SUMMARY OF THE AEP SYSTEM GENERATION DISPATCH PARAMETERS

The AEP System Control Center located in Columbus, Ohio serves as the central location from which the generation and transmission facilities of the system's operating companies are economically dispatched on a single-integrated system basis. Reliability of service must be maintained even as total AEP System generation requirements are continually supported in the most economic manner possible.

An extensive microwave communication system links the Control Center to the power plants and interconnection points with non-affiliated utilities throughout the system, telemetering unit generation and interconnection power flow data to a dual DEC VAX 8550 digital computer control system at the Columbus location. As the incoming data are monitored, the computers can quickly detect any variation in total customer load requirements, determine which generating units can most economically and efficiently satisfy such a variation (economic dispatch), and transmit impulses via the microwave system to those units under control, automatically adjusting each unit's generation by the necessary amount. For those units that might not be on automatic control at that time, load variation instructions are telephoned directly from the Control Center to the plant involved. A combination of the following components stored in the DEC VAX 8550 computer is used for economic dispatch calculations:

Unit Input (MBtu) - Output (MW) Curve
Unit Fuel Cost (cents/MBtu)
Non-fuel Variable Cost (Maintenance) (mills/kWh)
Emission Allowance Cost (¢/MBtu--certain units)
Unit Capability Limits (MW)
Loss Formula

Unit Input (MBtu) - Output (MW) Curve (Exhibit 1)

A unit's initial heat rate curve is obtained from design specifications. After the unit has been on line for a period of time the curve is updated based on actual performance test data. Throughout the life of the unit subsequent tests may also be performed, e.g., following a turbine-overhaul outage. Four curves, each representing unit performance at each of the four seasonal intake water temperatures, are used in performing economic dispatch cost calculations. The choice of the curve for each month is based on the expected intake water temperature. Special consideration is given for some units with scrubbers, which are assigned multiple curves for each water temperature to reflect the number of scrubbers in use.

The data points of the unit input-output curve are optimally fitted by a parabola. The incremental heat rate curve is then obtained as the first derivative of the parabola and results in an equation of a straight line. The incremental cost curve for a given unit is the incremental heat rate curve evaluated at the applicable fuel cost.

Unit Fuel Cost (cents/MBtu) (Exhibit 2)

Unit fuel cost used for economic dispatch consists of the estimated Account No. 151 coal cost, the actual Account No. 152 coal cost, the lime cost, if applicable, the emission allowance cost Account No. 158.1, if applicable, and a heat rate adjustment factor (HRAF), and is calculated as follows:

> Unit fuel cost = (151 coal + 152 coal + lime + emission allowances) * HRAF (shown under the heading "Total" in 8th column).

Estimated 151 Coal Cost (Exhibit 3)

The estimated unadjusted Account 151 coal cost for a given month is based on a three-month weighted-average cost of coal. This value is calculated from the latest available actual average accounting cost at month's end for a particular coal pile combined with the cost of two months' projected deliveries to that pile. For example, the estimated Account 151 coal cost to be used for the month of May would be computed near the end of April. It would be based on the following 3-month weighted average: end-of-March actual cost; end-of-April estimated cost (obviously this estimate is under a substantial influence of actual costs since most of the month's data are already historical); and projected May cost.

Actual 152 Coal Handling Cost (Exhibits 2 and 3)

The actual Account 152 coal handling cost is the latest available actual cost--in this example March's. The adjusted "pure" coal handling cost can be found under the heading "152" in the 4th and 6th columns of Exhibit 2. The unadjusted cost can be determined by dividing the adjusted cost by the HRAF (see - 3 - below) shown in the last column. Also, the unadjusted account 152 cost can be found on Exhibit 3.

Lime Cost (Exhibit 2)

For those units with scrubbers, the lime cost is the latest available actual monthly cost (shown under the heading "Scrub" in 2nd column).

Emission Allowance Cost (Exhibit 2)

For those units that such cost is applicable, it is shown on Exhibit 2, column 7 under the heading "158.1" (and also, the unadjusted figure is shown on Exhibit 3, column 5 with the same heading).

An "emission allowance" is the equivalent of one ton of SO_2 emitted in the atmosphere during the operation of a generating unit. The units that bear this additional cost -- about 25 -- are the ones specified in the Clean Air Act Amendments of 1990 that became effective on January 1, 1995. The AEP System, with the FERC's approval, employs the Cantor Fitzerald SO_2 allowance price index as the basis of such costs. In May, the index was $76.40/ton; that index is translated, through the sulfur content of each particular coal pile, into ¢/MBtu.

Heat Rate Adjustment Factor (HRAF) (Exhibit 2)

The purpose of the heat-rate adjustment factor is to more adequately reflect the actual performance of each generating unit. The factor can be viewed as effectively adjusting the input curve points shown on Exhibit 1 but without the complexity of adjusting an array of figures for each generating unit on a monthly basis. Adjusting the fuel cost acts as a proxy to that and it only involves one figure. (shown in the righthandmost column).

Non-fuel Variable Cost (Maintenance and B&O Tax) (Exhibit 2)

The sum of one-half of the latest twelve-month average rate of maintenance costs (Account Nos. 510-514) incurred, expressed in mills/kWh of net generation, (shown under the heading "Mtce" in 9th column) is added to the incremental fuel cost.

Unit Capability Limits (MW) (Exhibit 4)

Each generating unit has a normal minimum operating limit (min load on 1st column) and a normal high operating limit, which usually coincides with the unit's net seasonal capability (full load on 3rd column). Between those limits, when on automatic control, a unit operates within specific MW increments, known as control bands. For example, for a 1,300 MW unit a control band is 100 MW. When generally on automatic control, the VAX computer pulses the unit and sets its desired economic generation loading every 90 seconds. Automatic control can be overridden manually by the power operators to allow for greater flexibility of meeting regulation requirements or to meet specific unit-load relationships (e.g., Kammer units dedicated to serving Ormet aluminum load).

Loss Formula

The loss formula and associated penalty factors used in the VAX computer are determined off-line, through extensive independent simulation models that recognize combinations of specific levels and sites of generation and specific site(s) of a given delivery. Tie-line and generation values are available via telemetry for each economic dispatch calculation. Inasmuch as losses associated with each transaction with a non-affiliated system represent an out-of-pocket cost for the AEP System, they are determined by the generation dispatch routine and reflected in the generation levels for each transaction. Their cost is usually recovered through the rate structure of the transaction. Losses formulae are updated whenever an EHV transmission line or major generating unit is added in the AEP System's vicinity and is deemed to have an effect on those formulae.

APPENDIX

In order to provide a comprehensive example illustrating the use, and interrelationships, of the various parameters described in this narrative as well as to simulate calculations performed by the VAX computer for economic dispatch of generation, consider the following:

> "Compute the average energy cost for the Glen Lyn Unit No. 6 at its minimum loading point of 85 MW and its maximum loading point of 240 MW, assuming a water intake temperature of 60 for May 1996."

Exhibit 1: Provides the coefficients of the heat-input quadratic equation (for 60, consider the second set of figures from the left).

$$A = 0.0117440$$
$$B = 6.28172$$
$$C = 246.7680$$

The heat-input equation is of the general form:

$$I = \frac{A}{2}(MW)^2 + B(MW) + C,$$ where I is the

MBtu amount required to sustain the unit's output at a MW level.

$$\text{Thus, } I = \frac{0.0117440}{2}(MW)^2 + 6.28172\,(MW) + 246.7680$$

At 85 MW, I = 823.139 MBtu
At 240 MW, I = 2,092.607 MBtu

Exhibit 3: Provides the unadjusted fuel cost Account 151, along with Account 152 coal handling cost.

Exhibit 2: Provides the HRAF at the righthandmost column. The HRAF in conjunction with the fuel costs shown on Exhibit 3 yield a total fuel cost of 142.87 ¢/MBtu for Glen Lyn 6.

Thus, at 85 MW, Fuel Cost = 823.139 MBtu x 142.87 ¢/MBtu
= $1,176.02

and, at 240 MW, Fuel Cost = 2,092.607 MBtu x 142.87 ¢/MBtu
= $2,989.71

$$\text{Energy Cost (at 85 MW)} = \frac{\$1{,}176.02}{(85)\ \text{MW x 1 hr.}} + \text{Variable Cost (Exhibit 2, Column 11)}$$

$$= \$13.836 + 1.620 = \$15.456/\text{MWh}$$

$$\text{Energy Cost (at 240 MW)} = \frac{\$2{,}989.71}{(240)\text{MW x 1 hr}} + 1.620$$

$$= \$12.457 + 1.620$$

$$= \$14.077/\text{MWh}$$

Above results can be verified and compared with the figures on Exhibit 4 (Sheet 2, 2nd row from the end, shown as $15.456 and $14.077 for the Glen Lyn 6 at 85- and 240-MW loadings, respectively). As stated, the above calculation pertains to the derivation of the average energy cost of a generating unit at specific loading levels. If an average incremental rate along a certain MW range of loadings was desired, one would compute the MBtu increment needed to raise the unit's loadings from the low point to the high point of that range and would cost the energy output along that range. For example, to compare and verify the average incremental energy rate shown for Glen Lyn 6 between 160 and 240 MW (entry 74, Exhibit 5, page 3), and 85 and 160 MW (entry 92), one would employ the MBtu amount already computed for 85 and 240 MW and would also need to compute the MBtu at the 160 MW level. Applying the same heat-input equation, at 160 MW, I = 1,402.166 MBtu and repeating the previous results here, for convenient reference,

At 85 MW, I = 823.139 MBtu
At 240 MW, I = 2,092.607 MBtu

It, thus, is obvious that to raise the unit's loading from 85 to 160 MW, (1,402.166 - 823.139) = 579.027 MBtu are needed. Incremental Cost between 85 and 160 MW would thus be:

$$\frac{579.027 \text{ MBtu} \times \$1.4287/\text{MBtu}}{(160-85) \text{ MW} \times 1 \text{ hr}} + \text{Variable Cost}$$

= 11.03 + 1.62

= 12.65 mills/kWh, which verifies entry 92 on Exhibit 5, page 3.

Similar computation for the 160 to 240 MW increment,

$$\frac{(2{,}092.607 - 1{,}402.166) \text{ MBtu} \times \$1.4287/\text{MBtu}}{(240 - 160) \text{ MW} \times 1 \text{ hr}} + 1.62$$

= 12.33 + 1.62

= 13.95 mills/kWh verifies entry 74 on Exhibit 5, page 3.

mew:NML:1J

GL6 - 40	253.4690 I-INTER		GL6 - 60	246.7680 I-INTER		GL6 - 75	293.6070 I-INTER		GL6 - 85	302.8800	
IR-INTER	6.16560		IR-INTER	6.28172		IR-INTER	5.97568		IR-INTER	6.05064	
IR-SLOPE	.0119950		IR-SLOPE	.0117440		IR-SLOPE	.0139610		IR-SLOPE	.0143030	
MW	INPUT	I-R	MW	INPUT	I-R	MW	INPUT	I-R	MW	INPUT	I-R
85	820.877	7185	85	823.139	7280	85	851.973	7162	85	868.854	7266
90	856.953	7245	90	859.685	7339	90	887.960	7232	90	905.364	7338
95	893.328	7305	95	896.526	7397	95	924.295	7302	95	942.232	7409
100	930.004	7365	100	933.660	7456	100	960.980	7372	100	979.459	7481
105	966.979	7425	105	971.087	7515	105	998.013	7442	105	1017.042	7552
110	1004.255	7485	110	1008.808	7574	110	1035.395	7511	110	1054.983	7624
115	1041.830	7545	115	1046.822	7632	115	1073.127	7581	115	1093.282	7695
120	1079.705	7605	120	1085.131	7691	120	1111.207	7651	120	1131.938	7767
125	1117.880	7665	125	1123.733	7750	125	1149.637	7721	125	1170.952	7839
130	1156.355	7725	130	1162.628	7808	130	1188.415	7791	130	1210.323	7910
135	1195.129	7785	135	1201.817	7867	135	1227.543	7860	135	1250.052	7982
140	1234.204	7845	140	1241.299	7926	140	1267.020	7930	140	1290.138	8053
145	1273.578	7905	145	1281.076	7985	145	1306.845	8000	145	1330.582	8125
150	1313.253	7965	150	1321.146	8043	150	1347.020	8070	150	1371.385	8196
155	1353.227	8025	155	1361.509	8102	155	1387.544	8140	155	1412.544	8268
160	1393.501	8085	160	1402.166	8161	160	1428.416	8209	160	1454.060	8339
165	1434.075	8145	165	1443.116	8219	165	1469.638	8279	165	1495.935	8411
170	1474.949	8205	170	1484.361	8278	170	1511.208	8349	170	1538.166	8482
175	1516.122	8265	175	1525.899	8337	175	1553.129	8419	175	1580.757	8554
180	1557.596	8325	180	1567.730	8396	180	1595.397	8489	180	1623.704	8625
185	1599.369	8385	185	1609.855	8454	185	1638.015	8558	185	1667.008	8697
190	1641.443	8445	190	1652.273	8513	190	1680.982	8628	190	1710.670	8768
195	1683.816	8505	195	1694.986	8572	195	1724.298	8698	195	1754.690	8840
200	1726.489	8565	200	1737.992	8631	200	1767.963	8768	200	1799.068	8911
205	1769.462	8625	205	1781.291	8689	205	1811.977	8838	205	1843.803	8983
210	1812.735	8685	210	1824.884	8748	210	1856.339	8907	210	1888.895	9054
215	1856.307	8745	215	1868.770	8807	215	1901.052	8977	215	1934.345	9126
220	1900.180	8805	220	1912.951	8865	220	1946.112	9047	220	1980.153	9197
225	1944.352	8864	225	1957.425	8924	225	1991.523	9117	225	2026.319	9269
230	1988.825	8924	230	2002.192	8983	230	2037.281	9187	230	2072.841	9340
235	2033.597	8984	235	2047.253	9042	235	2083.389	9257	235	2119.722	9412
240	2078.669	9044	240	2092.607	9100	240	2129.847	9326	240	2166.959	9483

Exhibit 1

EFCPRRPT

AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING SYSTEM
ADJUSTED ESTIMATE FUEL RATES

05/02/96
07:54:47

SYSTEM POWER MARKETS

EFFECTIVE DATE 05/01/1996

	COAL COST C/MBTU							COST M/KWH			OIL COST C/MBTU			HRAF		S
UN	SCRUB	151	BASE-152	C-CHG	TOTAL-152	158.1	TOTAL	MTCE	B&O TAX	TOTAL	151	152	TOTAL	HRAF	DATE	T
AM1	0.00	158.62	4.49	0.00	4.49	0.00	163.11	0.92	0.00	0.92	425.11	25.76	450.87	1.030	9603	C
AM2	0.00	152.77	4.33	0.00	4.33	0.00	157.10	0.92	0.00	0.92	409.43	24.81	434.24	0.992	9603	C
AM3	0.00	165.24	4.68	0.00	4.68	0.00	169.92	0.92	0.00	0.92	442.86	26.84	469.70	1.073	9603	C
BJ6	0.00	117.29	2.51	0.00	2.51	8.76	128.56	0.50	0.00	0.50	394.55	0.00	394.55	0.994	9603	C
BS1	0.00	122.43	2.72	0.00	2.72	0.00	125.15	0.83	0.00	0.83	454.13	26.69	480.82	1.103	9603	C
BS2	0.00	112.89	2.51	0.00	2.51	0.00	115.40	0.83	0.00	0.83	418.72	24.61	443.33	1.017	9603	C
CD1	0.00	190.40	4.49	0.00	4.49	23.30	218.19	0.91	0.00	0.91	402.73	8.58	411.31	1.088	9603	C
CD2	0.00	166.92	7.71	0.00	7.71	0.00	174.63	0.91	0.00	0.91	403.84	8.61	412.45	1.091	9603	C
CD3	0.00	179.16	4.56	0.00	4.56	0.00	183.72	0.91	0.00	0.91	434.66	289.33	723.99	1.171	9603	C
CR1	0.00	123.60	3.76	0.00	3.76	0.00	127.36	0.92	0.00	0.92	447.39	17.01	464.40	1.030	9603	C
CR2	0.00	124.44	3.79	0.00	3.79	0.00	128.23	0.92	0.00	0.92	450.43	17.12	467.55	1.037	9603	C
CR3	0.00	124.44	3.79	0.00	3.79	0.00	128.23	0.92	0.00	0.92	450.43	17.12	467.55	1.037	9603	C
CV1	0.00	201.11	2.58	0.00	2.58	18.89	222.58	1.53	0.00	1.53	551.06	0.00	551.06	1.093	9603	C
CV2	0.00	187.68	2.41	0.00	2.41	17.63	207.72	1.53	0.00	1.53	514.25	0.00	514.25	1.020	9603	C
CV3	0.00	190.81	2.45	0.00	2.45	17.92	211.18	1.53	0.00	1.53	522.82	0.00	522.82	1.037	9603	C
CV4	0.00	183.71	3.18	0.00	3.18	15.98	202.87	1.53	0.00	1.53	421.62	0.00	421.62	0.993	9603	C
CV5	16.79	132.24	7.74	0.00	7.74	0.00	139.98	1.53	0.00	1.53	461.35	0.00	461.35	1.079	9603	C
CV6	15.37	121.09	7.08	0.00	7.08	0.00	128.17	1.53	0.00	1.53	422.44	0.00	422.44	0.988	9603	C
GL5	0.00	142.25	6.63	0.00	6.63	0.00	148.88	1.62	0.00	1.62	478.59	37.38	515.97	1.138	9603	C
GL6	0.00	136.50	6.37	0.00	6.37	0.00	142.87	1.62	0.00	1.62	459.24	35.87	495.11	1.092	9603	C
GV1	9.09	159.75	6.70	0.00	6.70	5.27	171.72	0.66	0.00	0.66	391.98	13.65	405.63	1.039	9603	C
GV2	8.93	156.83	6.58	0.00	6.58	5.17	168.58	0.66	0.00	0.66	384.82	13.40	398.22	1.020	9603	C
KM1	0.00	91.16	6.47	0.00	6.47	22.86	120.49	1.24	0.00	1.24	503.22	52.30	555.52	1.060	9603	C
KM2	0.00	93.14	6.61	0.00	6.61	23.36	123.11	1.24	0.00	1.24	514.14	53.44	567.58	1.083	9603	C
KM3	0.00	90.56	6.42	0.00	6.42	22.71	119.69	1.24	0.00	1.24	499.90	51.96	551.86	1.053	9603	C
KR1	0.00	157.47	6.83	0.00	6.83	0.00	164.30	1.37	0.00	1.37	490.11	44.95	535.06	1.086	9603	C
KR2	0.00	160.95	6.98	0.00	6.98	0.00	167.93	1.37	0.00	1.37	500.94	45.94	546.88	1.110	9603	C
ML1	0.00	135.10	2.78	0.00	2.78	4.78	142.66	0.60	0.00	0.60	398.36	18.85	417.21	0.979	9603	C
ML2	0.00	134.55	2.77	0.00	2.77	4.76	142.08	0.60	0.00	0.60	396.74	18.77	415.51	0.975	9603	C
MR1	0.00	243.74	2.55	0.00	2.55	31.80	278.09	1.41	0.00	1.41	530.09	20.75	550.84	1.093	9603	C
MR2	0.00	242.18	2.53	0.00	2.53	31.59	276.30	1.41	0.00	1.41	526.70	20.61	547.31	1.086	9603	C
MR3	0.00	230.58	2.41	0.00	2.41	30.08	263.07	1.41	0.00	1.41	501.48	19.63	521.11	1.034	9603	C
MR4	0.00	229.02	2.39	0.00	2.39	29.88	261.29	1.41	0.00	1.41	498.08	19.49	517.57	1.027	9603	C

Exhibit 2
Page 1 of 2

EFCPRRPT

AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING SYSTEM
ADJUSTED ESTIMATE FUEL RATES

05/02/96
07:54:49

SYSTEM POWER MARKETS EFFECTIVE DATE 05/01/1996

	COAL COST C/MBTU							COST M/KWH			OIL COST C/MBTU			HRAF		S
UN	SCRUB	151	BASE-152	C-CHG	TOTAL-152	158.1	TOTAL	MTCE	B&O TAX	TOTAL	151	152	TOTAL	HRAF	DATE	T
MR5	0.00	142.40	2.09	0.00	2.09	5.23	149.72	1.41	0.00	1.41	469.54	22.27	491.81	1.087	9603	C
MI1	0.00	164.80	7.23	0.00	7.23	0.00	172.03	1.29	0.00	1.29	463.82	6.91	470.73	1.030	9603	C
PC5	0.00	107.22	3.24	0.00	3.24	20.56	131.02	2.75	0.00	2.75	463.70	0.00	463.70	1.031	9603	O
RP1	0.00	111.24	4.37	0.00	4.37	0.00	115.61	0.69	0.00	0.69	390.52	0.00	390.52	1.030	9603	C
RP2	0.00	111.02	4.36	0.00	4.36	0.00	115.38	0.69	0.00	0.69	389.77	0.00	389.77	1.028	9603	C
SMT	0.00	16.47	2.00	0.00	2.00	0.00	18.47	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0	C
SP1	0.00	133.30	4.34	0.00	4.34	0.00	137.64	0.96	0.00	0.96	546.97	23.69	570.66	1.075	9603	C
SP2	0.00	130.32	4.25	0.00	4.25	0.00	134.57	0.96	0.00	0.96	534.76	23.16	557.92	1.051	9603	C
SP3	0.00	129.33	4.21	0.00	4.21	0.00	133.54	0.96	0.00	0.96	530.69	22.99	553.68	1.043	9603	C
SP4	0.00	133.05	4.33	0.00	4.33	0.00	137.38	0.96	0.00	0.96	545.95	23.65	569.60	1.073	9603	C
SP5	0.00	129.95	4.23	0.00	4.23	0.00	134.18	0.96	0.00	0.96	533.23	23.10	556.33	1.048	9603	C
ST1	0.00	135.90	6.32	0.00	6.32	4.70	146.92	1.29	0.00	1.29	397.20	0.00	397.20	0.992	9603	C
ST2	0.00	137.14	6.38	0.00	6.38	4.74	148.26	1.29	0.00	1.29	400.80	0.00	400.80	1.001	9603	C
ST3	0.00	135.49	6.30	0.00	6.30	4.69	146.48	1.29	0.00	1.29	396.00	0.00	396.00	0.989	9603	C
ST4	0.00	136.32	6.34	0.00	6.34	4.72	147.38	1.29	0.00	1.29	398.40	0.00	398.40	0.995	9603	C
TC1	0.00	200.90	9.69	0.00	9.69	0.00	210.59	1.99	0.00	1.99	495.10	0.00	495.10	1.148	9603	C
TC2	0.00	195.83	9.44	0.00	9.44	0.00	205.27	1.99	0.00	1.99	482.59	0.00	482.59	1.119	9603	C
TC3	0.00	190.75	9.20	0.00	9.20	0.00	199.95	1.99	0.00	1.99	470.08	0.00	470.08	1.090	9603	C
TC4	0.00	121.79	6.44	0.00	6.44	15.40	143.63	1.99	0.00	1.99	456.70	0.00	456.70	1.059	9603	C
ZM1	15.59	106.92	2.18	0.00	2.18	0.00	109.10	1.25	0.00	1.25	406.73	0.00	406.73	0.982	9603	C

NOTE: 1) COAL, OIL AND SCRUBBER COSTS ARE ADJUSTED BY THE HEAT RATE ADJUSTMENT FACTOR.
2) CONESVILLE 5 & 6, GAVIN 1 & 2, AND ZIMMER 1 COAL 151 AND COAL TOTAL INCLUDE THE COST OF LIMESTONE FOR SCRUBBERS.

Exhibit 2
Page 2 of 2

EFCPRRPT

AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING SYSTEM
UNADJUSTED ESTIMATE FUEL RATES

05/02/96
07:54:47

SYSTEM POWER MARKETS

EFFECTIVE DATE 05/01/1996

	UNADJUSTED COAL RATES				UNADJUSTED OIL RATES		
UNIT	151	BASE-152	C-CHG	158.1	151	152	C-CHG
AM1	154.00	4.36	0.00	0.00	412.73	25.01	0.00
AM2	154.00	4.36	0.00	0.00	412.73	25.01	0.00
AM3	154.00	4.36	0.00	0.00	412.73	25.01	0.00
BJ6	118.00	2.53	0.00	8.01	396.93	0.00	0.00
BS1	111.00	2.47	0.00	0.00	411.72	24.20	0.00
BS2	111.00	2.47	0.00	0.00	411.72	24.20	0.00
CD1	175.00	4.13	0.00	21.42	370.16	7.89	0.00
CD2	153.00	7.07	0.00	0.00	370.16	7.89	0.00
CD3	153.00	3.89	0.00	0.00	371.19	247.08	0.00
CR1	120.00	3.65	0.00	0.00	434.36	16.51	0.00
CR2	120.00	3.65	0.00	0.00	434.36	16.51	0.00
CR3	120.00	3.65	0.00	0.00	434.36	16.51	0.00
CV1	184.00	2.36	0.00	17.28	504.17	0.00	0.00
CV2	184.00	2.36	0.00	17.28	504.17	0.00	0.00
CV3	184.00	2.36	0.00	17.28	504.17	0.00	0.00
CV4	185.00	3.20	0.00	16.09	424.59	0.00	0.00
CV5	107.00	7.17	0.00	0.00	427.57	0.00	0.00
CV6	107.00	7.17	0.00	0.00	427.57	0.00	0.00
GL5	125.00	5.83	0.00	0.00	420.55	32.85	0.00
GL6	125.00	5.83	0.00	0.00	420.55	32.85	0.00
GV1	145.00	6.45	0.00	5.07	377.27	13.14	0.00
GV2	145.00	6.45	0.00	5.07	377.27	13.14	0.00
KM1	86.00	6.10	0.00	21.57	474.74	49.34	0.00
KM2	86.00	6.10	0.00	21.57	474.74	49.34	0.00
KM3	86.00	6.10	0.00	21.57	474.74	49.34	0.00
KR1	145.00	6.29	0.00	0.00	451.30	41.39	0.00
KR2	145.00	6.29	0.00	0.00	451.30	41.39	0.00
ML1	138.00	2.84	0.00	4.88	406.91	19.25	0.00
ML2	138.00	2.84	0.00	4.88	406.91	19.25	0.00
MR1	223.00	2.33	0.00	29.09	484.99	18.98	0.00
MR2	223.00	2.33	0.00	29.09	484.99	18.98	0.00
MR3	223.00	2.33	0.00	29.09	484.99	18.98	0.00
MR4	223.00	2.33	0.00	29.09	484.99	18.98	0.00

Exhibit 3
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EFCPRRPT

AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING SYSTEM
UNADJUSTED ESTIMATE FUEL RATES

05/02/96
07:54:49

SYSTEM POWER MARKETS EFFECTIVE DATE 05/01/1996

	UNADJUSTED COAL RATES				UNADJUSTED OIL RATES		
UNIT	151	BASE-152	C-CHG	158.1	151	152	C-CHG
MR5	131.00	1.92	0.00	4.81	431.96	20.49	0.00
MT1	160.00	7.02	0.00	0.00	450.31	6.71	0.00
PC5	104.00	3.14	0.00	19.94	449.76	0.00	0.00
RP1	108.00	4.24	0.00	0.00	379.15	0.00	0.00
RP2	108.00	4.24	0.00	0.00	379.15	0.00	0.00
SHT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SP1	124.00	4.04	0.00	0.00	508.81	22.04	0.00
SP2	124.00	4.04	0.00	0.00	508.81	22.04	0.00
SP3	124.00	4.04	0.00	0.00	508.81	22.04	0.00
SP4	124.00	4.04	0.00	0.00	508.81	22.04	0.00
SP5	124.00	4.04	0.00	0.00	508.81	22.04	0.00
ST1	137.00	6.37	0.00	4.74	400.40	0.00	0.00
ST2	137.00	6.37	0.00	4.74	400.40	0.00	0.00
ST3	137.00	6.37	0.00	4.74	400.40	0.00	0.00
ST4	137.00	6.37	0.00	4.74	400.40	0.00	0.00
TC1	175.00	8.44	0.00	0.00	431.27	0.00	0.00
TC2	175.00	8.44	0.00	0.00	431.27	0.00	0.00
TC3	175.00	8.44	0.00	0.00	431.27	0.00	0.00
TC4	115.00	6.08	0.00	14.54	431.26	0.00	0.00
ZM1	93.00	2.22	0.00	0.00	414.19	0.00	0.00

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AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING

MINIMUM MAXIMUM LOAD REPORT
ESTIMATED - COMMITTED COAL

EFFECTIVE REPORT DATE 05/01/96

	MINIMUM LOAD			MAXIMUM LOAD				
	MWH	TOTAL (1) AVERAGE COST M/KWH	SO2 ALLOWANCE AVG. COST M/KWH	MWH	TOTAL (1) AVERAGE COST M/KWH	SO2 ALLOWANCE AVG. COST M/KWH	WITHOUT AUX BOILER SUPPLYING START-UP STEAM $	WITH AUXILIARY BOILER SUPPLYING START-UP STEAM $
MUSKINGUM RIVER 1	80	29.729	3.238	200	26.458	2.864	9,490	
MUSKINGUM RIVER 2	80	29.561	3.219	200	26.432	2.861	9,490	
MUSKINGUM RIVER 4	90	28.349	3.081	210	26.022	2.815	9,066	
MUSKINGUM RIVER 3	90	28.350	3.080	210	25.794	2.788	9,066	
CONESVILLE 1	72	23.752	1.886	115	22.692	1.796	5,903	
CONESVILLE 3	70	22.734	1.799	161	22.207	1.755	7,522	
CONESVILLE 2	72	22.396	1.771	115	21.294	1.677	5,576	
CONESVILLE 4	150	22.776	1.674	339	20.968	1.531	16,702	19,337
TANNERS CREEK 1	50	24.301	0.000	145	20.835	0.000	5,913	
TANNERS CREEK 2	50	23.336	0.000	145	20.549	0.000	5,913	
TANNERS CREEK 3	85	21.989	0.000	205	19.935	0.000	9,343	
CARDINAL 1	320	20.292	2.070	595	19.596	1.995	37,105	52,012
SMITH MOUNTAIN	0	0.000	0.000	565	18.470	0.000		
GLENLYN 5-1 BLR	25	20.458	0.000	55	18.169	0.000	1,707	
GLENLYN 5-2 BLR	55	18.457	0.000	95	17.940	0.000	3,401	
PICWAY 5	30	19.116	2.568	90	17.252	2.276	772	
CARDINAL 3	330	17.876	0.000	630	17.149	0.000		71,560
JAMES GAVIN 1	500	18.377	0.544	1300	16.730	0.493	77,167	105,627
MOUNTAINEER 1	435	18.378	0.000	1300	16.613	0.000		118,322
JAMES GAVIN 2	500	18.053	0.533	1300	16.437	0.484	77,167	105,627
KANAWHA RIVER 2	70	18.844	0.000	200	16.306	0.000	5,290	
JOHN AMOS 3	435	17.798	0.000	1300	16.055	0.000	78,912	
JOHN AMOS 1	270	18.560	0.000	800	15.868	0.000	33,800	46,442
CARDINAL 2	320	16.423	0.000	595	15.865	0.000	32,765	49,365
KANAWHA RIVER 1	70	18.388	0.000	200	15.840	0.000	5,290	
CONESVILLE 5-2	165	16.277	0.000	375	15.391	0.000	9,958	
JOHN AMOS 2	270	17.910	0.000	800	15.317	0.000	33,800	46,442
STUART 3	60	17.119	0.507	152	15.038	0.440	2,802	
STUART 4	60	16.704	0.494	152	14.876	0.435	2,802	
STUART 2	60	17.605	0.522	152	14.779	0.431	2,802	
STUART 1	60	16.684	0.492	152	14.644	0.427	2,802	
MITCHELL 1	270	16.410	0.530	800	14.597	0.469	31,534	46,859
MITCHELL 2	270	16.346	0.528	800	14.541	0.467	31,534	46,859
MUSKINGUM RIVER 5	310	15.007	0.475	580	14.363	0.452		38,261
TANNERS CREEK 4	300	15.231	1.420	500	14.271	1.317	20,702	

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS .

Exhibit 4
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AMERICAN ELECTRIC POWER SERVICE CORPORATION
ENERGY COSTING AND REPORTING

MINIMUM MAXIMUM LOAD REPORT
ESTIMATED - COMMITTED COAL

EFFECTIVE REPORT DATE 05/01/96

	-------- MINIMUM LOAD --------			-------- MAXIMUM LOAD --------				
	MWH	TOTAL (1) AVERAGE COST M/KWH	SO2 ALLOWANCE AVG. COST M/KWH	MWH	TOTAL (1) AVERAGE COST M/KWH	SO2 ALLOWANCE AVG. COST M/KWH	WITHOUT AUX BOILER SUPPLYING START-UP STEAM $	WITH AUXILIARY BOILER SUPPLYING START-UP STEAM $
CONESVILLE 6-2	165	15.033	0.000	375	14.222	0.000	10,396	
GLENLYN 6	85	15.456	0.000	240	14.077	0.000	4,540	
PHILIP SPORN 1	50	15.592	0.000	150	13.395	0.000	5,986	
PHILIP SPORN 4	50	15.704	0.000	150	13.250	0.000	5,986	
PHILIP SPORN 2	50	15.225	0.000	150	13.119	0.000	5,986	
BECKJORD 6	19	14.709	0.968	53	12.940	0.848	2,155	
PHILIP SPORN 3	50	14.978	0.000	150	12.805	0.000	5,986	
PHILIP SPORN 5	220	13.953	0.000	450	12.723	0.000		38,426
CLINCH RIVER 1	80	14.383	0.000	235	12.658	0.000	4,243	
CLINCH RIVER 2	80	14.159	0.000	235	12.455	0.000	4,243	
KAMMER 2	80	14.204	2.460	205	12.441	2.125	3,876	
CLINCH RIVER 3	80	14.121	0.000	235	12.405	0.000	4,243	
KAMMER 1	80	13.928	2.407	205	12.158	2.071	3,876	
KAMMER 3	80	13.858	2.394	205	12.118	2.064	3,876	
BIG SANDY 1	100	13.135	0.000	260	11.927	0.000	3,780	
OVEC	0	0.000	0.000	0	11.888	0.000		
ZIMMER 1	152	12.543	0.000	330	11.639	0.000		44,598
BIG SANDY 2	270	13.251	0.000	800	11.595	0.000		35,441
ROCKPORT 1	435	13.142	0.000	1300	11.496	0.000	72,395	117,086
ROCKPORT 2	435	13.118	0.000	1300	11.475	0.000	72,395	117,086

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS .

AMERICAN ELECTRIC POWER SERVICE CORPORATION
SYSTEM POWER MARKETS
ENERGY COSTING AND REPORTING

AVERAGE RATE OF
INDICATED MW INCREMENT AS OF 5/1/96

	MW RANGE		MW INCREMENT	TOTAL (1) AVG. RATE ($/MWH)	SO2 ALLOWANCE COST AVG. RATE ($/MWH)
1 MUSKINGUM RIVER 2	80	200	120	24.35	2.63
2 MUSKINGUM RIVER 4	90	210	120	24.28	2.62
3 MUSKINGUM RIVER 1	80	200	120	24.28	2.61
4 MUSKINGUM RIVER 3	90	210	120	23.88	2.57
5 CONESVILLE 3	70	161	91	21.80	1.73
6 CONESVILLE 1	72	115	43	20.91	1.65
7 CARDINAL 1	500	595	95	19.86	2.03
8 CONESVILLE 4	202	339	137	19.78	1.44
9 CONESVILLE 2	72	115	43	19.44	1.51
10 TANNERS CREEK 2	50	145	95	19.08	0.00
11 TANNERS CREEK 1	50	145	95	19.01	0.00
12 CONESVILLE 4	150	202	52	18.88	1.37
13 CARDINAL 1	400	500	100	18.70	1.89
14 TANNERS CREEK 3	85	205	120	18.48	0.00
15 SMITH MOUNTAIN	0	565	565	18.47	0.00
16 CARDINAL 3	570	630	60	17.90	0.00
17 CARDINAL 1	320	400	80	17.61	1.79
18 GLENLYN 5 (2 BLRS)	55	95	40	17.23	0.00
19 MOUNTAINEER 1	1200	1300	100	17.17	0.00
20 CARDINAL 3	500	570	70	17.06	0.00
21 MOUNTAINEER 1	1100	1200	100	16.79	0.00
22 JAMES GAVIN 1	1200	1300	100	16.68	0.50
23 JOHN AMOS 3	1200	1300	100	16.61	0.00
24 MOUNTAINEER 1	1000	1100	100	16.41	0.00
25 JAMES GAVIN 1	1100	1200	100	16.40	0.48
26 JAMES GAVIN 2	1200	1300	100	16.39	0.48
27 PICWAY 5	30	90	60	16.32	2.12
28 GLENLYN 5 (1 BLR)	25	55	30	16.27	0.00
29 JOHN AMOS 1	700	800	100	16.26	0.00
30 JOHN AMOS 3	1100	1200	100	16.23	0.00
31 JAMES GAVIN 1	1000	1100	100	16.12	0.47
32 JAMES GAVIN 2	1100	1200	100	16.11	0.47
33 CARDINAL 2	500	595	95	16.07	0.00
34 MOUNTAINEER 1	900	1000	100	16.04	0.00
35 CARDINAL 3	400	500	100	15.96	0.00
36 JOHN AMOS 3	1000	1100	100	15.86	0.00

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS.

AMERICAN ELECTRIC POWER SERVICE CORPORATION
SYSTEM POWER MARKETS
ENERGY COSTING AND REPORTING

AVERAGE RATE OF
INDICATED MW INCREMENT AS OF 5/1/96

	MW RANGE		MW INCREMENT	TOTAL (1) AVG. RATE ($/MWH)	SO2 ALLOWANCE COST AVG. RATE ($/MWH)
37 JAMES GAVIN 2	1000	1100	100	15.84	0.47
38 JAMES GAVIN 1	900	1000	100	15.84	0.47
39 JOHN AMOS 2	700	800	100	15.69	0.00
40 MOUNTAINEER 1	800	900	100	15.66	0.00
41 CONESVILLE 5	300	375	75	15.63	0.00
42 JAMES GAVIN 1	800	900	100	15.57	0.46
43 JAMES GAVIN 2	900	1000	100	15.56	0.45
44 JOHN AMOS 3	900	1000	100	15.48	0.00
45 JOHN AMOS 1	500	600	100	15.48	0.00
46 JAMES GAVIN 2	800	900	100	15.29	0.45
47 MOUNTAINEER 1	700	800	100	15.28	0.00
48 JAMES GAVIN 1	700	800	100	15.28	0.44
49 CARDINAL 2	400	500	100	15.15	0.00
50 JOHN AMOS 3	800	900	100	15.12	0.00
51 JAMES GAVIN 2	700	800	100	15.02	0.44
52 JOHN AMOS 1	600	700	100	14.96	0.00
53 KANAWHA RIVER 2	70	200	130	14.94	0.00
54 JOHN AMOS 2	500	600	100	14.94	0.00
55 MOUNTAINEER 1	600	700	100	14.90	0.00
56 JAMES GAVIN 1	500	700	200	14.86	0.44
57 CARDINAL 3	330	400	70	14.86	0.00
58 JOHN AMOS 3	700	800	100	14.73	0.00
59 MITCHELL 1	700	800	100	14.68	0.47
60 MITCHELL 2	700	800	100	14.63	0.47
61 JOHN AMOS 1	400	500	100	14.63	0.00
62 JAMES GAVIN 2	500	700	200	14.60	0.43
63 KANAWHA RIVER 1	70	200	130	14.46	0.00
64 CONESVILLE 6	300	375	75	14.44	0.00
65 JOHN AMOS 2	600	700	100	14.44	0.00
66 MOUNTAINEER 1	435	600	165	14.41	0.00
67 MUSKINGUM RIVER 5	500	580	80	14.38	0.45
68 JOHN AMOS 3	600	700	100	14.37	0.00
69 CARDINAL 2	320	400	80	14.28	0.00
70 MITCHELL 1	600	700	100	14.22	0.46
71 CONESVILLE 5	165	300	135	14.18	0.00
72 MITCHELL 2	600	700	100	14.16	0.45

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS.

Exhibit 5
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AMERICAN ELECTRIC POWER SERVICE CORPORATION
SYSTEM POWER MARKETS
ENERGY COSTING AND REPORTING

AVERAGE RATE OF
INDICATED MW INCREMENT AS OF 5/1/96

	MW RANGE		MW INCREMENT	TOTAL (1) AVG. RATE ($/MWH)	SO2 ALLOWANCE COST AVG. RATE ($/MWH)
73 JOHN AMOS 2	400	500	100	14.13	0.00
74 GLENLYN 6	160	240	80	13.95	0.00
75 JOHN AMOS 3	435	600	165	13.87	0.00
76 MITCHELL 1	500	600	100	13.74	0.44
77 MITCHELL 2	500	600	100	13.69	0.44
78 STUART 4	60	152	92	13.68	0.40
79 STUART 3	60	152	92	13.67	0.39
80 MUSKINGUM RIVER 5	400	500	100	13.66	0.43
81 JOHN AMOS 1	270	400	130	13.65	0.00
82 STUART 1	60	152	92	13.30	0.38
83 MITCHELL 1	400	500	100	13.28	0.43
84 TANNERS CREEK 4	400	500	100	13.27	1.21
85 MITCHELL 2	400	500	100	13.22	0.42
86 JOHN AMOS 2	270	400	130	13.18	0.00
87 CONESVILLE 6	165	300	135	13.11	0.00
88 STUART 2	60	152	92	12.93	0.37
89 MUSKINGUM RIVER 5	310	400	90	12.91	0.40
90 MITCHELL 1	270	400	130	12.73	0.40
91 MITCHELL 2	270	400	130	12.68	0.41
92 GLENLYN 6	85	160	75	12.65	0.00
93 TANNERS CREEK 4	300	400	100	12.39	1.12
94 PHILIP SPORN 1	50	150	100	12.30	0.00
95 PHILIP SPORN 2	50	150	100	12.06	0.00
96 PHILIP SPORN 4	50	150	100	12.02	0.00
97 BECKJORD 6	19	53	34	11.94	0.76
98 BIG SANDY 2	700	800	100	11.89	0.00
99 OVEC (AP,CSP,I&M,OP)	0	0	0	11.88	0.00
100 CLINCH RIVER 1	80	235	155	11.77	0.00
101 PHILIP SPORN 3	50	150	100	11.72	0.00
102 CLINCH RIVER 2	80	235	155	11.57	0.00
103 PHILIP SPORN 5	220	450	230	11.55	0.00
104 CLINCH RIVER 3	80	235	155	11.52	0.00
105 BIG SANDY 1	200	260	60	11.45	0.00
106 KAMMER 2	80	205	125	11.31	1.91
107 BIG SANDY 2	400	500	100	11.11	0.00
108 ZIMMER 1	241	330	89	11.03	0.00

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS.

AMERICAN ELECTRIC POWER SERVICE CORPORATION
SYSTEM POWER MARKETS
ENERGY COSTING AND REPORTING

AVERAGE RATE OF
INDICATED MW INCREMENT AS OF 5/1/96

	MW RANGE		MW INCREMENT	TOTAL (1) AVG. RATE ($/MWH)	SO2 ALLOWANCE COST AVG. RATE ($/MWH)
109 KAMMER 1	80	205	125	11.02	1.86
110 KAMMER 3	80	205	125	11.01	1.86
111 BIG SANDY 1	100	200	100	11.00	0.00
112 BIG SANDY 2	600	700	100	10.98	0.00
113 ROCKPORT 1	1200	1300	100	10.97	0.00
114 ROCKPORT 2	1200	1300	100	10.95	0.00
115 ROCKPORT 1	1100	1200	100	10.89	0.00
116 ROCKPORT 2	1100	1200	100	10.87	0.00
117 ROCKPORT 1	1000	1100	100	10.82	0.00
118 ROCKPORT 2	1000	1100	100	10.80	0.00
119 ROCKPORT 1	900	1000	100	10.73	0.00
120 ROCKPORT 2	900	1000	100	10.71	0.00
121 ZIMMER 1	152	241	89	10.70	0.00
122 BIG SANDY 2	270	400	130	10.69	0.00
123 ROCKPORT 1	800	900	100	10.66	0.00
124 ROCKPORT 2	800	900	100	10.64	0.00
125 ROCKPORT 1	700	800	100	10.57	0.00
126 ROCKPORT 2	700	800	100	10.55	0.00
127 ROCKPORT 1	600	700	100	10.50	0.00
128 ROCKPORT 2	600	700	100	10.48	0.00
129 ROCKPORT 1	435	600	165	10.39	0.00
130 ROCKPORT 2	435	600	165	10.36	0.00
131 BIG SANDY 2	500	600	100	10.07	0.00

(1) THE AVERAGE RATE INCLUDES SO2 ALLOWANCE COST FOR PHASE 1 UNITS.