0006	-0.240759	UTILCON VAR ONLY FOR TVA,DUKE,COMM UNITS
7273	1	-0.199636	0.051461	-3.879	0.0003	-0.237282	

BS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
1	SANONO2	7.806	7.736	0.069230
2	SANONO3	7.371	7.341	0.030178
3	MILLSTN3	7.906	7.907	-.001219
4	FERMI2	8.031	7.838	0.192881
5	SHORHAM	8.384	8.218	0.166178
	NINEMPT2	8.244	8.202	0.041833
	WATTSBR	7.412	7.232	0.179575
8	WATTSBR	7.122	6.837	0.285645
9	WPPSS2	8.016	7.999	0.017403
10	FARLEY1	7.227	7.438	-.211393
11	FARLEY2	7.130	7.043	0.087148
12	PALOV1	7.651	7.896	-.244696
13	PALOV2	7.453	7.500	-.047327
14	PALOV3	7.455	7.500	-.044961
15	HARRIS1	7.960	7.616	0.343983
16	HARRIS2	7.238	7.221	0.017087
17	PERRY1	7.659	7.732	-.073479
18	PERRY2	7.197	7.337	-.140040
19	BRAIDWD	7.398	7.504	-.105584
20	BRAIDWD	7.002	7.108	-.105793
21	BYRON1	7.549	7.487	0.062601
22	BYRON2	7.109	7.091	0.018446
23	LASALL1	7.400	7.474	-.073458
24	LASALL2	6.928	7.078	-.150415

UPDATED NUCLEAR CAPITAL COST REGRESSION BASED ON TVA 85 DATA
BASED ON POST-71 CPD UNITS W/OUT LIN PLANT
WITH CPD7273, NO COOL

13:50 TUESDAY, DECEMBER 29, 1985

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
25	MIDLAND1	7.963	7.721	0.242066
26	MIDLAND2	7.618	7.326	0.291987
27	MARBHIL	7.676	7.703	-.026382
28	MARBHIL	7.126	7.307	-.181360
29	CATAWBA	7.438	7.391	0.047695
30	CATAWBA	7.010	6.995	0.015284
31	MCGUIRE1	6.841	7.191	-.350107
32	MCGUIR2	6.753	6.795	-.042045
33	BEAVRVL2	8.148	8.099	0.048650
34	STLUC1E2	7.483	7.855	-.372162
[redacted]	HATCH2	6.858	7.214	-.355336
[redacted]	CLINTON1	8.030	8.167	-.137352
37	WOLFCRK	7.611	7.684	-.072867
38	GRAGULF1	7.676	7.677	-.001037
39	GRAGULF2	7.404	7.281	0.122627
40	SUSQUE1	7.689	7.700	-.011321
41	SUSQU2	7.218	7.305	-.086872
42	SEABRK1	7.921	7.933	-.011825
43	SEABRK2	7.676	7.537	0.138512
44	HOPECRK	8.088	8.372	-.283931
45	SUMMER	7.351	7.406	-.055541
46	COMANCH	7.743	7.666	0.077813
47	COMANCH	7.186	7.270	-.083502
48	BELLAF1	7.480	7.431	0.048728
49	BELLAF2	7.205	7.036	0.169828
50	CALLAWY	7.632	7.695	-.063106
51	SOTEX1	8.089	7.869	0.220277
52	SOTEX2	7.401	7.474	-.072119
53	VOGTLE1	8.151	7.805	0.346356
54	VOGTLE2	7.768	7.409	0.358832
55	RIVBND	8.138	8.135	0.002988
56	ARKONE2	6.827	7.053	-.225808
[redacted]	WATERFD3	7.834	7.846	-.012427

SUM OF RESIDUALS 7.90479E-13
SUM OF SQUARED RESIDUALS 1.624355

1-8-85

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RGS

IR-OCA-23-4

Concerning Schedule 20, please provide the results of the regression shown on page 3 of 4 without the Construction Permit received in 1972-1973 Indicator. If such a run has not been done, please do so. In answering this question, please provide the results of all statistical tests performed, including a listing of the predicted values and/or residuals from the regression for each unit in the sample. Please calculate the excess cost percentage for Limerick from this run (i.e. Limerick's actual cost/predicted cost and actual cost/standardized cost).

Answer

Attachment IR-OCA-23-4 contains the results of the regression equation without the Construction Permit received in 1972-1973 variable. This attachment also contains a listing of the actual value, the predicted value and the residual for each unit included in the regression. Based on this regression the predicted cost is $2,626 and the ratio of Limerick's actual cost to the predicted cost is 1.092. The average standardized cost based on this regression is $2,675 and the ratio of Limerick's actual cost to the average standardized cost is 1.072.

Responsible Witness: Dr. Lewis J. Perl
National Economic Research Associates, Inc.

EP VARIABLE: LNCOST84 LOG OF COST PER KW IN 1984 DOLLARS

OURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
ODEL	6	7.066529	1.177755	27.735	0.0001
RROR	50	2.123238	0.042465		
TOTAL	56	9.189767			

ROOT MSE	0.206070	R-SQUARE	0.7690
DEP MEAN	7.538263	ADJ R-SQ	0.7412
C.V.	2.733651		

ARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > ITI	STANDARDIZED ESTIMATE	VARIABLE LABEL
NTERCEP	1	7.817352	0.056981	137.192	0.0001	0.000000	INTERCEPT
UBSQ	1	-0.413051	0.058711	-7.035	0.0001	-0.504681	SUBSEQUENT UNIT INDICATOR
ARROCK	1	-0.145564	0.065209	-2.232	0.0301	-0.176485	COMPOSITE ROCK FOUND. INDICATOR
INGBWR	1	0.262430	0.094396	2.782	0.0076	0.214515	SINGLE UNIT BWR INDICATOR
NWAIND	1	0.248318	0.174578	1.422	0.1611	0.108683	LOG OF MEANS WAGE INDEX
EAST	1	0.213848	0.081878	2.612	0.0119	0.194203	NORTHEAST INDICATOR
TILCMX	1	-0.255366	0.069042	-3.699	0.0005	-0.273761	UTILCON VAR ONLY FOR TVA,DUKE,COMM UNITS

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
1	SANONO2	7.806	7.870	-.064004
2	SANONO3	7.371	7.457	-.085576
3	MILLSTN3	7.906	7.861	0.045432
4	FERMI2	8.031	7.971	0.059971
5	SHORHAM	8.384	8.323	0.061205
6	NINEMPT2	8.244	8.131	0.112661
7	WATTSBR	7.412	7.358	0.053364
8	WATTS8R	7.122	6.945	0.176914
9	WPPSS2	8.016	8.108	-.091613
10	FARLEY1	7.227	7.595	-.368365
11	FARLEY2	7.130	7.182	-.052347
12	PALOV1	7.651	7.829	-.178249
13	PALOV2	7.453	7.416	0.036595
14	PALOV3	7.455	7.416	0.038966
15	HARRIS1	7.960	7.574	0.386667
16	HARRIS2	7.238	7.161	0.077251
17	PERRY1	7.659	7.650	-.030524
18	PERRY2	7.197	7.277	-.080004
19	BRAIDWD	7.398	7.430	-.032640
20	BRAIDWD	7.002	7.017	-.014962
21	BYRON1	7.549	7.413	0.135964
22	BYRON2	7.109	7.000	0.109290
23	LASALL1	7.400	7.576	-.175861
24	LASALL2	6.928	7.163	-.235341
25	MIDLAND1	7.[illegible]	7.[illegible]	0.[illegible]

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
26	MIDLAND2	7.618	7.441	0.176250
27	MARBHIL	7.676	7.660	0.016206
28	MARBHIL	7.126	7.247	-.121292
29	CATAWBA	7.438	7.317	0.121165
30	CATAWBA	7.010	6.904	0.106235
31	MCGUIRE1	6.841	7.317	-.476273
32	MCGUIR2	6.753	6.904	-.150730
33	BEAVRVL2	8.148	8.029	0.119160
34	STLUCIE2	7.483	7.789	-.305671
[illegible]	HATCH2	6.858	7.329	-.470543
[illegible]	CLINTON1	8.030	8.077	-.046698
37	WOLFCRK	7.611	7.641	-.030258
38	GRAGULF1	7.676	7.634	0.041580
39	GRAGULF2	7.404	7.221	0.182729
40	SUSQUE1	7.689	7.853	-.164298
41	SUSQU2	7.218	7.440	-.222368
42	SEABRK1	7.921	7.886	0.034794
43	SEABRK2	7.676	7.473	0.202616
44	HOPECRK	8.088	8.277	-.189219
45	SUMMER	7.351	7.563	-.212481
46	COMANCH	7.743	7.623	0.120442
47	COMANCH	7.186	7.210	-.023393
48	BELLAF1	7.480	7.358	0.122153
49	BELLAF2	7.205	6.945	0.260734
50	CALLAWY	7.632	7.652	-.020510
51	SOTEX1	8.089	7.803	0.285745
52	SOTEX2	7.401	7.390	0.011838
53	VOGTLE1	8.151	7.738	0.412942
54	VOGTLE2	7.768	7.325	0.442860
55	RIVBND	8.138	8.045	0.093677
56	ARKONE2	6.827	7.192	-.365314
[illegible]	WATERFD3	7.834	7.779	0.054074

OF RESIDUALS 7.860386-13
OF SQUARED RESIDUALS 2.123238

SORTED BY STANDARDIZED DIRECT COST

OBS	UNITNAME	PLANTID	_TYPE_	_FREQ_	BOOKCOST	LNCOST84	COST84	LNSTDCST	STDCOST	LNPRECST	PREDCOST	NETDER	AVGSTD
1	HATCH2	6051	1	1	460128	6.85841	951.85	7.40238	1639.88	7.32935	1524.39	786.00	1639.88
2	ARKONE2	8055	1	1	846150	6.82707	922.48	7.50801	1822.58	7.19238	1329.27	912.00	1822.58
3	STLUCIE2	6045	1	1	1420000	7.48297	1777.52	7.56765	1934.59	7.78864	2413.04	804.00	1934.59
4	MCGUIR2	6038	1	2	1103095	6.79717	896.17	7.55982	1944.98	7.11067	1251.19	1180.00	1919.50
5	SUMMER	6127	1	1	1306000	7.35072	1557.32	7.66084	2123.54	7.56320	1926.00	900.00	2123.54
6	LASALL2	6026	1	2	1247000	7.16393	1328.21	7.66772	2139.14	7.26953	1620.86	1078.00	2138.19
7	FARLEY2	6001	1	2	754039	7.17828	1312.19	7.66296	2154.67	7.38864	1652.12	829.00	2128.05
8	SUSQU2	6103	1	2	0	7.45341	1773.84	7.67999	2165.50	7.64674	2138.63	1057.50	2164.59
9	HOPECRK	6118	1	1	3195000	8.08769	3254.17	7.68411	2173.53	8.27690	3932.00	1067.00	2173.53
10	WPPSS2	3928	1	1	3234000	8.01597	3028.96	7.78171	2396.36	8.10759	3319.56	1100.00	2396.36
11	SANONO3	360	1	2	2250000	7.58835	2021.87	7.79853	2437.16	7.66314	2173.98	1093.50	2437.02
12	PERRY2	6020	1	2	2615580	7.42777	1727.16	7.81786	2485.32	7.48324	1816.04	1205.00	2484.57
13	MARSHIL	6029	1	2	0	7.40105	1700.15	7.82078	2497.73	7.45359	1763.00	1130.00	2491.84
14	CLINTON1	6059	1	1	3148000	8.02983	3071.21	7.82662	2506.45	8.07653	3218.03	933.00	2506.45
15	WOLFCRK	6066	1	1	3030000	7.61074	2019.77	7.84306	2547.99	7.64100	2081.81	1150.00	2547.99
16	PALOV3	6008	1	3	3122566	7.51578	1852.31	7.83909	2550.76	7.55401	1946.40	1270.00	2537.90
17	BRAIDWD	6022	1	2	2053500	7.20017	1365.92	7.84952	2564.59	7.22397	1401.29	1120.00	2564.49
18	CALLAWY	6153	1	1	3000000	7.63157	2062.28	7.85281	2572.96	7.65208	2105.02	1120.00	2572.96
19	WPPSS2	.	0	57	2066641	7.53826	2035.05	7.87332	2674.89	7.53826	2000.98	1081.82	2626.27
20	MILLSTN3	566	1	1	3825000	7.90613	2713.88	7.91875	2748.34	7.86070	2593.34	1156.00	2748.34
21	COMANCH	6145	1	2	2282000	7.46491	1813.82	7.92184	2763.99	7.41639	1698.61	1111.00	2756.85
22	WATERFD3	8056	1	1	2733000	7.83356	2523.89	7.92739	2772.19	7.77548	2391.04	1104.00	2772.19
23	FERMI2	1729	1	1	3575000	8.03132	3075.80	7.93329	2788.59	7.97135	2896.76	1093.00	2788.59
24	SHORHAM	2518	1	1	4266000	8.38429	4377.76	7.93453	2792.04	8.32308	4117.84	820.00	2792.04
25	RIVRBND	6462	1	1	0	8.13845	3423.59	7.96700	2884.18	8.04477	3117.44	934.00	2884.18
26	NINEMPT2	2589	1	1	5350000	8.24368	3803.58	7.98599	2939.48	8.13101	3398.23	1100.00	2939.48
27	CATAWBA	6036	1	2	1550000	7.22437	1404.02	7.98702	2942.60	7.11067	1251.19	1145.00	2942.51
28	GRAGULF2	6072	1	2	1812500	7.53955	1898.39	7.98547	2945.28	7.42739	1717.41	1250.00	2937.97
29	WATTSBR	3420	1	2	1942500	7.26699	1447.27	7.98846	2952.38	7.15185	1303.79	1177.00	2946.75
30	BEAVRVL2	6040	1	1	3559000	8.14804	3456.59	7.99248	2958.62	8.02888	3068.38	833.00	2958.62
31	SEABRK2	6115	1	2	4447650	7.79828	2454.74	7.99202	2967.70	7.67957	2210.00	1150.00	2957.28
32	BYRON2	6023	1	2	2173000	7.32927	1561.26	7.99595	2969.17	7.20664	1377.21	1120.00	2968.90
33	MIDLAND2	6028	1	2	2215000	7.79051	2453.74	8.01587	3030.36	7.64796	2141.23	852.00	3028.64
34	SOTEX2	6251	1	2	0	7.74536	2448.90	8.02261	3077.98	7.59607	2032.96	1250.00	3049.13
35	BELLAF2	6150	1	2	2820000	7.34271	1559.47	8.06476	3188.04	7.15127	1303.03	1213.00	3180.40
36	HARRIS2	6015	1	2	2725000	7.59514	2128.17	8.10528	3351.62	7.36718	1617.05	900.00	3311.91
37	VOGTLE2	6258	1	2	0	7.95936	2914.92	8.30122	4029.24	7.53146	1905.76	1160.00	4028.79

SUPPLEMENT TO IR-OCA-23-4

The attached table summarizes the regression results submitted in response to IR-OCA-23-4, and, by reference, to IR-STAFF-LIM-23. Those interrogatories requested that the regression utilized in Schedule 20 be run without the "Construction Permit Received in 1972-1973 Indicator." Although the regression can be run, it is important to emphasize at this time my position that running the requested regressions without the 1972-73 variable is inappropriate.

The inclusion of the 1972-73 variable is an integral component to this analysis both because it makes good logical sense as a determinant of cost and because it is statistically significant at a very high level. Historically, regulatory changes have been a major factor in driving up nuclear costs and, consequently, each successive vintage of nuclear plant has proven to be more expensive than that built previously. Prior to the addendum, we accounted for this phenomenon by excluding plants with construction permit dates prior to 1972 from the analysis. This was done because, when the model was originally set up, it appeared that costs were markedly lower prior to 1972 than after that date but that costs had stabilized for units with post-1971 CP dates. However, the September TVA data indicates continuing upward trends in costs within the post-1971 data base. Specifically, the 1972 and 1973 plants are markedly less expensive than those built later. Since it is highly improbable that this time-related cost effect is attributable to utility imprudence, it is appropriate to control for these time-related cost differences when comparing cost across plants.

Of course, while the theoretical rationale for including time-related variables in the analysis has always been clear, the appropriateness of including specific time effects depends upon their statistical significance. And the 1972-73 variable is quite clearly statistically significant. The t-statistic on this variable is 3.879 indicating that the probability that plants with CP dates in 1972 and 1973 have the same costs as nuclear units in the sample is less than 1.000. Moreover, the overall fit of the model is improved markedly by the inclusion of this variable. The R-squared rises from 74 percent when the time variable is omitted to 79.8 percent when it is included.

Responsible Witness: Dr. Lewis J. Perl
National Economic Research Associates, Inc.

NUCLEAR CAPITAL COSTS FOR POST-1971 PLANTS STANDARDIZED TO LIMERICK 1

BASED ON REGRESSION EQUATION WITHOUT CONSTRUCTION PERMIT RECEIVED IN 1972-1973 INDICATOR

Plant	Actual Direct Cost (1984 $/kW) (1)	Standardized Direct Cost (1984 $/kW) (2)
Hatch 2	$ 952	$1,640
Arkansas Nuclear One 2	922	1,823
St. Lucie 2	1,778	1,535
McGuire	896	1,945
Summer	1,557	2,124
LaSalle	1,328	2,139
Farley	1,312	2,155
Susquehanna	1,774	2,166
Hope Creek	3,254	2,174
WPPSS 2	3,029	2,396
San Onofre	2,022	2,437
Perry	1,727	2,485
Marble Hill	1,700	2,498
Clinton 1	3,071	2,506
Wolf Creek	2,020	2,548
Palo Verde	1,852	2,551
Braidwood	1,366	2,565
Callaway	2,062	2,573
Millstone 3	2,714	2,748
Comanche Peak	1,814	2,764
Waterford 3	2,524	2,772
Fermi 2	3,076	2,789
Shoreham	4,378	2,792
Limerick 1	2,868	2,868
River Bend	3,424	2,884
Nine Mile Point 2	3,804	2,939
Catawba	1,404	2,943
Grand Gulf	1,898	2,945
Watts Bar	1,447	2,952
Beaver Valley 2	3,457	2,959
Seabrook	2,455	2,968
Byron	1,561	2,969
Midland	2,454	3,030
South Texas	2,449	3,078
Bellafonte	1,559	3,188
Harris	2,128	3,352
Vogtle	2,915	4,029
Average, excluding Limerick 1	2,035	2,675

1-6-85

Phila

R95

IR-OCA-23-5

Please provide the results of the regression in Schedule 20 using a cutoff date of June 30, 1973, rather than December 31, 1973 for the new Construction Permit Received indicator. If such a run has not been done, please do so. In answering this question, please provide the results of all statistical tests performed, including a listing of the predicted values and/or residuals from the regression for each unit in the sample. Please calculate the excess cost percentage for Limerick from this run (i.e. Limerick's actual cost/predicted cost and actual cost/standardized cost).

Answer

Attachment IR-OCA-23-5 contains the results of the regression equation with the Construction Permit Received variable redefined with a cut-off date of June 30, 1973 rather than December 31, 1973. This attachment also contains a listing of the actual value, the predicted value and the residual for each of the units included in the regression equation. Based on this regression, the predicted cost is $2,618 and the ratio of Limerick's actual cost to predicted cost is 1.095. The average standardized cost based on this regression is $2,662 and the ratio of Limerick's actual cost to the standardized average cost is 1.077.

Responsible Witness: Dr. Lewis J. Perl
National Economic Research Associates, Inc.

UPDATED NUCLEAR CAPITAL COST REGRESSION BASED ON TVA 85 DATA
BASED ON POST-71 CPD UNITS W/OUT LIM PLANT 12:50 TUESDAY, DECEMBER 24, 1985
WITH CPD7273 SET AT JUNE 30 1973 NOT DECEMBER 31

EP VARIABLE: LNCOST84 LOG OF COST PER KW IN 1984 DOLLARS

OURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
ODEL	7	7.321413	1.045916	27.430	0.0001
RROR	49	1.868354	0.038130		
OTAL	56	9.189767			

ROOT MSE	0.195268	R-SQUARE	0.7967
DEP MEAN	7.538263	ADJ R-SQ	0.7676
C.V.	2.590361		

ARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > ITI	STANDARDIZED ESTIMATE	VARIABLE LABEL
NTERCEP	1	7.839775	0.054686	143.359	0.0001	0.000000	INTERCEPT
UBSQ	1	-0.402696	0.055778	-7.220	0.0001	-0.492029	SUBSEQUENT UNIT INDICATOR
ABROCK	1	-0.141946	0.061803	-2.297	0.0259	-0.172100	COMPOSITE ROCK FOUND, INDICATOR
INGHWR	1	0.324508	0.092568	3.506	0.0010	0.265258	SINGLE UNIT BWR INDICATOR
NWAIND	1	0.169542	0.168210	1.008	0.3184	0.074204	LOG OF MEANS WAGE INDEX
EAST	1	0.180910	0.078626	2.301	0.0257	0.164292	NORTHEAST INDICATOR
TILCMX	1	-0.252283	0.065434	-3.856	0.0003	-0.270456	UTILCON VAR ONLY FOR TVA,DUKE,COMM UNITS
PD7273	1	-0.164280	0.063540	-2.585	0.0128	-0.176114	

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
1	SANONO2	7.806	7.875	-.069832
2	SANONO3	7.371	7.473	-.101755
3	MILLSTN3	7.906	7.862	0.044415
4	FERMI2	8.031	7.883	0.147913
5	SHORHAM	8.384	8.201	0.183269
6	NINEMPT2	8.244	8.192	0.052076
7	WATTSBR	7.412	7.242	0.170107
8	WATTSBR	7.122	6.839	0.283303
9	WPPSS2	8.016	8.019	-.003018
10	FARLEY1	7.227	7.481	-.254438
11	FARLEY2	7.130	7.079	0.051229
12	PALOV1	7.651	7.848	-.196857
13	PALOV2	7.453	7.445	0.007637
14	PALOV3	7.455	7.445	0.010003
15	HARRIS1	7.960	7.631	0.329512
16	HARRIS2	7.238	7.228	0.009741
17	PERRY1	7.659	7.710	-.051262
18	PERRY2	7.197	7.307	-.110698
19	BRAIDWD	7.398	7.455	-.057298
20	BRAIDWD	7.002	7.052	-.049982
21	BYRON1	7.549	7.443	0.105808
22	BYRON2	7.109	7.041	0.067775
23	LASALL1	7.400	7.597	-.196987
24	LASALL2	6.928	7.194	-.266775

UPDATED NUCLEAR CAPITAL COST REGRESSION BASED ON TVA 85 DATA
BASED ON POST-71 CPD UNITS W/OUT LIN PLANT
WITH CPD7273 SET AT JUNE 30 1973 NOT DECEMBER 31

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
25	MIDLAND1	7.963	7.701	0.262486
26	MIDLAND2	7.618	7.298	0.319533
27	MARBHIL	7.676	7.690	-.013536
28	MARBHIL	7.126	7.287	-.161385
29	CATAWBA	7.438	7.378	0.060563
30	CATAWBA	7.010	6.975	0.035278
31	MCGUIRE1	6.841	7.214	-.372594
32	MCGUIR2	6.753	6.811	-.057407
33	BEAVRVL2	8.148	8.019	0.128938
34	STLUCIE2	7.483	7.820	-.337201
[illegible]	HATCH2	6.858	7.222	-.363215
[illegible]	CLINTON1	8.030	8.162	-.132232
37	WOLFCRK	7.611	7.677	-.066067
38	GRAGULF1	7.676	7.672	0.003527
39	GRAGULF2	7.404	7.269	0.134316
40	SUSQUE1	7.689	7.857	-.167669
41	SUSQU2	7.218	7.454	-.236054
42	SEABRK1	7.921	7.879	0.041838
43	SEABRK2	7.676	7.476	0.199309
44	HOPECRK	8.088	8.334	-.246082
45	SUMMER	7.351	7.459	-.108685
46	COMANCH	7.743	7.664	0.078898
47	COMANCH	7.186	7.262	-.075293
48	BELLAF1	7.480	7.406	0.074430
49	BELLAF2	7.205	7.003	0.202656
50	CALLAWY	7.632	7.684	-.052802
51	SOTEX1	8.089	7.830	0.259645
52	SOTEX2	7.401	7.427	-.025622
53	VOGTLE1	8.151	7.786	0.365342
54	VOGTLE2	7.768	7.383	0.384903
55	RIVRBND	8.138	8.140	-.001931
56	ARKONE2	6.827	7.086	-.258480
[illegible]	WATERFD3	7.834	7.814	0.019638

SUM OF RESIDUALS 7.96252E-13
SUM OF SQUARED RESIDUALS 1.868354

OBS	UNITNAME	PLANTID	_TYPE_	_FREQ_	BOOKCOST	LNCOST84	COST84	LNSTDCST	STDCOST	LNPRECST	PRECOST	NETDER	AVGSTD
1	HATCH2	6051	1	1	460128	6.85841	951.85	7.50711	1820.95	7.22162	1368.71	786.00	1820.95
2	STLUCIE2	6045	1	1	1420000	7.48297	1777.52	7.53313	1868.94	7.82017	2490.34	804.00	1868.94
3	ARKONE2	6055	1	1	548150	6.82707	922.48	7.61185	2022.01	7.08555	1194.58	912.00	2022.01
4	HOPECRK	6118	1	1	3795000	8.08769	3254.17	7.62425	2047.24	8.33377	4162.09	1067.00	2047.24
5	LASALL2	6026	1	2	1247000	7.16393	1328.21	7.63851	2077.91	7.39575	1662.18	1078.00	2076.64
6	MCGUIR2	6038	1	2	1103095	6.79717	896.17	7.65533	2138.15	7.01217	1132.64	1180.00	2111.87
7	SUSQU2	6103	1	2	0	7.45341	1773.84	7.66845	2141.01	7.65529	2154.74	1057.50	2139.76
8	CLINTON1	6059	1	1	3148000	8.02983	3071.21	7.73810	2294.10	8.16206	3505.40	933.00	2294.10
9	SUMMER	6127	1	1	1306000	7.35072	1557.32	7.76164	2348.75	7.45941	1736.12	900.00	2348.75
10	FARLEY2	6001	1	2	754039	7.17828	1312.19	7.76873	2393.13	7.27988	1490.33	829.00	2365.45
11	SANONO3	360	1	2	2250000	7.58835	2021.87	7.78453	2403.45	7.67414	2195.75	1093.50	2403.15
12	MARBHIL	6029	1	2	0	7.40105	1700.15	7.78287	2405.70	7.48851	1823.75	1130.00	2399.14
13	PERRY2	6020	1	2	2615500	7.42777	1727.16	7.78935	2415.81	7.50875	1861.03	1205.00	2414.75
14	WOLFCRK	6066	1	1	3030000	7.61074	2019.77	7.80426	2451.03	7.67680	2157.71	1150.00	2451.03
15	PALOV3	6008	1	3	3122566	7.51978	1852.31	7.81059	2477.93	7.57952	1994.71	1270.00	2466.59
16	BRAIDWD	6022	1	2	2052500	7.20017	1365.92	7.81669	2481.69	7.25381	1442.22	1120.00	2481.68
17	CALLAWY	6153	1	1	3000000	7.63157	2062.28	7.81753	2483.76	7.68437	2174.10	1120.00	2483.76
18	WPPSS2	3928	1	1	3234000	8.01597	3028.96	7.86732	2610.55	8.01895	3038.10	1100.00	2610.55
19	RIVRBND	6462	1	1	0	8.13845	3423.59	7.86840	2613.38	8.14038	3430.21	934.00	2613.38
20	COMANCH	6145	1	2	2282000	7.46491	1813.82	7.87213	2630.95	7.46311	1778.00	1111.00	2623.15
21	WPPSS2	.	0	57	2066641	7.53826	2035.05	7.87033	2661.80	7.53826	2004.21	1081.82	2618.43
22	WATERFD3	8056	1	1	2733000	7.83356	2523.89	7.88997	2670.36	7.81392	2474.81	1104.00	2670.36
23	MILLSTN3	566	1	1	3825000	7.90613	2713.88	7.91475	2737.36	7.86172	2595.97	1156.00	2737.36
24	CATAWBA	6036	1	2	1950000	7.22437	1404.02	7.91825	2747.18	7.17645	1324.87	1145.00	2746.96
25	NINEMPT2	2589	1	1	5350000	8.24368	3803.50	7.92241	2758.40	8.19160	3610.50	1100.00	2758.40
26	GRAGULF2	6072	1	2	1812500	7.53955	1898.39	7.93925	2811.26	7.47063	1791.43	1250.00	2805.26
27	BYRON2	6023	1	2	2173000	7.32927	1561.26	7.95762	2857.76	7.24197	1425.26	1120.00	2857.27
28	SEABRK2	6115	1	2	4447650	7.79828	2454.74	7.99090	2963.12	7.67771	2203.59	1150.00	2953.96
29	SOTEX2	6251	1	2	0	7.74536	2448.90	7.98734	2973.45	7.62835	2097.47	1250.00	2943.46
30	BEAVRVL2	6040	1	1	3555000	8.14804	3456.59	7.99927	2978.78	8.01510	3038.44	833.00	2978.78
31	BELLAF2	6150	1	2	2820000	7.74271	1559.47	8.00887	3013.71	7.20417	1372.38	1213.00	3007.53
32	FERMI2	1729	1	1	3575000	8.03132	3075.80	8.01824	3035.83	7.88341	2652.90	1093.00	3035.83
33	HARRIS2	6015	1	2	2725000	7.59914	2128.17	8.03996	3142.22	7.42952	1719.26	900.00	3102.48
34	SHORHAM	2518	1	1	4266000	8.38429	4377.76	8.05360	3145.09	8.20102	3644.67	820.00	3145.09
35	WATTSBR	3420	1	2	1942500	7.26699	1447.27	8.09703	3289.97	7.04029	1164.94	1177.00	3284.71
36	MIDLAND2	6028	1	2	2215000	7.79051	2453.74	8.16134	3504.30	7.49950	1843.89	852.00	3502.87
37	VOGTLE2	6258	1	2	0	7.95936	2914.92	8.24545	3810.44	7.58424	2006.95	1160.00	3810.26

SUPPLEMENT TO IR-OCA-23-5

OCA-23-5 requested additional analysis which involved redefining the 1972-73 dummy variable to include all of 1972 but only the first half of 1973. While we have done this analysis for the Consumer Advocate, and the results are summarized in the attached Table One, we do not think that it is a valid or defensible way to approach the problem. First, when we define the variable as suggested by the Consumer Advocate, the overall regression results deteriorate markedly. Thus, defining the variable to include all units built with CP dates in 1972-73, the R-squared is .798 but when it is redefined to include plants built in 1972 and the first six months of 1973, the R-squared falls to .767.

Moreover, it is clear that the cost of plants licensed in the last six months of the 1972-73 period are consistent with the cost of all plants licensed in the 1972-73 period and are significantly lower in cost than plants receiving their license after the 1972-73 period. In order to illustrate this point we have run a regression which has two dummy variables -- one to denote the 18 months period from January 1, 1972 to June 30, 1973 and the other to denote the last six months of 1973. Both of these dummy variables are statistically significant. They suggest that plants built in the first 18 months of this period are 18 percent less expensive than plants built after 1973 and that plants built in the last six months of this period are 25 percent less expensive. Moreover, the R-squared for this "two-variable regression", .7958, is markedly higher than the regression which simply leaves out the last six month period, and nearly as high as the regression which lumps together in a single variable all units built in the entire period 1972-73. With this two-variable regression the ratio of Limerick's predicted costs to the predicted costs of the other units in the sample is 1.029, which is even lower than the ratio which I reached in the revised addendum. The regression defined in this way is described in Table 2 which is attached.

Responsible Witness: Dr. Lewis J. Perl
National Economic Research Associates, Inc.

NUCLEAR CAPITAL COSTS FOR POST-1971 PLANTS STANDARDIZED TO LIMERICK 1

BASED ON REGRESSION EQUATION WITH REDEFINED CONSTRUCTION PERMIT RECEIVED IN 1972-1973 INDICATOR

Plant	Actual Direct Cost (1984 $/kW) (1)	Standardized Direct Cost (1984 $/kW) (2)
Hatch 2	$ 952	$1,821
St. Lucie 2	1,778	1,869
Arkansas Nuclear One 2	922	2,022
Hope Creek	3,254	2,047
LaSalle	1,328	2,078
McGuire	896	2,138
Susquehanna	1,774	2,141
Clinton 1	3,071	2,294
Summer	1,557	2,349
Farley	1,312	2,393
San Onofre	2,022	2,403
Marble Hill	1,700	2,406
Perry	1,727	2,416
Wolf Creek	2,020	2,451
Palo Verde	1,852	2,478
Braidwood	1,366	2,482
Callaway	2,062	2,484
WPPSS 2	3,029	2,611
River Bend	3,424	2,613
Comanche Peak	1,814	2,631
Waterford 3	2,524	2,670
Millstone 3	2,714	2,737
Catawba	1,404	2,747
Nine Mile Point 2	3,804	2,758
Grand Gulf	1,898	2,811
Byron	1,561	2,858
Limerick 1	2,868	2,868
Seabrook	2,455	2,963
South Texas	2,449	2,973
Beaver Valley 2	3,457	2,979
Bellafonte	1,559	3,014
Fermi 2	3,076	3,036
Harris	2,128	3,142
Shoreham	4,378	3,145
Watts Bar	1,447	3,290
Midland	2,454	3,504
Vogtle	2,915	3,810
Average, excluding Limerick 1	2,035	2,662

DEP VARIABLE: LNCOST84 LOG OF COST PER KW IN 1984 DOLLARS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	8	7.581228	0.947653	28.279	0.0001
ERROR	48	1.608540	0.033511		
C TOTAL	56	9.189767			

ROOT MSE	0.183061	R-SQUARE	0.8250
DEP MEAN	7.538263	ADJ R-SQ	0.7958
C.V.	2.428421		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	STANDARDIZED ESTIMATE	VARIABLE LABEL
INTERCEP	1	7.898984	0.054457	144.502	0.0001	0.000000	INTERCEPT
SUBSQ	1	-0.355632	0.052352	-7.557	0.0001	-0.483398	SUBSEQUENT UNIT INDICATOR
BARROCK	1	-0.177045	0.059254	-2.986	0.0044	-0.214654	COMPOSITE ROCK FOUND. INDICATOR
SINGBWR	1	0.265892	0.089258	2.978	0.0045	0.217345	SINGLE UNIT BWR INDICATOR
LNWAIND	1	0.282033	0.162787	1.733	0.0896	0.123439	LOG OF MEANS WAGE INDEX
NEAST	1	0.233160	0.076061	3.065	0.0036	0.211741	NORTHEAST INDICATOR
UTILCNX	1	-0.218138	0.062557	-3.487	0.0011	-0.233851	UTILCON VAR ONLY FOR TVA,DUKE&CONN UNITS
CPD7273	1	-0.179035	0.059803	-2.994	0.0043	-0.191932	
HALF73	1	-0.250863	0.089807	-2.794	0.0077	-0.191126	

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
1	SANONO2	7.806	7.700	0.105404
2	SANONO3	7.371	7.305	0.066413
3	MILLSTN3	7.986	7.919	-.012565
4	FERMI2	8.031	7.843	0.188432
5	SHORHAM	8.384	8.244	0.139919
6	NINEMPT2	8.244	8.194	0.050138
7	WATTSBR	7.412	7.251	0.160981
8	WATTSBR	7.122	6.855	0.267112
9	WPPSS2	8.016	8.009	0.006633
10	FARLEY1	7.227	7.448	-.221081
11	FARLEY2	7.130	7.052	0.077602
12	PALOV1	7.651	7.905	-.253434
13	PALOV2	7.453	7.509	-.056005
14	PALOV3	7.455	7.509	-.053639
15	HARRIS1	7.960	7.602	0.357913
16	HARRIS2	7.238	7.207	0.031078
17	PERRY1	7.659	7.734	-.075435
18	PERRY2	7.197	7.339	-.141934
19	BRAIDWD	7.398	7.512	-.113845
20	BRAIDWD	7.002	7.116	-.113596
21	BYRON1	7.549	7.492	0.057108
22	BYRON2	7.109	7.096	0.013015
23	LASALL1	7.400	7.439	-.038494

OBS	ID	ACTUAL	PREDICT VALUE	RESIDUAL
24	LASALL2	6.928	7.043	-.115388
25	MIDLAND1	7.963	7.754	0.209290
26	MIDLAND2	7.618	7.358	0.259273
27	MANBHIL	7.676	7.701	-.024281
28	MARSHIL	7.126	7.305	-.179197
29	CATAWBA	7.438	7.383	0.055336
30	CATAWBA	7.010	6.987	0.022989
31	MCGUIRE1	6.841	7.204	-.363064
32	MCGUIR2	6.753	6.808	-.054941
33	BEAVRVL2	8.148	8.121	0.026611
34	STLUCIE2	7.483	7.858	-.375325
35	HATCH2	6.858	7.231	-.372702
36	CLINTON1	8.030	8.153	-.123276
37	WOLFCRK	7.611	7.679	-.068145
38	GRAGULF1	7.676	7.671	0.004651
39	GRAGULF2	7.404	7.275	0.128577
40	SUSQUE1	7.689	7.660	0.028777
41	SUSQU2	7.218	7.265	-.046712
42	SEABRK1	7.921	7.948	-.026651
43	SEABRK2	7.676	7.552	0.123751
44	HOPECRK	8.088	8.371	-.283268
45	SUMMER	7.351	7.411	-.060772
46	COMANCH	7.743	7.658	0.085007
47	COMANCH	7.186	7.263	-.076247
48	BELLAF1	7.480	7.429	0.050814
49	BELLAF2	7.205	7.034	0.171976
50	CALLAWY	7.632	7.691	-.059984
51	SOTEX1	8.089	7.874	0.215200
52	SOTEX2	7.401	7.479	-.077130
53	VOGTLE1	8.151	7.801	0.350167
54	VOGTLE2	7.768	7.405	0.362664
55	RIVRBND	8.138	8.117	0.021417
56	ARKONE2	6.827	7.064	-.236760
57	WATERFD3	7.834	7.848	-.014337

SUM OF RESIDUALS 8.00249E-13
SUM OF SQUARED RESIDUALS 1.69854

TABLE 2
Page 2 of 2

SCA EXHIBIT NO. 8
R-850152

1-8-85

Plub

RDS

State	Veterans and eligibles	Vietnam era veterans	Disabled veterans	Special disabled veterans
REGION V				
Indiana	*3	*3	*2	*5
REGION VI				
Louisiana:				
Placement	7	13.5	15.5	N/A
FCJL	N/A	55	N/A	75
Counseling	150	250	500	N/A
Enrollment in training	(1)	(1)	(1)	(1)
Received some reportable service	40	50	60	N/A
REGION VIII				
South Dakota:				
Placement	8	10	12	N/A
FCJL	N/A	7	N/A	0.3
Counseling	10	15	20	N/A
Enrollment in training	10	15	20	N/A
Received some reportable service	8	10	12	N/A
REGION X				
Alaska	10	20	30	40

(1) Waived for program year 1985.
* Standard deviations.

[FR Doc. 85-30508 Filed 12-24-85; 8:45 am]
BILLING CODE 4510-79-M

NUCLEAR REGULATORY COMMISSION

Philadelphia Electric Co. Limerick Generating Station, Unit 1; Consideration of Issuance of Amendment to Facility Operating License and proposed No Significant Hazards Consideration Determination and Opportunity for Hearing

[Docket No. 50-352]

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. NPF-39, issued to Philadelphia Electric Company (the licensee), for operation of the Limerick Generating Station Unit 1 located in Montgomery County, Pennsylvania.

The amendment would revise the Technical Specifications (TS) to allow a one-time-only extension of time to satisfy a limited number of testing requirements for the excess flow check values in certain instrumentation lines which must be performed every 18 months and which require a plant shutdown. Under the amendment, the surveillances would be performed during a plant shutdown beginning no later than May 26, 1986, which will occur a maximum of 96 days beyond the time otherwise designated by TS. The purpose of this amendent is to allow continued operation of the plant until other more extensive surveillance testing needs to be performed, and for which plant shutdown is unavoidable. The Technical Specification requirements for testing every 18 months which are requested to be extended are as follows:

Excess Flow Check Valves,
Specification 4.6.3.4 (Primary Containment Isolation Valves), Table 3.6.3-1, Part B.

The testing for this specification is a water leak test to verify that these check valves will check flow when subjected to a differential pressure. These lines are small (1 inch or less), are equipped with one-quarter inch restricting orifices inside primay containment which serve to limit flow and are completely enclosed within primary and secondary containment. The lines provide fluid to pressure transmitting devices in the plant's instrumentation systems.

The leak test of the excess flow check valves in Technical Specification Table 3.6.3-1 cannot be performed during normal operation for the following reasons: (1) Entry of personnel would be required inside the primary containment which is at undersirable temperatures and radiation levels for routine personnel access during power operations; and (2) the instrument lines down stream of the valves must be partially drained in performing the test thus rendering numerous transmitters inoperable or tripped.

The consequences of leakage from an instrumentation line are minimal since the one-quarter inch orifice inside containment limits flow, and the majority of the line outside of primary containment is only three-eights inch in diameter. The lines protected by the check valves are also located within the reactor enclosure which is served by the standby gas treatment system so that any release from the line would be filtered and monitored. The failure of an instrument line is an analyzed event in the Final Safety Analysis Report and no aspect of the proposed change to the Technical Specifications would require a change in the safety analysis.

The 18 month surveillance interval was selected to be consistent with the maximum anticipated interval between refueling outages. However, the Technical Specifications allow an extension of 25% to this frequency to accommodate operations scheduling. Therefore, the end of the most limiting surveillance interval, including the allowable 25% extension, for Limerick Unit 1 is February 19, 1986. The next shutdown is currently expected to start on or before May 26, 1986. The period of plant operation during the requested extensions, therefore, is a maximum of 96 days. The need for the one-time extension in the surveillance interval is a consequence of the operation of Limerick, Unit 1 at less than five percent of rated power for an extended period of time. This amendment is in accordance with the licensee's application for amendment dated December 18, 1986.

Before issuance of the proposed license amendment, the Commission will have made findings required by the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations.

The Commission has made a proposed determination that the amendment request involves no significant hazards consideration. Under the Commission's regulations in 10 CFR 50.92, this means that operation of the facility in accordance with the proposed amendment would not (1) involve a

significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previosly evaluated; or (3) involve a significant reduction in a margin of safety.

The licensee, in its letter of December 18, 1985, has determined and the NRC staff agrees that the proposed amendment will not: 1) Involve a significant increase in the probability or consequences of an accident previous evaluated because no change in the design or accident analysis of an instrument line break in the FSAR is required. Moreover, based on the type of surveillance extended, no significant increase in the probability of equipment failure is postulated, 2) Create the possibility of a new or different kind of accident from any accident previously evaluated because this amendment neither removes or adds any equipment nor does it eliminate required tests; and 3) Involve a significant reduction in the margin of safety because the increased surveillance interval (96-days) does not significantly increase the possibility that an undetected failure will occur in any of the related equipment covered by these Technical Specifications. Accordingly, the Commission proposes to determine that the proposed changes to the Technical Specifications involve no significant hazards considerations.

The Commission is seeking public comments on this proposed determination. Any comments received within 30 days after the date of publication of this notice will be considered in making any final determination. The Commission will not normally make a final determination unless it receives a request of a hearing. Comments should be addressed to the Rules and Procedures Branch, Division of Rules and Records, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

By January 26, 1986, the licensee may file a request for a hearing with respect to issuance of the amendment to the subject facility operating license and any person whose interest may be affected by this proceeding and who wishes to participate as a party in the proceeding must file a written petition for leave to intervene. Requests for a hearing and petitions for leave to intervene shall be filed in accordance with the Commission's "Rules of Practice for Domestic Licensing Proceedings" in 10 CFR Part 2. If a request for a hearing or petition for leave to intervene is filed by the above date, the Commission or an Atomic Safety and Licensing Board, designated by the Commission or by the Chairman of the Atomic Safety and Licensing Board Panel, will rule on the request and/or petition and the Secretary or the designated Atomic Safety and Licensing Board will issue a notice of hearing or an appropriate order.

As required by 10 CFR 2.714, a petition for leave to intervene shall set forth with particularity the interest of the petitioner in the proceeding, and how that interest may be affected by the results of the proceeding. The petition should specifically explain the reasons why intervention should be permitted with particular reference to the following factors: (1) The nature of the petitioner's right under the Act to be make a party to the proceeding; (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any order which may be entered in the proceeding on the petitioner's interest. The petition should also identify the specific aspect(s) of the subject matter of the proceeding as to which petitioner wishes to intervene. Any person who has filed a petition for leave to intervene or who has been admitted as a party may amend the petition without requesting leave of the Board up to fifteen (15) days prior to the first prehearing conference scheduled in the proceeding, but such an amended petition must satisfy the specificity requirements described above.

Not later than fifteen (15) days prior to the first prehearing conference scheduled in the proceeding, a petitioner shall file a supplement to the petition to intervene which must include a list of the contentions which are sought to be litigated in the matter, and the bases for each contention set forth with reasonable specificity. Contentions shall be limited to matters witihin the scope of the amendment under consideration. A petitioner who fails to file such a supplement which satisfies these requirements with respect to at least one contention will not be permitted to participate as a party.

Those permitted to intervene become parties to the proceeding, subject to any limitations in the order granting leave to intervene, and have the opportunity to participate fully in the conduct of the hearing, including the opportunity to present evidence and cross-examine witnesses.

If a hearing is requested, the Commission will make a final determination on the issue of no significant hazards consideration. The final determination will serve to decide when the hearing is held.

If the final determination is that the amendment request involves no significant hazards consideration, the Commission may issue the amendment and make it effective, notwithstanding the request for a hearing. Any hearing held would take place after issuance of the amendment.

If the final determination is that the amendment involves a significant hazards consideration, any hearing held would take place before the issuance of any amendment.

Normally, the Commission will not issue the amendment until the expiration of the 30-day notice period. However, should circumstances change during the notice period such that failure to act in a timely way would result, for example, in derating or shutdown of the facility, the Commission may issue the license amendment before the expiration of the 30-day notice period, provided that its final determination is that the amendment involves no significant hazards consideration. The final determination will consider all public and State comments received. Should the Commission take this action, it will publish a notice of issuance and provide the opportunity for a hearing after issuance. The Commission expects that the need to take this action will occur very infrequently.

A request for a hearing or a petition for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulator Commission, Washington, DC 20555, Attention: Docketing and Service Branch, or may be delivered to the Commission's Public Document Room, 1717 H Street, NW., Washington, DC, by the above date. Where petitions are filed during the last ten (10) days of the notice period, it is requested that the petitioner promptly so inform the Commission by a toll-free telephone call to Western Union at (800) 325-6000 (in Missouri (800) 342-6700). The Western Union operator should be given Datagram Identification Number 3737 and the following message addressed to Walter R. Butler: petitioner's name and telephone number; date petition was mailed; plant name; and publication date and page number of the Federal Register notice. A copy of the petition should also be sent to the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to Conner and Wetterhahn, 1747 Pennsylvania Ave., NW., Washington, DC 20036, attorney for the licensee.

Nontimely filings of petitions for leave to intervene, amended petitions, supplemental petitions and/or requests for hearing will not be entertained

absent a determination by the Commission, in the presiding officer or the Atomic Safety and Licensing Board, that the petition and/or request should be granted based upon a balancing of the factors specified in 10 CFR 2.174(a)(1)(i)–(v) and 2.714(d).

For further details with respect to this action, see the application for amendment dated December 18, 1985 which is available for public inspection at the Commission's Public Document Room, 1717 H Street, Pottstown, Pennsylvania 19464.

Dated at Bethesda, Maryland, this 20 day of December 1985.

For the Nuclear Regulatory Commission.

Walter R. Butler,

BWR Project Directorate No. 4 Division of BWR Licensing.

[FR Doc. 85-30409, Filed 12-24-85; 8:45 am]

BILLING CODE 7590-01-M

DEPARTMENT OF TRANSPORTATION

State of Maryland, 55 mph Speed Limit Compliance Proceeding; Prehearing Conference

[Docket No. 43656]

Served December 20, 1985

Notice is hereby given that pursuant to the Order of the Secretary of Transportation dated December 9, 1985, instituting the above-titled proceeding and the December 17, 1985 notice of assignment by the Chief Administrative Law Judge, a prehearing conference will be held on January 9, 1986, at 10:00 a.m. (local time), in Room 5332, Nassif Building, 400 7th Street, SW., Washington, DC, before the undersigned administrative law judge.

In order to facilitate the conduct of the prehearing conference, the State of Maryland shall serve on the parties, with two copies to the judge, the information and materials required by Appendix A to the Secretary's order by January 7, 1986. In addition, the State of Maryland shall serve any requests for information from the other parties, proposed stipulations, if any, response to the Secretary's order, and a proposed procedural schedule by January 7, 1986.

NHTSA/FHWA shall serve in the parties, with two copies to the judge, by January 7, 1986, the following information: (a) Identify all witnesses which NHTSA/FHWA may present at the Hearing; (b) for each witness identified in (a) provide the following data: (1) employer, (2) position, (3) education, and (4) expertise; (c) submit a summary of the testimony expected to be obtained the person named in (a); (d) copies of all exhibits which NHTSA/FHWA intends to offer as evidence at the hearing in this proceeding. In addition, NHTSA/FHWA shall serve any requests for information, proposed stipulations, if any, and a proposed procedural schedule by January 7, 1986.

All parties should understand that January 7, 1986, is a delivery date and not a mailing date.

Dated at Washington, DC., December 19, 1985.

John M. Vittone,

Administrative Law Judge.

[FR Doc. 85-30531 Filed 12-24-85; 8:45 am]

BILLING CODE 4910-62-M

Research and Special Programs Administration

National Hazardous Materials Transportation Advisory Committee; Advisory Committee Renewal

AGENCY: Research and Special Programs Administration (RSPA); Department of Transportation (DOT).

ACTION: Publication of advisory committee renewal.

SUMMARY: The RSPA announces the renewal of the National Hazardous Materials Transportation Advisory Committee (NHMTAC) a multidisciplinary advisory committee created under the Federal Advisory Committee Act (Pub. L. 92-463; 86 Stat. 720 (FACA) to provide DOT with a non-Federal perspective on issues and developments in all aspects of hazardous materials transportation. This renewal is effective January 1, 1986 to December 31, 1987.

FOR FURTHER INFORMATION CONTACT: Sherwood C. Chu, Office of Hazardous Materials Transportation, Research and Special Programs Administration, Washington, D.C. 20590 (202) 472-2698.

Authority: Sec. 325, Department of Transportation Act (49 U.S.C. 325) and Sec. 5(c), Federal Advisory Committee Act (5 U.S.C. 10).

M. Cynthia Douglass,

Administrator.

[FR Doc. 85-30532 Filed 12-24-85; 8:45 am]

BILLING CODE 4910-60-M

VETERANS ADMINISTRATION

Veterans Administration Wage Committee; Meetings

The Veterans Administration, in accordance with Pub. L. 92-463, gives notice that meetings of the Veterans Administration Wage Committee will be held on:

Thursday, January 16, 1986, at 2:30 p.m.
Thursday, January 30, 1986, at 2:30 p.m.
Thursday, February 13, 1986, at 2:30 p.m.
Thursday, February 27, 1986, at 2:30 p.m.
Thursday, March 13, 1986, at 2:30 p.m.
Thursday, March 27, 1986, at 2:30 p.m.

The meetings will be held in Room 304, Veterans Administration Central Office, 810 Vermont Avenue, NW., Washington, DC 20420.

The Committee's purpose is to advise the Chief Medical Director on the development and authorization of wage schedules for Federal Wage System (blue-collar) employees.

At these meetings the Committee will consider wage survey specifications, wage survey data, local committee reports and recommendations, statistical analyses, and proposed wage schedules.

All portions of the meetings will be closed to the public because the matters considered are related solely to the internal personnel rules and practices of the Veterans Administration and because the wage survey data considered by the Committee have been obtained from officials of private business establishments with a guarantee that the data will be held in confidence. Closure of the meetings is in accordance with subsection 10(d) of Pub. L. 92-463, as amended by Pub. L. 94-409, and as cited in 5 U.S.C. 552b(c)(2) and (4).

However, members of the public are invited to submit material in writing to the Chairman for the Committee's attention.

Additional information concerning these meetings may be obtained from the Chairman, Veterans Administration Wage Committee, Room 1175, 810 Vermont Avenue, NW., Washington, DC 20420.

Dated: December 16, 1985.

Rosa Maria Fontanez,

Committee Management Officer.

[FR Doc. 85-30431 Filed 12-24-85; 8:45 am]

BILLING CODE 8320-01-M

OCA EXHIBIT NO. 83
R-850152

1-8-85

Plib

RDS

Q.IR-PAIEUG-2-64. Please provide a summary of the completion date and total cost per kW of Limerick Unit Nos. 1 and 2 and common plant, as estimated each year from 1966 to 1985. Provide the information in the following format:

Year of Estimate	Limerick 1 $/kW	Completion Date	Limerick 2 $/kW	Completion Date	Common Plant $/kW
1966	'	'	'	'	'
1967	'	'	'	'	'

A.IR-PAIEUG-2-64.

Year of Estimate	Limerick 1 $/kW	Completion Date	Limerick 2 $/kW	Completion Date	Common (3) Plant $/kW
1/71	339 (1)	4/75	(1)	4/77	(1)
7/72	573 (1)	4/79	(1)	1/80	(1)
10/74	824 (1)	4/81	(1)	4/82	(1)
10/75	949 (1)	4/81	(1)	4/83	(1)
6/77	1,222 (1)	4/83	(1)	4/85	(1)
8/78	1,922 (2)	4/85	1,094	4/87	(2)
2/80	2,045 (2)	4/85	1,144	4/87	(2)
9/80	1,190	4/85	1,255	4/87	565
12/80	1,295	4/85	1,552	10/87	574
6/82	1,355	4/85	1,855	10/87	785
1/83	2,027	4/85	2,267	10/88	608
1/84	2,026	4/85	2,799	4/90	643
11/84	2,210	8/85	2,985	7/90	718
3/85	2,361	12/85	2,985	7/90	753
7/85	2,409	2/86	2,985	7/90	763

(1) Cost shown was estimated on a total station basis, therefore a breakdown between units and common plant is unavailable.
(2) Cost shown was estimated for #1 Unit and 100% of common plant and a breakdown of this cost is unavailable.
(3) The cost per kW of common plant is based on two-unit capacity of plant.

Responsible Witness: V.S. Boyer, Senior Vice President - Nuclear Power

OCA EXHIBIT NO. 6
R-850152

1-8-85

Phl's

RJS

Q. IR-OCA-15-5. Please reference pages 6 and 7 of the Company's response in the Limerick 2 Investigation at I-840381 identified as Attachment DR-WJC4-OCA-114A (which was entered into the record as OCA Exhibit 62). Please provide an update of the net annual cost of continuing rather than terminating the lease on 458 MW of combustion turbines through October 1, 1996, using the same methodology, but utilizing the "paid in balance" as of June 27, 1986.

A. IR-OCA-15-5. Based on utilizing the "paid in balance" as of June 27, 1986, page 7 of OCA Exhibit 62 to the Limerick 2 investigation becomes: the annual cost from 1986 to 1996 assumes continuing the CT lease payments until normal termination on 10/1/96.

Theoretical paid in balance 6/27/86	$40,859,000
Credit for each of 21 semi-annual payments $40,859,000 / 21	$1,946,000
Semi-annual lease payment	2,193,000
Cost to ratepayers per lease payment	$247,000
Cost to ratepayers in 1986	$247,000
Annual cost to ratepayers 1987-1996	$494,000

Therefore, page 6 of OCA Exhibit 62 becomes:

Annual Cost of Retaining 458 mw of CT's until 1996

Year	Cost Millions $
1986	0
1987	1
1988	0
1989	1
1990	0
1991	1
1992	0
1993	1
1994	0
1995	1
1996	0

(Continued)

The annual cost described in OCA Exhibit 62 to the Limerick 2 investigation was the annual cost of continued lease payments only. When the fuel and interchange and O&M costs associated with the 458 mw of combustion turbines are added to the lease costs, the net annual cost for continuing rather than terminating the lease becomes:

Net Annual Cost of Retaining 458 mw of CT's until 1996

	Costs in Million $			
Year	Fuel & Interchange	Operating & Maintenance	Lease Payments	Total Cost
1986	1	2	0	3
1987	1	4	1	6
1988	1	3	0	4
1989	1	4	1	6
1990	2	5	0	7
1991	1	4	1	6
1992	1	5	0	6
1993	2	5	1	8
1994	3	5	0	8
1995	3	5	1	9
1996	3	5	0	8

Responsible Witness: C.H.Rush, Chief Engineer - Research & Planning Division

R-850152

1-2-85

PMS

A95

Q.IR-UUC/UP-2-22. Please provide the studies listed on Schedule 9.

A.IR-UUC/UP-2-22. Copies of both 9/5/80 and 1/27/81 studies "Comparison of the Limerick Nuclear Station with other alternatives" were provided in response to IR-OCA-2-24. Copies of the remaining studies listed on Schedule 9 are contained in Attachment IR-UUC/UP-2-22.

Responsible Witness: C.H. Rush, Chief Engineer - Research and Planning Division

System Planning Division
S12-1 - 2301 Market Street

January 29, 1981

LIMERICK BRIEFING BOOK

Here is a copy of the Limerick Briefing Book for your information. The book was prepared for use by the Board of Directors.

Full color photographic artwork was used in the books distributed to the directors. References to the photographic artwork and charts in this copy may be incorrect, as this copy has been machine collated.

FRS:bar

Copies - KGL
W.H
all Dir Heads
Sam Boyle

OVERSIZE DOCUMENTS

LIMERICK BRIEFING BOOK

JANUARY 1981

PREFACE

This briefing book has been prepared for the Philadelphia Electric Company's Board of Directors' January 30-31, 1981 meeting with Bechtel Power Corporation and General Electric Company in California.

The purpose of this book is to acquaint the Board with the major aspects of the Limerick project, and to identify areas of concern. The book consists of approximately 20 items. The items may be read in any order as each is presented separately and is self supporting.

INSIDE COVER

The inside cover is a recent aerial photograph of the Limerick Generating Station site. The picture was taken in September 1980.

The predominate feature is the 507 foot, hyperbolic, natural draft cooling tower for Unit #1. In the foreground are the nuclear reactor enclosures, with the turbine building directly behind.

At present, construction is 46% complete, with the daily work force at the site numbering 2700.

LIMERICK BRIEFING BOOK

INDEX

Limerick Project Description

The Limerick Generating Station is situated on an approximately 600 acre site about 3 miles south of Pottstown.

The site is traversed by the Schuylkill River. The major portion of the site and virtually all plant facilities are located in Limerick Township, Montgomery County.

Approximately 100 acres of the site are located in Lower Pottsgrove Township, also in Montgomery County; and nearly 100 acres are located on the west bank of the Schuylkill River in East Coventry Township, Chester County.

The site was chosen as a result of an extensive evaluation of potential sites conducted over a period of 15 months in 1968 and 1969.

Favorable characteristics which led to the choice of this site include

- Immunity to flooding
- Satisfactory meteorology and geology
- Good access by rail and highways
- Existing 500 kV transmission facilities

Public announcement of the Limerick Project occurred in October, 1969. Philadelphia Electric Company contracted with General Electric Company for major plant equipment such as the nuclear steam supply systems, turbine-generators, and nuclear fuel; and with Bechtel Power Corporation for architectural, engineering and construction management services.

Application for a construction permit was filed with the Atomic Energy Commission in February, 1970. Lengthy staff review, the need to comply with the newly enacted National Environmental Policy Act, and protracted public hearings resulted in the construction permit not being granted until June 1974.

Delay in receipt of the construction permit, failure of anticipated load growth to materialize, and financial constraints have resulted in postponement of anticipated commercial operation of Unit #1 from Spring, 1975 to Spring, 1985 and commercial operation of Unit #2 from Spring, 1977 to Fall, 1987.

At the present time construction of Unit #1 is 56% complete; Unit #2 is 26% complete; and overall the project is 46% complete.

Total expenditures to date are approximately $1.5 billion. Estimated total cost of the project at completion is approximately $4.1 billion.

Referring to the attached artist's conception of the completed plant on the opposite page:

The main plant is centrally located on the site. Unit #1 facilities generally occupy the left hand portion of the plant, and Unit #2 facilities occupy the right hand portion. Each unit has a nominal rating of 1,100,000 kW (1,100 mw).

The reactor enclosures are shown in the foreground. The control structure and turbine enclosure are located adjacent to and immediately behind the reactor enclosure. The radioactive waste treatment facilities enclosure is located to the left of Unit #1 reactor enclosure.

Administration and service facilities are located to the right of the reactor enclosure.

Two diesel-generator buildings, each housing four diesel-generator units which provide emergency power, are located in front of the reactor enclosure

Cooling requirements for Unit #1 are provided by a single natural draft cooling tower having a height of 507 feet. A second, identical tower provides cooling requirements for Unit #2.

The circulating water pumphouse, located between the plant and the cooling towers, contains eight pumps (four per unit) which continuously circulate cooling water between the steam condensers within the plant and the cooling towers.

An intake and pumping structure is located on the east bank of the Schuylkill River.

A spray pond encompassing 9 acres of surface area and containing some 28 million gallons of water is provided for emergency shut-down cooling purposes. The pond and its associated pumphouse are located to the left of and behind the cooling towers.

Located to the left of the Unit #1 cooling tower is a 220,000 volt substation. Power produced by the Unit #1 generator is fed to this substation.

Two 220,000 volt transmission lines emanate from the substation and terminate at the existing Cromby Station near Phoenixville.

A 500,000 volt substation is located to the right of the plant. Power produced by the Unit #2 generator is fed to this substation.

Three 500,000 volt transmission lines emanate from this substation. Two of these lines terminate at the existing Whitpain Substation near Norristown. The third line terminates at the existing Peach Bottom Station.

Other site facilities at the Limerick Site

Limerick Atomic Information Center

The Limerick Atomic Information Center is located immediately behind the 500,000 volt substation. Over 250,000 people have visited the center since it opened in the early '70's.

Training Simulator

The Training Simulator Center, located behind the Limerick Atomic Information Center, contains a computer based mock-up of the Limerick Control Room which is capable of simulating every conceivable transient, abnormal, or emergency condition which can occur at the plant. Here operators for both the Peach Bottom and Limerick plants will be trained. The center is now fully operational.

LIMERICK - PROJECT STATUS

The following tables show construction status, project costs, field manhour requirements, and materials required.

Construction Status - January 1, 1981

Total Project	46% complete
Unit #1 and common	56% complete
Unit #2	26% complete

Project Cost - Millions of Dollars

	Direct Costs	AFUDC	Total
Spent through December 31, 1980	$1,165	$ 391	$1,556
Required to Complete	1,394	1,170	2,564
Total	$2,559	$1,561	$4,120

Field Manhour Requirements - Thousands of Hours

	Unit #1*	Unit #2	Total
Bechtel Manual	23,500	13,800	37,300
Subcontractor	5,100	2,900	8,000
Bechtel Nonmanual	9,200	4,500	13,700
Total Field Manhours	37,800	21,200	59,000
Expended through December 31, 1980	21,400	5,600	27,000

* Includes common facilities

LIMERICK - Project Status (con'd)

MATERIALS REQUIRED

Commodity/Unit	Unit 1 & Common Qty.	Unit 1 & Common Percent Complete	Unit 2 Qty.	Unit 2 Project Complete	Total Plant Qty.	Total Plant Project Complete
Civil						
Structural Concrete (cubic yards)	200,000	95%	100,000	70%	300,000	[redacted]
Reinforcing Bar (tons)	25,000	95%	15,000	70%	40,000	[redacted]
Form Work (square feet)	3,700,000	95%	2,300,000	35%	6,000,000	70%
Structural Steel (tons)	12,000	95%	8,000	85%	20,000	90%
HVAC Duct (tons)	1,900	60%	900	0%	2,800	40%
Pipe						
Large Pipe (linear feet)	270,000	90%	140,000	30%	410,000	70%
Small Pipe (linear feet)	275,000	40%	195,000	3%	470,000	25%
Instruments (each)	2,700	10%	1,900	0%	4,600	6%
Instr. Tubing (linear feet)	155,000	3%	110,000	0%	265,000	2%
Electrical						
Conduit (linear feet)	470,000	60%	210,000	15%	950,000	50%
Cable Tray (linear feet)	65,000	70%	35,000	5%	100,000	45%
Cable (linear feet)	5,600,000	4%	3,900,000	0%	9,500,000	[redacted]
Terminations (each)	165,000	4%	125,000	0%	290,000	2%

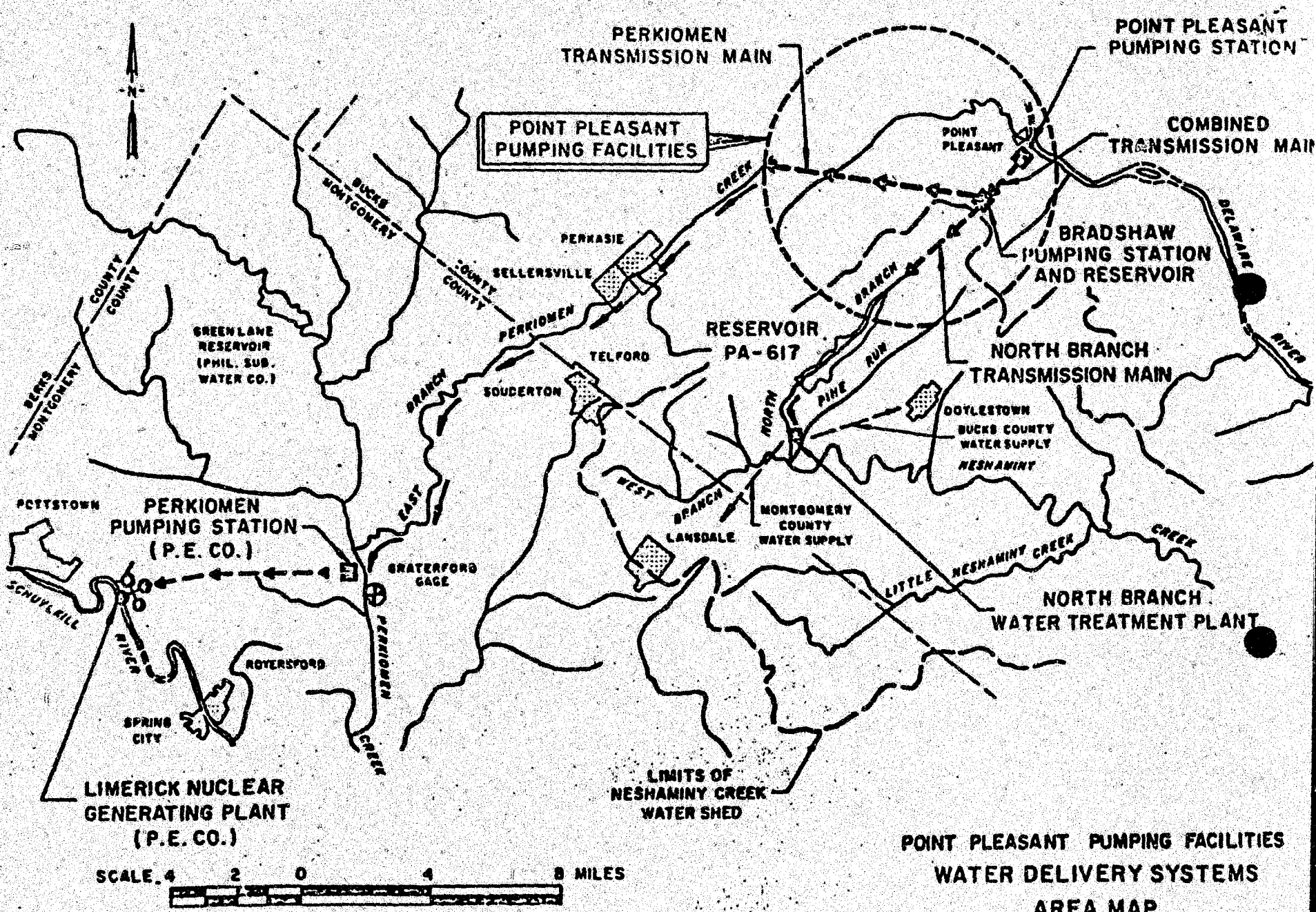
LIMERICK SITE SELECTION

In 1969, Gilbert Associates, Inc. conducted a comprehensive study for PECO to determine suitable sites for 2-1000 mw nuclear units. As the power from Peach Bottom, Conemaugh, and Keystone enters the PECO system from the south, it was desirable from a system reliability standpoint to place the next large generating addition in the northern part of our service area. The Limerick site was selected because of the following advantages: essentially no new transmission right-of-way was required, other than on railroad rights of way, as the site is located at the junction of several existing right-of-way corridors; economically the site is the least expensive when all constructions costs are considered; and the site met all NRC criteria.

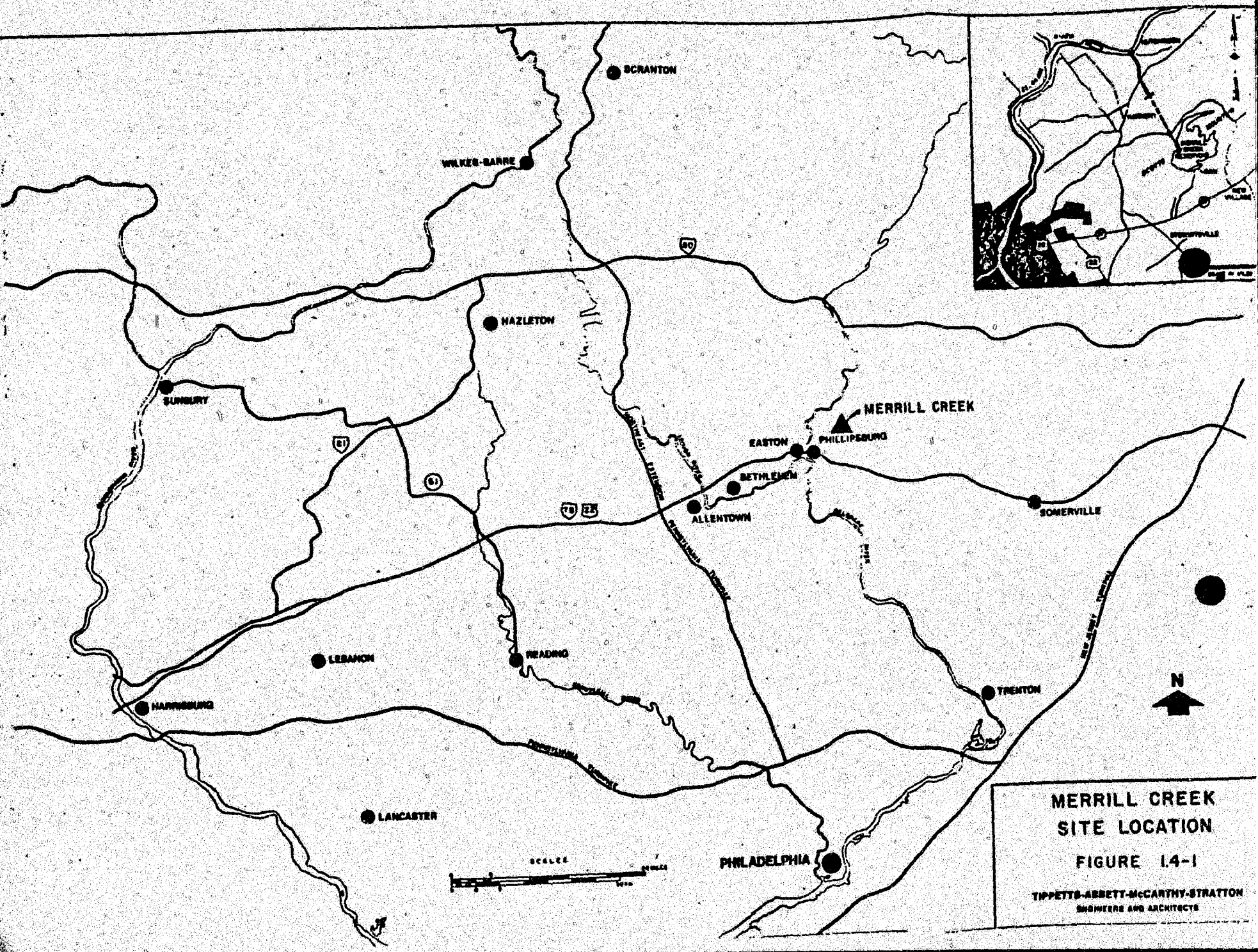
The main disadvantage of the site is that the Schuylkill River below Pottstown does not have sufficient flow to accommodate the station's evaporative water requirements. This was realized before the site was selected. Prior to land acquisition, PECO discussed water requirements with the Delaware River Basin Commission (DRBC). When the plan to remove water from the Delaware River was approved PECO joined with Bucks County in a water resource development program originally initiated in 1966. The proposed system will transfer Delaware River water to Limerick by pipelines and open flow in the Perkiomen Creek. Presently, environmentalists and anti-nuclear groups are voicing their concern over the environmental impact of the pumping facilities to be located on the Delaware River. However, they are a small minority and we do not anticipate any serious problems. The attached drawing shows the water supply system.

With the cancellation of the Tocks Island Project in 1978, the DRBC became more concerned with the replacement of consumptive water use from the Delaware River. Sufficient water flow is required to maintain the "salt line" below the city water intakes. The DRBC passed regulation requiring electric utilities using Delaware River water to provide for consumptive make-up during periods of low natural river flow. To respond to this requirement utilities in the basin formed the Delaware River Basin Electric Utilities Group (DRBEUG). DRBEUG proposes to build a consumptive usage make-up reservoir at Merrill Creek in New Jersey. Approximately 35% of the capacity of the reservoir will be dedicated to Limerick. See the following drawing for location.

In essence, the Limerick site is a trade off between transmission and water supply. The cost of the water supply system is more than offset by transmission savings.



POINT PLEASANT PUMPING FACILITIES
WATER DELIVERY SYSTEMS
AREA MAP



MERRILL CREEK
SITE LOCATION

FIGURE 1.4-1

TIPPETTS-ABBETT-McCARTHY-STRATTON
ENGINEERS AND ARCHITECTS

LIMERICK

CHANGES SINCE TMI

The incident at Three Mile Island has had a major effect on the nuclear industry. With regard to Limerick, three major areas are affected: plant design, operator training, and emergency planning.

Plant Design Additions

1. Relief valve position monitors via accoustic emission detectors.
2. Improved primary containment isolation features.
3. Higher range radiation monitors.
4. Improved sampling and shielding provisions.
5. Technical Support Center for for post-accident control.
6. Emergency Operations Center for off-site activity control.
7. Additional instrumentation will be located in the control room. This instrumentation will alert the operators of the status of all safety systems.
8. Human factors review of control room.
9. Establishment of off-site news center.

Operator Training

1. Program directed to meet increased knowledge and proficiency requirements.
2. More stringent operator selection process.
3. Upgraded qualification and training program with inclusion of heat transfer, thermodynamics and related subjects.
4. Increased simulator training experience.
5. Additional shift personnel with specialists in analysis of transients and emergency conditions.

Simulator training will be provided at a center on the Limerick site. The control boards at the training center are designed specifically like those in the plant and the installed equipment and computers are so programmed that operation of the Limerick units may be simulated under normal, transient, and emergency conditions. The simulator meets or exceeds all present requirements of the American Nuclear Society's standards for power plant simulators. It will also meet all NRC requirements. A picture of the simulation control room is shown on the opposite page.

CHANGES SINCE TMI (Cont'd)

Emergency Planning

1. Provide dedicated communications with civil authorities at all levels.
2. Provide a warning system for all persons within a 10-mile radius of the plant.
3. Develop emergency plans involving local, state and federal agencies and assure that adequate civil plans are prepared.
4. Demonstrate adequacy of plans through practice drills.

LIMERICK

PROBABILISTIC RISK ASSESSMENT

In its continuing review of the safety of nuclear generating facilities, the Nuclear Regulatory Commission requested the Philadelphia Electric Company in May of 1980 to conduct a Probabilistic Risk Assessment (PRA) of its Limerick Generating Station. This technique has been used in the space industry and was first applied to nuclear power plants in 1975. Since that time, the techniques and data bases have been improved, and the concept is expected to be used more extensively in the design and analysis of nuclear plants. Studies similar to that conducted for Limerick are currently being carried out for other nuclear plants.

The conclusion of the Limerick PRA is that the plant does not present an undue risk to the public. This statement is based on a comparison with other man-made or natural events and with evaluations which have been conducted for other nuclear facilities in the NRC's Wash 1400 or Rasmussen Reactor Safety Study.

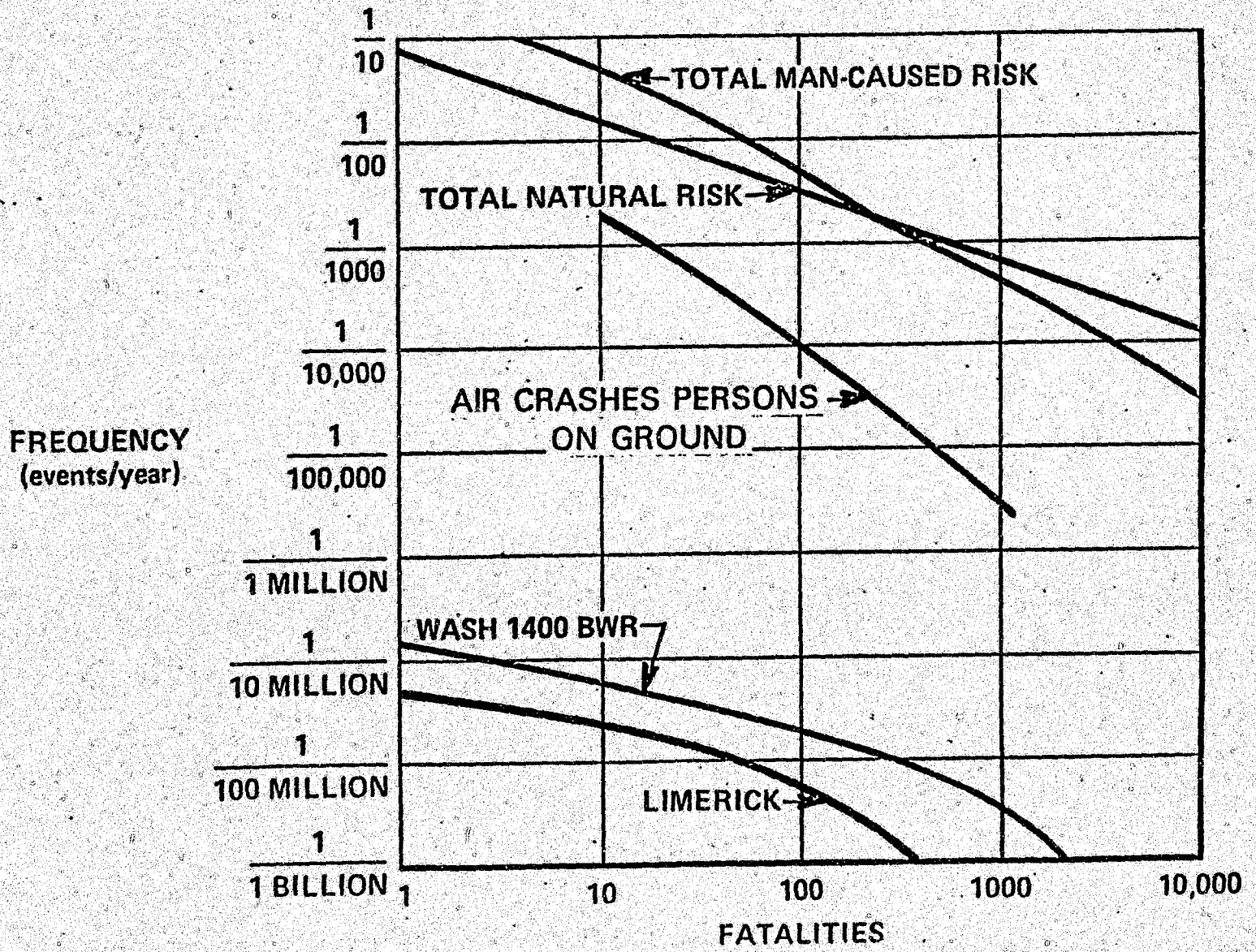
Philadelphia Electric engaged General Electric and Science Applications, Inc. to perform the Limerick analysis. Saul Levine of NUS, Inc., reviewed the work as it was being performed. An oral report on the results of the work was presented December 9, 1980 at a public hearing to the NRC. A complete written report will be furnished to the NRC at a later date. A comprehensive study was carried out which required additional time beyond the originally designated schedule of four months. The cost of the study amounted to about $1.5 million.

The NRC chose Limerick for additional study because of the immediate area's high population density when compared with other existing and planned nuclear facilities. The detrimental effect of the high population density was found to be more than offset by the use of a reinforced steel-lined containment, upgraded safety systems, and a highly reliable off-site transmission system.

The graph on the opposite page compares the risk of fatalities from an accident at Limerick with WASH 1400, air crashes, total natural and total man-caused risks. The total man-caused risks include only involuntary risks such as dam failures, toxic gases, air crashes,and explosions. Voluntary man-cause risks, such as riding in an automobile, have not been included. The annual risk of being killed in an automobile accident is approximately 1 in 4000. The PRA was site specific for Limerick. It included an area with a 500 mile radius from the Limerick site.

Limerick Preliminary Risk Assessment

Limerick/Wash 1400 Risk Comparison



RADIOACTIVE WASTES

Disposal of radioactive wastes is primarily a social and political problem, not a technical problem.

High level nuclear wastes from commercial nuclear power plants result from reprocessing spent fuel and are required to be solidified prior to final disposal. Extensive engineering studies and laboratory tests have shown that wastes can be disposed of in geological formations that will be undisturbed for centuries without the need for continuous surveillance. Disposal in rock salt formations is the method recommended by several groups including three different committees of the National Academy of Sciences. The federal government is now attempting to select several disposal locations.

There is ample time for disposal sites to be developed, as reprocessors, by law, may store nuclear wastes for up to ten years. Nuclear fuel reprocessing plants have been in world-wide operation for 30 years. In the U.S. there are three government plants in operation; one commercial plant partially constructed, and two commercial plants shut down because of economic conditions. Because of the federal government's decision not to allow commercial reprocessing, the future of these commercial plants is in question. There are 12 other reprocessing plants in the world, principally in Europe.

If reprocessing of spent fuel from commercial nuclear reactors is allowed in the future, the high level wastes would occupy a very small volume. The annual high level waste generated from a 1,000 mw nuclear plant would occupy a cube about four feet on edge. In contrast, a coal fired unit of the same size would require 33 railroad cars a day for ash disposal. By the year 2000, the entire amount of high level wasted generated in the U.S., would occupy a 50-foot cube if plutonium and uranium are recycled. Actual disposal of wastes would be in sealed cannisters and very little surface land area would be required.

We already have a legacy of nuclear wastes from the government's nuclear weapons program. Adding to that volume, particularly with better management and technology, adds little to the existing reality. There is no doubt that we have the capability to effectively deal with nuclear wastes.

The government's prohibition of commercial spent fuel reprocessing has created a need to store spent fuel. Lack of government storage facilities has led to installation of spent fuel storage racks which increase the storage capacity of spent fuel pools. We have completed the installation of additional spent fuel storage capacity at our Peach Bottom plant at a total cost of $7,000,000. A similar alteration in the design of Limerick facilities has been approved and is in progress.

The 32 racks presently being fabricated for Limerick will provide a total storage capacity of 4080 assemblies (2040 per unit). Space is available to add additional racks which would provide a total storage capacility of 5,724 spent fuel assemblies. When the racks presently being fabricated are installed, Limerick 1 and 2 will be able to maintain full core (764 assemblies) discharge capability through 1993 and 1995 respecitvely assuming 1985/1987 commercial operation dates and 18 month refueling cycles.

Limerick low level wastes such as spent resins which are used for water purification and liquid radwaste treatment are expected to be solidified, packaged, and removed by a commercial contractor to a licensed burial site. This type of waste is estimated to be approximately 24,000 cu. ft. per year. In addition, there are other radioactive wastes such as compactable trash and contaminated equipment which also require disposal at the burial sites. Presently there are three commercial burial sites in operation, namely Barnwell, SC; Beatty, Nevada; and Richland, Washington. It is difficult to assess the quantity of material the States will allow the sites to receive from the various generators. We do know that a referendum recently passed by the voters of Washington will not allow non-medical out of state waste to be received after July 1, 1981. Due to the uncertainties of the disposal picture, we are investigating the installation of on site storage facilities as well as waste volume reduction techniques.

LIMERICK - PIPE HANGERS AND SUPPORTS

Changes in NRC regulations require piping supports on safety related piping to be substantially up-graded to meet new criteria. Piping must not only be able to withstand a "design" earthquake, but also the forces resulting from pipe breaks where the reaction from the fluid flow would tend to do further damage.

The attached photographs show various pipe supports. A conventional pipe support is shown on top with a threaded rod connecting the ceiling roof beams to a normal strap-type pipe hanger. This type of support is used extensively in non-nuclear generating stations.

The second photograph (middle) shows a seismic support using angle iron welded to the building structure. The third photograph (bottom) shows the complexity of some of the seismic supports at Limerick.

This illustrates just one of the many additional safety design changes. The result of these changes is an increased need for pipefitters and welders. Installation of pipe hangers was originally estimated at 400,000 manhours. Now it is estimated to involve 2,300,000 manhours, a 475% increase.

LIMERICK COST HISTORY

The graph on the opposite page shows the $2,118 million difference between Bechtel's Forecast 1 and Forecast 5. Forecast 1 was issued October 1975. Forecast 5 is the most recent and was issued December 1980. In five years the total Limerick project has increased 105%, a compound rate of 15% per year.

A summary of the causes for the increase are as follows:

Plant design or scope changes	11%	$233 Million
Installation rate variance	3%	64 Million
Overheads associated with longer schedule	13%	275 Million
New Taxes*	4%	85 Million
Escalation due to longer schedule	19%	402 Million
AFUDC due to schedule/cost/interest rate changes	50%	1059 Million
	100%	$2118 Million

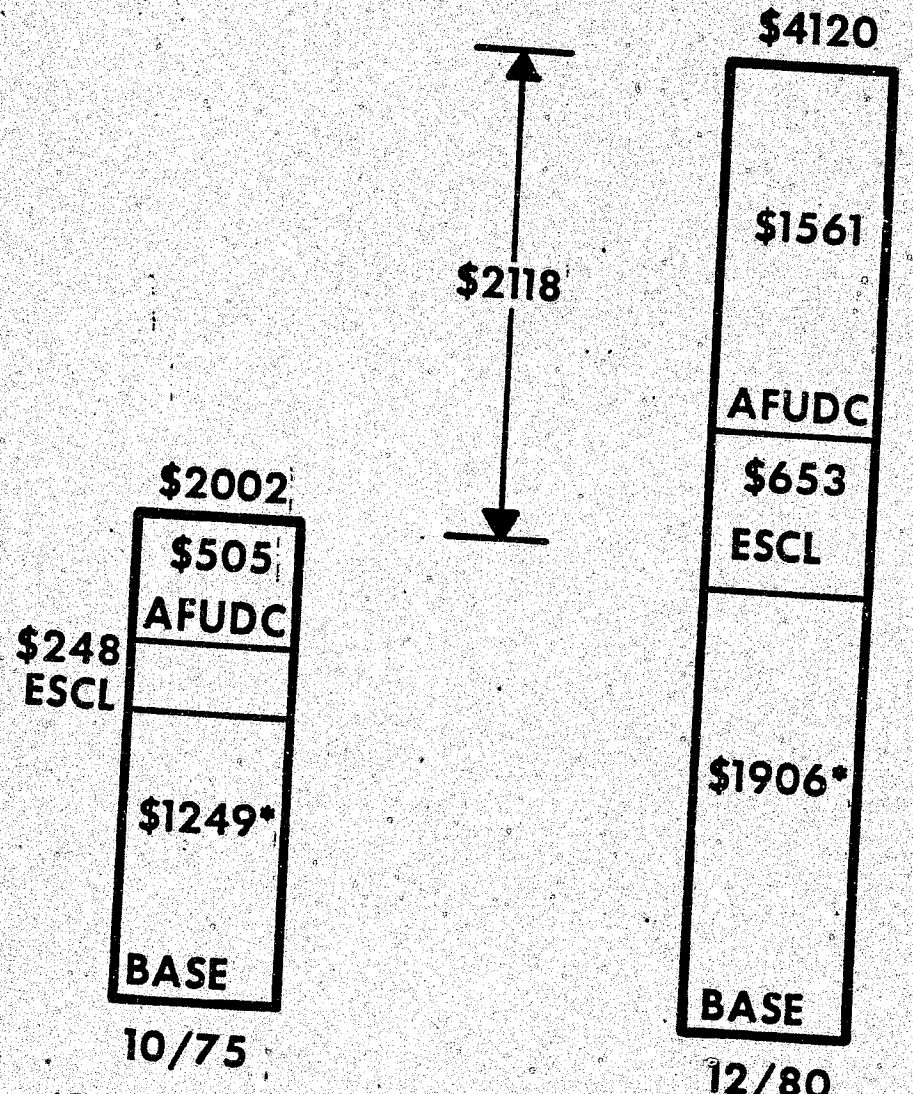
Base costs shown in the cost bars are in constant March 1975 dollars (the effect of inflation is included in the escalation category). The increase of $657 million is attributable to design changes necessitated by NRC requirements or regulations, by General Electric or by PECO. The relative breakdown of this cost is given in the first four categories in the above summary.

The areas of escalation and AFUDC have shown the greatest increases due to the prolonged construction period. These are responsible for almost 70% of the increase.

* The Pennsylvania Public Utility Realty Tax Act (PURTA) was passed in 1971. The effect of this tax was not included in earlier estimates.

LIMERICK COST HISTORY
($ IN MILLIONS)

SERVICE DATES:	UNIT 1	1981	50 MONTHS →	1985
	UNIT 2	1982	63 MONTHS →	1987



*BASE COST EXPRESSED IN 3/75 DOLLARS

LIMERICK

SUMMARY OF COST AND SERVICE DATE HISTORY

Date	Estimated Service Dates Limerick #1	Limerick #2	Estimated Cost Incl. Interest & Overhead (Millions)	Comments
Jan/71	Apr/75	Apr/77	716	Capital Authorization approved.
Jan/72				Site work suspended. Construction Permit not issued.
July/72	Aug/78	Jan/80	1209	Bechtel Preliminary Estimate.
June/74	July/79	Dec/80		Construction Permit recd. Construction resumed.
Oct/74	Apr/81	Apr/82	1738	Rescheduled due to financial reasons.
May/75	Apr/81	Apr/83		Rescheduled due to reduced load forecast.
Oct/75	Apr/81	Apr/83	2002	Bechtel Forecast 1.
June/77	Apr/83	Apr/85	2578	Supplemental Capital Authorization approved.
May/78	Apr/85	Apr/87		Rescheduled due to reduced load forecast.
Dec/80	Apr/85	Oct/87	4120	Bechtel Forecast 5.

Further details and explanation are given in the Major Milestones Section which follows.

MAJOR MILESTONES

May 1968 — A capacity addition was planned based on the following % reserves:

Year	Load Mw	Capacity Mw	w/Limerick (% Reserve)	w/o Limerick (% Reserve)
1974	6010	7073	17.7	17.7
1975	6340	7968	25.7	11.5

April 1969 — Based on a nuclear site evaluation study, the Limerick Site (Schuylkill Crossing) was chosen on the basis of economics. Other sites considered were Washington Crossing, Buckingham, Tohickon Creek, and Pine Forge.

January 1971 — The Capital Authorization for Limerick based on scheduled commercial operation dates of 1975 and 1977 had an estimated cost of $716 million.

January 1972 — Construction was suspended at Limerick because the construction permit had not been obtained.

July 1972 — Bechtel presented a new construction schedule and a preliminary estimate of costs to PECO based on receiving construction permits by January 1973. PECO revised its service date estimates to August 1978 and January 1980 and its cost estimate to $1209 million based on Bechtel's report.

June 1974 — Construction permits for the two units were received on June 19, 1974 and construction at Limerick resumed. Service was scheduled for July 1979 and December 1980.

October 1974 — The Company announced that financial constraints were responsible for reducing the 1975 construction budget from $571 million to approximately $420 million which necessitated a 2-year delay in construction schedule.

May 1975 — The Load Capacity Forecasts shows a peak load reduction in 1981 and in 1982. Therefore Limerick No. 2 could be rescheduled for 1983. Reduced peak loads affects timing of new units because of two reasons: First, new capacity can be delayed without affecting service reliability. Second, lower loads reduce revenues thereby making it more difficult to raise the required capital to finance the construction program because of lower interest coverage rates.

October 1975 — The estimated cost had increased by $264 million since October 1974. The major increases were attributable to escalation of direct costs, state of the art changes, and additional AFUDC.

May 1976 — Construction expenditures were further reduced as load growth estimates were reduced.

MAJOR MILESTONES (Cont'd)

June 1977	A supplemental Capital Authorization was approved based on Limerick service dates of 1983 and 1985. The Comparison of Initial and Supplemental Estimates shows that 32% of the increase can be attributed to escalation, 23% to scope additions including NRC licensing requirements, 34% to additional Allowance for Funds Used During Construction (AFUDC), 5% for Pennsylvania Realty Tax and the remaining 6% for miscellaneous items.
May 1978	Construction expenditures were further reduced as load growth estimates were reduced.
December 1980	The increase in the estimate is due mainly to delays in the service dates of the units.

LIMERICK - ECONOMICS

Investor-owned utilities, such as PECO, are mandated to provide reliable service at reasonable cost. From the inception, a nuclear fueled Limerick Station has been the lowest cost of all alternatives.

The first study of nuclear energy was made in 1965, and indicated that a nuclear plant would provide energy at about 75% of the total cost of the best fossil alternative. Continued economic evaluations of nuclear energy indicate that nuclear energy is the correct choice for PECO.

Nuclear construction costs have increased dramatically since the 1965 study; however, they have been more then offset by the rapid escalation of fossil fuel costs. Limerick's average fuel cost for 1985-1994 is 1.5¢/kwh. The average fuel cost of electricity that Limerick will be replacing is 12¢/kwh for the same period.

In the late 1960's, PECO was experiencing a growth rate of over 6% per year. Large capacity additions were required to meet the expected future demand for electricity. Peach Bottom Station was under construction with service scheduled for the early 1970's. Limerick Station and then Fulton Station were planned to meet this demand. With the energy crunch of 1973 and the accompanying business recession, the Limerick service dates were delayed, and Fulton was cancelled.

A December 1980 comparison of a nuclear fueled Limerick with the best alternatives indicates that nuclear energy is the best choice and that the alternatives are economically unreasonable. The alternative plans are compared to a nuclear-fueled Limerick (the base plan) for the 1982-1994 period. The increased costs, as indicated, would have to be passed on to PECO customers through higher rates.

The following alternatives were considered:

Alternative 1 - Convert the Limerick project to coal-firing. Approximately one-half of the present Limerick capital expenditures would be reusable for the coal plant. The service dates of the 2-1130 mw coal units would be April 1989 and April 1990. The additional cost of this plan in the 1982-1994 period is $5 billion.

Alternative 2 - Limerick terminated with 2-615 mw coal-fired units installed at another location. The cost of this alternate is $6 billion greater than the base plan.

Alternative 3 - Limerick terminated with no replacement capacity installed. Costs would increase by $8 billion.

LIMERICK - COAL CONVERSION STUDY

In April 1980, PECO commissioned Gilbert Associates, Inc. to determine the technical feasibility and capital cost of conversion of the two Limerick units from nuclear-fueled to coal-fired. In its investigation, Gilbert assumed maximum use of existing site facilities. Approximately one-half of the existing facilities would be used and useful for a coal-fired plant. The reactors, their enclosures, and radioactive waste treatment equipment would have to be abandoned. In addition to technical feasibility and costs, the Gilbert study included an assessment of the SO_2 removal system, sludge storage sites, air pollution dispersion analysis, and an analysis of required permits. The results of the investigation have been presented in a comprehensive report dated September 16, 1980. Highlights of the report are as follows:

Plant Data

Output	2-1130 mw units
Stacks	2-1100 foot
SO_2 removal	Wet limestone
Commercial Operation	
Unit #1	4/89
Unit #2	4/90
Licensing and Permit Time	4 years
Total Cost	$5.4 billion (1)
Daily Coal Requirments	22,300 tons (over 2 unit trains)
Daily Limestone Consumption	2,100 tons
Daily Sludge Production	6,800 tons (one 20 ton truck every 4 minutes)
Sludge Disposal Sites Investigated	7

Gilbert Associates, Inc. choose wet limestone scrubbing for the converted coal plant. PECO would probably elect to use regenerative magnesium oxide scrubbing simular to the systems being installed at Eddystone and Cromby.

The choice of wet limestone scrubbing by Gilbert is understandable. Wet limestone scrubbing is considered a proven system and is in general use throughout the nation. Magnesium oxide scrubbing is a newer design being pioneered by PECO. The advantage of magnesium oxide scrubbing is that no waste is produced as the magnesium is recycled. Sulfuric acid is a by-product of this recycling.

NOTES:

(1) Includes ¼ of Limerick sunk costs of $1.9 billion as of 12/31/81 plus AFDUC on this amount until the service dates of coal units.

LIMERICK

AREAS OF CONCERN

INTRODUCTION

PECO, Bechtel, GE, and others are greatly concerned that the Limerick project be completed on schedule and within the latest forecast cost of $4.1 billion. The performance of Bechtel and GE has been satisfactory, but their top management must be impressed with the importance of this project to PECO.

PECO and the Limerick project are competing with other Bechtel and GE projects. SUPPORT OF THE LIMERICK PROJECT FROM TOP MANAGEMENT OF BECHTEL AND GE IS A MUST. LIMERICK IS THE LARGEST PROJECT IN PECO'S HISTORY.

The following areas of concern have been idenfied as possible schedule and design problems. Their detailed monitoring and early solution are imperative if Limerick is to be completed on time and within budget.

LIMERICK - AREAS OF CONCERN

LABOR SHORTAGES

There is a shortage of labor in two trades vital to the completion of the Limerick Project - electricians and pipefitters. The shortage is due primarily to high volume of construction activity in the Delaware Valley and New Jersey, especially Atlantic City.

By July 1, 1981 a payroll force of 800 pipefitters will be required; 750 are now employed. However, it will be difficult to reach and maintain the 800 level because of the anticipated loss of personnel to overtime jobs and jobs closer to Philadelphia beginning in the Spring. The 800 level must be maintained until mid-1985.

By January 1, 1982 a payroll force of 640 electricians will be required. A steady buildup from the present 345 man-force is planned. Electrical manpower needs are higher than previously expected because (1) the majority of Three Mile Island related additions are electrical in nature and (2) seismic requirements for cable tray and conduit have increased installation manhours.

Actions which have been taken or are being studied to attract and retain labor include:

1. Recruiting and training welders from the local areas. Upon qualification these men are issued permits by the local union which are only valid at Limerick. More than 135 men have been trained to date.

2. The implementation of the National Labor Union Agreement provision for a sub-journeymen pipefitter classification at 75% of journeymen wage. More than 90 sub-journeymen are now employed.

3. Enhancement of pipefitter travel pay within guidelines of labor contract. An increase in longevity has resulted.

4. Close cooperation and continuing dialogue with both pipefitters and electrician union combined with firm insistance on fulfillment of requirements. One result is the issuance of permits to non-union men by the electricians.

5. Development of incentive programs which will be implemented to off set attrition to more attractive jobs or to meet required manpower level.

THIS PROBLEM MUST BE COMMON TO OTHER BECHTEL PROJECTS. WHAT METHOD HAS BECHTEL FOUND TO BE THE BEST IN ATTRACTING AND KEEPING PERSONNEL?

LIMERICK - AREAS OF CONCERN

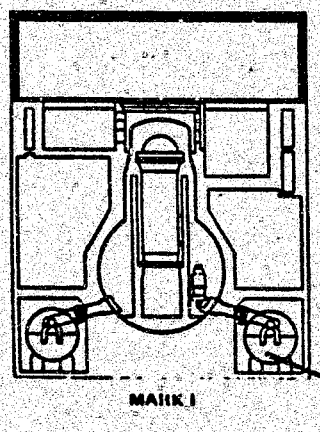
CONTAINMENT MODIFICATIONS

Limerick and Peach Bottom Stations are both General Electric Co. Boiling Water Reactors (BWR). Peach Bottom's containment is the Mark I design. It utilizes a torus for suppression of pressure releases in the event of an accident. The torus is a large donut shaped steel chamber located beneath the reactor. The Limerick design uses a Mark II containment. A concrete suppression pool located below the reactor is used instead of a torus to absorb pressure releases. Both types of containment are schematically shown below.

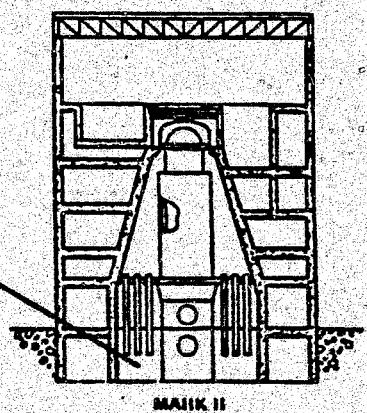
In 1975, GE notified the owners of the Mark I and II containment design of additional stresses the suppression pool may be required to accommodate. Owner groups were formed to study the situation. Computer modeling and field testing is in progress, but is behind schedule. When complete, design and field modifications will be made.

The utilities along with GE and Bechtel have been working to develop standards and criteria that the NRC would accept and approve. NRC approval has been very late and has delayed Limerick engineering and construction. A HIGH PRIORITY MUST BE GIVEN TO THIS BY GE AND BECHTEL SO THAT CONSTRUCTION CAN PROCEED ON SCHEDULE.

Peach Bottom



Limerick



LIMERICK - AREAS OF CONCERN

REACTOR SAFETY DESIGN CHANGES

The Nuclear Regulatory Commission (NRC) is considering a major reactor safety design change. At present there are several operating situations (turbine trip, loss of a cooling pump, loss of off-site power, etc.) that require automatic reactor shutdown. In the industry this shutdown, which is quite rapid, is referred to as a reactor "scram."

The NRC considers it possible that during the life of the reactor an unusual operating situation would occur that would prevent a normal reactor scram. The industry acronym for this situation is ATWS, Anticipated Transient Without Scram.

AT PRESENT THE ATWS CRITERIA HAS NOT BEEN DEFINED BY THE NRC. LIMERICK WILL BE REQUIRED TO MEET THE ATWS CRITERIA WHEN DEVELOPED. THIS COULD PRESENT FURTHER DESIGN AND SCHEDULING PROBLEMS. A TIMELY SOLUTION IS IMPERATIVE.

LICENSING STATUS

Construction Permit

The Limerick construction permit application was tendered to the Atomic Energy Commission (now Nuclear Regulatory Commission) in February 1970. Construction permits were issued in June 1974. An application for the Operating License will be filed in early 1981.

Operating License

The Limerick operating license application is comprised of the following documents:

General Information (per 10CFR50.33)
Final Safety Analysis Report (FSAR)
Fire Protection Evaluation Report (FPER)
Emergency Plan
Environmental Report - Operating License Stage (EROL)
Security Plan (Proprietary)
Safeguards Contingency Plan (Proprietary)

The Nuclear Regulatory Commission has developed the following schedule for its review of the Limerick operating license application, based on the application being tendered in early 1981:

Operating License Application Tendered	early 1981
Docket Application	2-81
Issue Draft Environmental Statement (DES)	6-82
Issue Safety Evaluation Report (SER)	8-82
Advisory Committee on Reactor Safety (ACRS) Review and Approval	9-82
Issue Final Environmental Statement (FES)	11-82
Issue SER Supplement	12-82
Start Hearings	1-83
End Hearings	5-83
Atomic Safety and Licensing Board (ASLB) Decision	9-83
Issue Operating License	11-83

Based on the length of construction permit hearings (2 years), and the number and sophistication of parties expected to intervene in the operating license proceeding, the hearings could extend well beyond the 5 months scheduled by the NRC.

In anticipation of prolonged hearings, one year of leeway has been allowed in the schedule. Loading of the nuclear fuel into the reactor cannot begin until the operating license is granted. If hearings extend beyond the 1 year and 5 months allowed, commercial operation will be delayed.

BECHTEL AND GE SUPPORT OF THE HEARINGS IS A MUST. GE ESPECIALLY MUST BE AVAILABLE TO DEFEND THEIR PLANT DESIGN.

LIMERICK - AREAS OF CONCERN

PUC ISSUES

Following the Company's filing for a rate increase in 1980, the Pennsylvania Public Utility Commission (PUC) decided to treat matters related to Limerick as a special investigation.

That investigation shall address, but not be limited to, the following issues:

a. The cost of construction delays at Limerick and whether those delays were reasonable.

b. The escalation of cost estimates for Limerick and whether those costs for the plant are reasonable.

c. The eventual impact of Limerick on PECO's capacity and reserve margins and the reasonableness thereof.

d. What alternatives PECO considered at the time the decision was made to build the plant and projected cost of each alternative.

e. Could any currently available alternate source of energy, conservation/load management activities, improvements in existing power plants' performance, etc. replace Limerick at a lower cost to the consumer assuming that:

1) expended costs are amortized over a reasonable period, or

2) expended costs are not amortized or collected from rate payers, or

3) expended costs are shared among stockholders and rate payers.

f. The potential of large electric consumers directly buying the capacity and/or energy associated with Limerick.

Direct testimony is to be submitted February 13, 1981. Eight weeks of public hearings will start March 23, 1981 and conclude July 3, 1981.

AS AN INTERNATIONAL ARCHITECT/ENGINEER, BECHTEL'S EXPERIENCE WILL BE OF GREAT VALUE IN DEFENDING LIMERICK'S COST HISTORY.

LIMERICK - AREAS OF CONCERN

NUCLEAR OPPOSITION

Shortly after the Limerick Generating Station project was announced in late 1969, the Environmental Coalition on Nuclear Power (ECNP) formed in the University City area. ECNP claimed to represent organizations having 10,000 members. ECNP has now scattered itself through central Pennsylvania, but it left behind Limerick Ecology Action (LEA). Some of the original ECNP founders started the local group. At the recent NRC public meeting about our preliminary risk analysis for Limerick, a representative of LEA said the group has 500 members, most living within ten miles of the plant. This seems surprisingly small for a 10-year old organization.

Tenacity, not growth, seems to be the chief characteristic of anti-nuclear organizations. Even the professionally organized Keystone Alliance, working out of the University of Pennsylvania area, does not seem to attract large numbers. In fact, with the exception of one large demonstration, Keystone's ability to draw crowds has diminished. They seldom try any more.

On the other hand, Keystone leaders seem to feel legitimatized by the accident at Three Mile Island. They are participating in - which means trying to use - the established process. Testifying at regulatory hearings, staging shareholder actions, and conducting public relations campaigns in an establishment-like manner, they have come in from the cold.

Some other organizations have anti-nuclear sympathies, but Keystone has the funds, leaders, and single purpose. A few small satellites of Keystone are active in suburban counties.

INCREASED NUCLEAR INFORMATION RELEASES BY NATIONALLY RECOGNIZED CORPORATIONS, SUCH AS BECHTEL AND GE, WOULD HELP MAINTAIN THE SILENT MAJORITY AS PRO-NUCLEAR.

LIMERICK - AREAS OF CONCERN

THE NEWS MEDIA

As a result of the Three Mile Island accident, many news people became much less objective towards nuclear power than had been the case. But only the Philadelphia Inquirer has mounted a consistent campaign against any nuclear activity.

In the suburban press, there is a turn over of reporters every couple of years. Editorial opinion has not been strongly expressed by most papers, but the reporting has required constant attention to assure a fair balance.

Frequent press briefings at Limerick and quick response to unfavorable stories have helped to keep the press well informed and we have generally been satisfied with the coverage. Even the Inquirer reporters have usually tried to do a balanced job.

Radio and television news people have also been fair in most reporting. This varies from time to time with personal comments and inuendos, but the coverage is not biased.

The print and television coverage we received on the probabilistic risk assessment meeting, a potentially all negative event, was relatively positive. This is the most important recent example of our program with the news media.

Whatever degree of balance we claim at any given time is due to contact, openness, and response by the Company. A period of "letting down" would make it necessary to start all over again.

A poll of the Philadelphia area public attitude toward nuclear power would probably give results similar to polls elsewhere. Most people realize that nuclear power is an important part of our energy mix, but few want to have a power plant of any kind nearby.

MEDIA RELEASES, INCLUDING PRIME TIME TELEVISION ADVERTISEMENTS, BY BECHTEL AND GE, CONCERNING THE NATIONS ENERGY PROBLEMS, AND THE ROLE OF NUCLEAR POWER WOULD BE OF GREAT VALUE.

PWL
RPS

ADDENDUM TO TESTIMONY OF LEWIS J. PERL

In my testimony in this proceeding I made certain comparisons between the cost of Limerick and other units. Since filing the testimony, new data on the construction costs of other nuclear units has become available. Since these new data have some effect on the results, I am filing the addendum to update the comparison included in my testimony. Using the revised results, the average cost of other units standardized to Limerick is 2,860, which is only 0.3 percent below Limerick. The predicted cost of Limerick is $2,818 which is only 1.8 percent less than Limerick. Thus, using the new data, and a new regression based upon that data, Limerick costs are even closer to the average costs than before. These results are described in Schedule 20, attached hereto. Page 1 of Schedule 20 contains a figure comparing the cost of Limerick and other units standardized to Limerick's characteristics. Page 2 of this Schedule contains the actual and standardized costs for each plant in the database. Page 3 describes the new regression relating costs to plant characteristics based upon the 1985 TVA survey, and page 4 contains notes describing this regression.

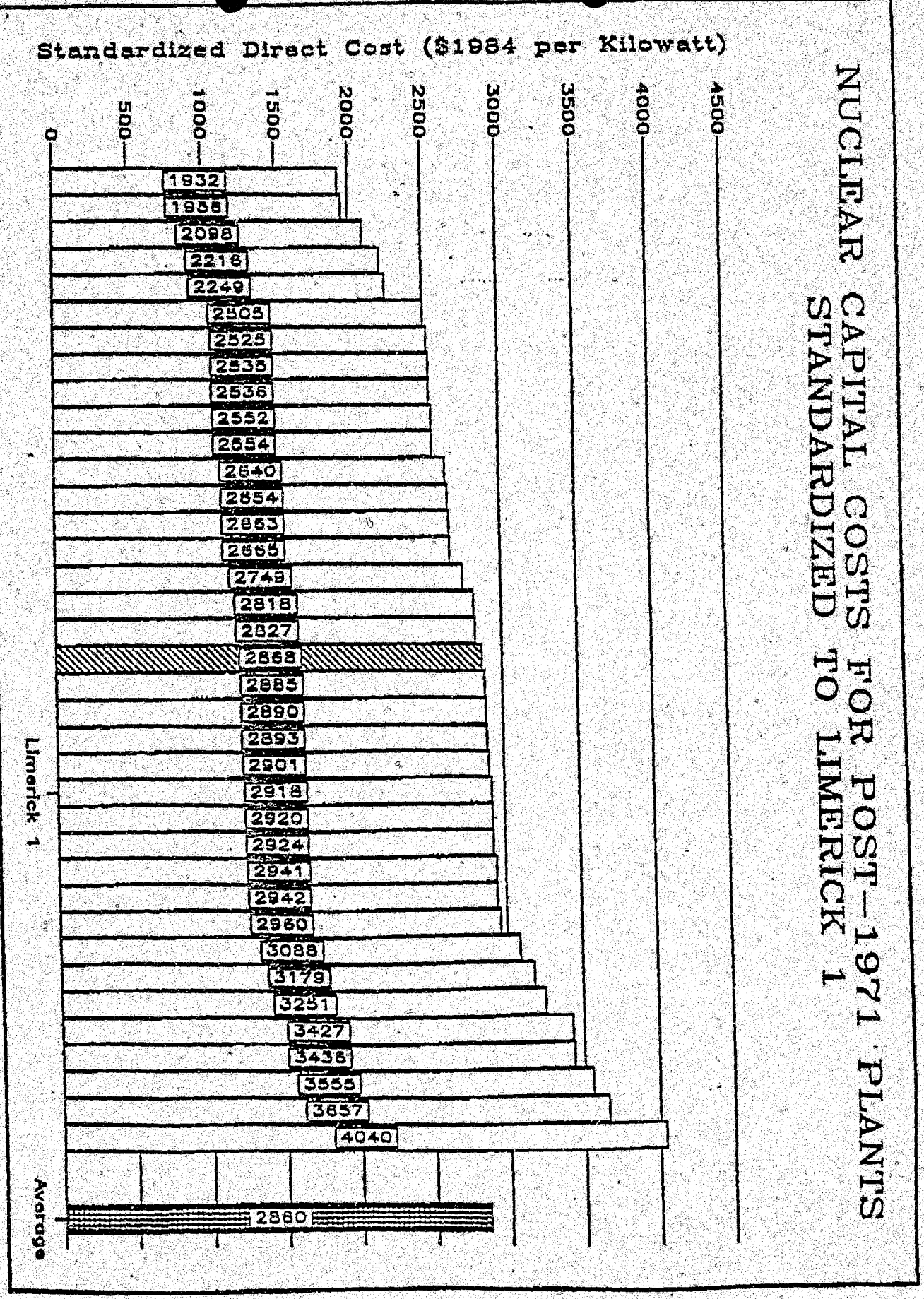
Moreover, these new comparisons accomodate to three issues raised by the OCA in interrogatories:

1. The regression used to estimate predicted cost for Limerick and to standardize Limerick's cost to those of other units excludes Limerick from the database.
2. The cooling tower variable, which was only marginally significant, is excluded from the regression.

3. We have compared Limerick to the predicted cost based on the regression as well as the standardized average of other plants.

I should note that in addition to updating the data, in my new comparison I have added a variable to the regression equation. This variable distinguishes between units with construction permits issued in 1972 or 1973 or in later years. This variable was added because the data now clearly indicates that units with post-1973 CP dates have higher costs.

NUCLEAR CAPITAL COSTS FOR POST-1971 PLANTS STANDARDIZED TO LIMERICK 1



NUCLEAR CAPITAL COSTS FOR POST-1971 PLANTS STANDARDIZED TO LIMERICK 1

Plant	Actual Direct Cost (1984 $/kW) (1)	Standardized Direct Cost (1984 $/kW) (2)
St. Lucie 2	$1,747	$1,932
Hatch 2	952	1,956
Hope Creek	3,254	2,098
Arkansas Nuclear One 2	922	2,218
McGuire	867	2,249
Clinton 1	3,071	2,505
LaSalle	1,328	2,525
Perry	1,727	2,535
Palo Verde	1,852	2,538
Marble Hill	1,700	2,552
Braidwood	1,366	2,554
Wolf Creek	2,020	2,640
Farley	1,312	2,654
Summer	1,557	2,663
Callaway	2,062	2,685
Millstone 3	2,714	2,749
Waterford 3	2,524	2,818
Commanche	1,814	2,827
Limerick 1	2,868	2,868
Riverbend	3,424	2,885
WPPSS 2	3,029	2,890
Nine Mile Point 2	3,804	2,893
Beaver Valley 2	3,457	2,901
Susquehanna	1,946	2,918
Seabrook	2,455	2,920
Grand Gulf	1,848	2,924
Catawba	1,404	2,941
San Onofre	2,022	2,942
Byron	1,561	2,960
South Texas	2,449	3,088
Bellafonte	1,559	3,179
Shoreham	4,378	3,251
Fermi 2	3,076	3,427
Harris	2,128	3,436
Watts Bar	1,447	3,555
Midland	2,454	3,857
Vogtle	2,915	4,040
Average, Excluding Limerick 1	$2,038	$2,880

REGRESSION RELATING CAPITAL COST FOR NUCLEAR UNITS WHICH RECEIVED A CONSTRUCTION PERMIT IN 1972 OR LATER TO SELECTED CHARACTERISTICS[1]

Based on 1985 Data

	Variable Mean[2] (1)	Regression Coefficient[3] (2)	t-Statistic[4] (3)
Log of Construction Cost	7.5399	-	-
Constant	1.0000	7.8724	-
Log of Wage Index[5]	-0.1080	0.2550	1.834
Subsequent Unit Indicator[6]	0.4035	-0.3833	7.273
Single Unit BWR Indicator[7]	0.1228	0.2786	3.293
Rock Foundation Indicator[8]	0.6140	-0.1649	2.811
Construction Permit Received in 1972-1973 Indicator[9]	0.3509	-0.1887	3.623
Utility is Constructor Indicator[10]	0.2456	-0.2313	3.724
Northeast Indicator[11]	0.1579	0.2489	3.399
Number of Observations		57	
Adjusted R^2		0.7932	
Standard Error		0.1843	
Predicted Cost (1984 $/kW)		$ 2,818	

REGRESSION RELATING CAPITAL COST FOR NUCLEAR UNITS WHICH RECEIVED A CONSTRUCTION PERMIT IN 1972 OR LATER TO SELECTED CHARACTERISTICS[1]

Based on 1985 Data

Sources and Notes

[1] The dependent variable in the regression is the natural log of capital cost per kilowatt. Actual costs have been adjusted to reflect the cost of constructing the plants at labor and materials costs prevailing in 1984 with no allowance for funds used during construction. The data are from a September 1985 TVA survey, or from a NERA survey of individual utilities if TVA did not report costs for a unit. Data for Limerick 1 and 2 were excluded from the sample.

[2] The variable mean is the average value of each of the variables in the analysis for the sample used to estimate the regression equation.

[3] The regression coefficient describes the effect of a one-unit change in the independant variable on the dependent variable.

[4] A t-statistic is the ratio of the mean of the coefficient to its standard error. It measures the reliability with which the coefficient is measured. A t-statistic of 2.01 or higher indicates that the coefficient is significantly different from zero at the 5 percent level. A t-statistic of 1.68 or higher indicates significance at the 10 percent level.

[5] The wage rate is a composite of 1981 wages plus fringe benefits for crafts used in constructing nuclear power plants. The composite consists of the following crafts: steamfitters (30 percent), electricians (19 percent), common laborers (13 percent), carpenters (12 percent), steelworkers (10 percent), operating engineers (7 percent), boilermakers (2 percent) and millwrights (2 percent). The wage is expressed as an index relative to the national average. Wages for these crafts were obtained from R.S. Means Co., Inc., 1978 Labor Rates for the Construction Industry for the communities from which construction labor was hired.

[6] The indicator is equal to 1 if the unit is a subsequent unit of a series built at a site and 0 otherwise.

[7] The indicator is equal to 1 if the unit is a single unit plant with a boiling water reactor and 0 otherwise. BWR classification is taken from U.S. Department of Energy, U.S. Central Station Nuclear Electric Generating Units; Significant Milestones (Status as of July 1, 1983), DOE/NE-0030/9, October 1983.

[8] The indicator is equal to 1 if the unit is built on a rock foundation and 0 otherwise. Rock or soil site classification was provided to NERA from Burns & Roe in March 1984.

[9] The indicator is equal to 1 if the unit received its construction permit in 1972 or 1973 and 0 otherwise.

[10] The indicator is equal to 1 if the utility acted as construction manager and either TVA, Duke Power Company, or Commonwealth Edison Company. Otherwise, the indicator is equal to 0. Construction manager data are from NUS Corporation, Commercial Nuclear Power Plants, Edition No. 16, February 1984.

[11] The indicator is equal to 1 if the unit is in Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont or Washington, D.C. and 0 otherwise. Locations are from U.S. Department of Energy, U.S. Central Station Nuclear Electric Generating Units; Significant Milestones (Status as of July 1, 1983), DOE/NE-0030/9, October 1983.

CERTIFICATE OF SERVICE

I hereby certify that I have caused copies of the Philadelphia Electric Company's Addendum to the Testimony of Lewis J. Perl, PECO Statement No. 11 filed on December 16, 1985 to be served by Federal Express mail in the Limerick No. I Rate Proceeding at Docket No. R-850152.

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PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS

RATE EP-A

CALCULATION OF REVENUE INCREASE SUPPLEMENT NO. 15

12 MONTHS ENDED
JUNE 30, 1985 & 1986

	SUPPLEMENT NO. 11			SUPPLEMENT NO. 15		
12 MONTHS SAMPLE	BILLS, KW AND KWH FROM SAMPLE (C)	PRICING	REVENUE	BILLS, KW AND KWH FROM SAMPLE (C)	PRICING	REVENUE
	(1)	(2)	(3)=(1)*(2)	(4)	(5)	(6)=(4)*(5)
1 CUSTOMER CHARGE	12 BILLS	$ 220.45	$ 2,645	72 POINTS	$ 1460	$ 105,120
2 ALL KW	1,068,926 KW	5.37	5,740,133	1,068,926 KW	15.78	16,867,652
3 FIRST 150 HRS USE	160,339,000 KWH	0.0739	11,849,052	160,339,000 KWH	0.0375	6,012,713
4 NEXT 150 HRS USE	90,000,000 KWH	0.0556	5,004,000	90,000,000 KWH	0.0375	3,375,000
5 ADDITIONAL USE	181,161,000 KWH	0.0376	6,811,654	181,161,000 KWH	0.0375	6,793,538
6 BASE REVENUE	431,500,000 KWH		$ 29,407,484	431,500,000 KWH		$ 33,154,023
TOTAL RATE EP-A -------- 12 MOS. ENDED 6/30/85						
7 PROFORMA BASE REVENUE			$ 29,632,000			$ 33,407,000 (A)
TOTAL RATE EP-A -------- 12 MOS. ENDED 6/30/86						
8 PROFORMA BASE REVENUE			$ 29,407,484			$ 33,154,000 (B)

(A) (LN.6,COL.6 / LN.6,COL.3) * LN.7,COL.3

(B) FROM LN.6

(C) LOAD CHARACTERISTICS SHOWN REFLECT MARCH 1985 CONTRACT AGREEMENT. FOR DISCUSSION OF THIS AGREEMENT SEE R.C.WILLIAMS' TESTIMONY.

NOTE: % INCREASE=(LN. 8,COL. 6 - LN.8.,COL.3) / (LN. 8,COL.3) = 12.7%