

ORIGINAL	
N.H.P.U.C. Case No.	DE 11-250
Exhibit No.	#70
Witness	James Brennan
DO NOT REMOVE FROM FILE	

**ATTACHMENT WHS - 1**

**LIST OF UNIT OUTAGES  
AND  
SCHEDULED OUTAGE PERIODS**

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
MERRIMACK 1 - UNIT OUTAGE LIST  
JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/8	2339	1/11	2045	2.9	Preventative Maintenance Outage - Air Heater
B	4/16	0800	4/17	1921	1.5	Transmission Equipment Beyond The 1st Substation
C	5/6	0800	5/17	1530	11.3	Forced Draft Fan
D	6/24	1225	6/24	1256	0.0	Boiler, Miscellaneous
E	8/5	0446	8/5	0953	0.2	Low Furnace Pressure - Booster Fan
F	8/5	1018	8/5	1533	0.2	Cyclone Feeders
G	8/15	1530	8/16	1230	0.9	Steam Generating Tube Leaks
H	9/11	0800	9/11	1116	0.1	Other High Pressure Turbine Problems
I	10/28	0001	11/22	0135	25.1	Boiler Overhaul
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					17.1	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
MERRIMACK 2 - UNIT OUTAGE LIST  
JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	3/21	0003	3/24	0415	3.2	Waterwall (Furnace Wall) Repairs
B	4/21	1500	5/10	1606	19.0	Preventative Maintenance Outage
C	6/24	1225	6/24	1615	0.2	Boiler, Miscellaneous
D	7/25	1532	7/29	1030	3.8	Flue Gas Expansion Joints
E	9/11	1000	9/11	1410	0.2	Other Generator Controls and Metering Problems
F	9/16	0001	12/7	0955	82.4	Major Generator Overhaul
G	12/7	0958	12/7	1304	0.1	No load - steam flow transmitter
H	12/29	0056	12/31	1805	2.7	Boiler Tube Repairs
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					29.2	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
MERRIMACK CT1 - UNIT OUTAGE LIST  
JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/13	1730	1/14	1927	1.1	GT Controls and Instrument
B	4/15	0415	4/17	1730	2.6	Generator Inspection
C	5/10	0500	5/10	1320	0.3	Inverters
D	5/11	0636	5/11	0655	0.0	Inverters
E	5/11	1913	5/11	2200	0.1	Circuit Breakers
F	5/21	1135	5/21	1333	0.1	Other Compressor Problems
G	6/3	1352	6/3	1430	0.0	Other Generator Controls and Metering Problems
H	7/23	0706	7/23	1325	0.3	Generator Other Cooling System Problems
I	7/31	1145	8/1	0315	0.6	Other AC Instrument Power Problems
J	8/8	1032	8/8	1032	-	GT Fuel Filters
K	9/6	1138	9/6	1250	0.0	GT Starting System
L	9/13	1018	9/13	1446	0.2	Other Generator Controls and Metering Problems
M	11/24	1859	11/24	1936	0.0	GT Starting System
N	12/26	1746	12/26	1752	0.0	Other Miscellaneous Balance of Plant Problems
O	12/27	0415	12/27	0422	0.0	Other Gas Turbine Combustor Problems
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					2.8	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
MERRIMACK CT2 - UNIT OUTAGE LIST  
JANUARY TO DECEMBER 2013

<u>ID</u>	<u>DATE</u>	<u>TIME</u>	<u>DATE</u>	<u>TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	4/16	0700	4/18	1600	2.4	Generator Inspection
B	4/19	1130	4/19	1138	0.0	Other Jet Engine Fuel System Problems
C	4/25	0814	4/25	1125	0.1	Jet Starting System
D	9/6	1138	9/6	1240	0.0	Jet Starting System
E	9/10	0955	9/10	1012	0.0	Jet Starting System
F	9/13	1018	9/13	1446	0.2	Other Generator Controls and Metering Problems
G	12/19	0830	12/19	0835	0.0	Liquid Fuel Oil Pump
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					0.4	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
NEWINGTON - UNIT OUTAGE LIST  
JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/23	1056	1/23	1517	0.2	Transmission System
B	4/1	0600	4/12	1500	11.4	Planned Overhaul
C	7/15	0855	7/15	1147	0.1	Feedwater Pump Drive - Local Controls
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					0.3	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
 SCHILLER 4 - UNIT OUTAGE LIST  
 JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/6	1002	1/9	1545	3.2	Other Main Steam Valves
B	1/18	0450	1/18	0546	0.0	Boiler, Miscellaneous
C	2/20	0248	2/22	0330	2.0	Second Superheater Leaks
D	3/18	0506	3/18	0537	0.0	Boiler, Miscellaneous
E	5/5	1200	5/15	1210	10.0	Preventative Maintenance Outage- Generator Hydrogen Coolers
F	5/31	0855	5/31	0935	0.0	Other Boiler Control and Instrumentation Problems
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					15.4	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
 SCHILLER 5 - UNIT OUTAGE LIST  
 JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/1	0000	1/1	2005	0.8	Combustion/Steam Condition Instrumentation (not local controls)
B	4/13	1017	5/3	0837	19.9	Boiler Overhaul
C	5/3	1220	5/3	1928	0.3	Boiler, Miscellaneous
D	5/3	2003	5/3	2250	0.1	Other Boiler Control and Instrumentation Problems
E	6/14	1250	6/14	1455	0.1	Other Miscellaneous Steam Turbine Problems
F	9/7	0056	9/7	0133	0.0	Boiler, Miscellaneous
G	10/25	2200	11/2	0355	7.2	Preventative Maintenance Outage
H	12/17	2020	12/18	0428	0.3	Other Miscellaneous Steam Turbine Problems
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					8.9	



PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
 SCHILLER 6 - UNIT OUTAGE LIST  
 JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/27	1002	1/31	0300	3.7	first superheater leaks
B	3/10	2300	4/10	1958	30.9	Planned Outage - Control System
C	4/10	2202	4/11	0700	0.4	boiler inspection/testing
D	4/11	0749	4/11	0820	0.0	boiler inspection/testing
E	4/11	2000	4/12	0700	0.5	boiler inspection/testing
F	6/4	0700	6/5	1650	1.4	economizer leaks
G	6/24	0620	6/24	0845	0.1	boiler , miscellaneous
H	12/28	1515	12/31	0455	2.6	steam generating tube leaks between steam drum and mud drum
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					8.6	

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE  
 SCHILLER CT1 - UNIT OUTAGE LIST  
 JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/25	0010	1/25	1255	0.5	Generator Bearings and Lube Oil System
B	8/27	1000	8/27	1040	0.0	Jet Engine Performance Testing - Individual Engines
C	10/1	0600	10/8	1310	7.3	Miscellaneous Regulatory
D	12/12	0920	12/12	1338	0.2	Other Jet Engine Fuel System Problems
E	12/17	1300	12/31	2359	14.5	Other Jet Engine Fuel System Problems
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					22.5	

WYMAN IV - UNIT OUTAGE LIST  
 JANUARY TO DECEMBER 2013

<u>OUTAGE ID</u>	<u>OUTAGE DATE</u>	<u>START TIME</u>	<u>OUTAGE DATE</u>	<u>STOP TIME</u>	<u>DAYS</u>	<u>REASON</u>
A	1/1	1200	1/1	2034	0.4	#4 unit field breaker/voltage reg. failed start up
B	1/3	0631	1/3	1100	0.2	PWF-4 TRIP on Unsuccessful Burner Shutdown due to Limit Switch Failure
C	1/3	1100	1/3	2130	0.4	PWF-4 Generator Breaker Opened on Pole Disagreement Relay
D	1/26	0240	1/29	0001	2.9	PWF 4 Restriction due to HP FW Heater Leak
E	1/29	0001	1/29	2245	0.9	PWF 4 Maintenance Outage for HP FW Leak
F	4/1	0001	4/4	2300	4.0	PWF 4 Maintenance Outage for HP FW Leak
G	6/24	1028	6/24	1910	0.4	Unit 4 generator breaker tripped
H	8/7	0001	8/11	2235	4.9	PWF 4 Maintenance Outage Boiler Wash
I	8/29	0507	8/29	1800	0.5	Pwf 4 maintenance outage for transformer work
J	11/1	0001	11/29	0732	28.3	PWF 4 Annual Outage
K	11/29	0737	11/29	1228	0.2	PWF 4 POF Post Testing in Outage
TOTAL FORCED & MAINTENANCE OUTAGE DOWN TIME					14.8	

PSNH Hydro Outage List -2013

	Site	Unit Number	Date & Time OFF line	Date & Time ON line	Outage Duration - Hours	Outage Duration - Days	Lost Generation (Y or N)	Outage Type	Cause of Outage
A	Amoskeag	S	2/4/13 15:08	2/4/13 15:54	0.77	0.03	Y	TRIP	Onan Emergency Generator power module failure.
B	Amoskeag	S	2/19/13 9:42	2/19/13 13:10	3.47	0.14	Y	T/D	3450 Breaker Cable Replacement
C	Amoskeag	S	2/22/13 8:23	2/22/13 8:53	0.50	0.02	Y	T/D	3450 Breaker Cable Replacement
D	Amoskeag	S	6/26/13 13:57	6/26/13 16:06	2.15	0.09	Y	TRIP	Transducer failure
E	Amoskeag	S	8/19/13 8:46	8/20/13 15:00	30.23	1.26	Y	EMO	TB-355 Testing.
F	Amoskeag	S	10/9/13 8:52	10/9/13 10:35	1.72	0.07	Y	EMO	Black Start Testing
A	Amoskeag	1	2/11/13 7:22	2/15/13 14:47	103.42	4.31	N	A.I.	Annual Inspection
B	Amoskeag	1	9/13/13 1:00	9/19/13 6:00	149.00	6.21	Y	DR	Main Transformer
C	Amoskeag	1	9/23/13 6:00	9/24/13 11:00	29.00	1.21	N	DR	Main Transformer
D	Amoskeag	1	11/2/13 18:00	11/4/13 0:00	30.00	1.25	Y	DR	Main Transformer
E	Amoskeag	1	11/19/13 14:00	11/20/13 15:00	25.00	1.04	Y	DR	Main Transformer
F	Amoskeag	1	11/27/13 15:00	12/5/13 17:00	194.00	8.08	Y	DR	Main Transformer
G	Amoskeag	1	12/6/13 0:00	12/10/13 0:00	96.00	4.00	Y	DR	Main Transformer
A	Amoskeag	2	1/7/13 7:21	1/11/13 13:40	102.32	4.26	N	A.I.	Annual Inspection
B	Amoskeag	2	6/21/13 8:52	6/21/13 11:52	3.00	0.13	Y	TRIP	Low oil level in lower guide bearing due to float malfunction
D	Amoskeag	2	9/13/13 1:00	9/19/13 6:00	149.00	6.21	Y	DR	Main Transformer
E	Amoskeag	2	9/23/13 6:00	9/24/13 11:00	29.00	1.21	Y	DR	Main Transformer
F	Amoskeag	2	10/24/13 1:31	10/24/13 6:32	5.02	0.21	Y	TRIP	Transducer failure
G	Amoskeag	2	11/2/13 18:00	11/4/13 0:00	30.00	1.25	Y	DR	Main Transformer
H	Amoskeag	2	11/4/13 7:36	11/4/13 13:54	6.30	0.26	N	EMO	Governor Maintenance
I	Amoskeag	2	11/19/13 14:00	11/20/13 15:00	25.00	1.04	N	DR	Main Transformer
J	Amoskeag	2	11/27/13 15:00	12/5/13 17:00	194.00	8.08	Y	DR	Main Transformer
K	Amoskeag	2	12/6/13 0:00	12/10/13 0:00	96.00	4.00	Y	DR	Main Transformer
A	Amoskeag	3	1/28/13 7:20	1/31/13 12:59	77.65	3.24	N	A.I.	Annual Inspection
C	Amoskeag	3	10/2/13 16:44	10/2/13 17:49	1.08	0.05	Y	TRIP	Faulty head water transducer controlling bladder
D	Amoskeag	3	10/4/13 0:26	10/4/13 8:13	7.78	0.32	Y	TRIP	Faulty head water transducer controlling bladder
E	Amoskeag	3	10/31/13 7:36	10/31/13 8:34	0.97	0.04	Y	TRIP	Low oil level in lower guide bearing due to sticky linkage of float
A	Ayers Island	S	2/17/13 11:05	2/17/13 11:30	0.42	0.02	Y	T/D	Disturbance on 115 KV system resulting in tripping of 3149 line at Pemi Substation
B	Ayers Island	S	9/30/13 9:59	9/30/13 19:53	9.90	0.41	Y	EMO	Install Mobile Substation.
C	Ayers Island	S	10/7/13 17:49	10/7/13 18:43	0.90	0.04	Y	T/D	3114 line from Pemi Substation tripped during storm
D	Ayers Island	S	10/16/13 8:47	10/16/13 19:29	10.70	0.45	Y	EMO	TB-8 and TB-19 replacement.
E	Ayers Island	S	10/23/13 7:01	10/23/13 15:15	8.23	0.34	Y	EMO	TB-8 and TB-19 replacement.
F	Ayers Island	S	12/3/13 7:51	12/4/13 14:48	30.95	1.29	Y	EMO	TB-8 and TB-19 replacement.
G	Ayers Island	S	12/4/13 15:35	12/4/13 16:07	0.53	0.02	Y	EMO	TB-8 and TB-19 replacement.
A	Ayers Island	1	2/25/13 7:59	3/11/13 11:18	339.32	14.14	N	A.I.	Annual Inspection
B	Ayers Island	1	5/22/13 14:13	5/22/13 14:56	0.72	0.03	Y	TRIP	Loss of oil flow to thrust bearing
C	Ayers Island	1	5/31/13 18:57	5/31/13 19:07	0.17	0.01	Y	TRIP	Loss of oil flow to thrust bearing
A	Ayers Island	2	1/21/13 8:01	1/28/13 17:12	177.18	7.38	N	A.I.	Annual Inspection
B	Ayers Island	2	2/6/13 8:52	2/6/13 11:22	2.50	0.10	Y	TRIP	Breaker position indicator lamp socket failed during bulb change and shorted to ground blowing DC fuse and tripping unit.
C	Ayers Island	2	12/7/13 0:00	12/8/13 14:00	38.00	1.58	Y	DR	Main Transformer
D	Ayers Island	2	12/23/13 1:00	12/25/13 21:00	68.00	2.83	Y	DR	Main Transformer
A	Ayers Island	3	11/1/13 14:00	11/4/13 7:00	65.00	2.71	Y	DR	Main Transformer
B	Ayers Island	3	11/18/13 14:00	11/20/13 7:00	41.00	1.71	Y	DR	Main Transformer
C	Ayers Island	3	11/26/13 15:00	11/30/13 9:00	90.00	3.75	Y	DR	Main Transformer
D	Ayers Island	3	11/30/13 14:00	12/3/13 7:50	65.83	2.74	Y	DR	Main Transformer
A	Canaan	1	4/15/13 8:10	4/15/13 14:15	6.08	0.25	Y	TRIP	Governor oil pump.
B	Canaan	1	4/23/13 10:53	4/23/13 18:08	7.25	0.30	Y	EMO	Generator breaker maintenance
C	Canaan	1	4/25/13 11:04	4/25/13 18:02	6.97	0.29	Y	EMO	Generator breaker maintenance
D	Canaan	1	5/7/13 9:34	5/9/13 12:03	50.48	2.10	Y	EMO	Dam Repair
E	Canaan	1	6/2/13 15:47	6/2/13 20:44	4.95	0.21	Y	T/D	357 overcurrent
F	Canaan	1	6/3/13 3:14	6/3/13 9:47	6.55	0.27	Y	TRIP	Governor oil pressure.
G	Canaan	1	6/10/13 10:52	6/10/13 15:15	4.38	0.18	Y	EMO	Remove turbine bearing oil pump.
H	Canaan	1	7/9/13 12:27	7/9/13 12:32	0.08	0.00	Y	T/D	357 overcurrent
I	Canaan	1	7/19/13 20:28	7/20/13 9:38	13.17	0.55	Y	T/D	357 overcurrent

PSNH Hydro Outage List -2013

	Site	Unit Number	Date & Time OFF line	Date & Time ON line	Outage Duration - Hours	Outage Duration - Days	Lost Generation (Y or N)	Outage Type	Cause of Outage
J	Canaan	1	7/22/13 6:53	8/2/13 15:57	273.07	11.38	Y	A.I.	Annual Inspection
K	Canaan	1	8/30/13 22:20	8/30/13 22:21	0.02	0.00	Y	T/D	Trip 355 line fault
L	Canaan	1	9/24/13 11:28	9/24/13 11:38	0.17	0.01	Y	T/D	Bus trip @ Berlin
M	Canaan	1	10/7/13 17:33	10/7/13 18:06	0.55	0.02	Y	T/D	X178 operation
N	Canaan	1	10/29/13 9:45	10/29/13 10:25	0.67	0.03	Y	T/D	Planned outage on 355 line
O	Canaan	1	11/19/13 13:39	11/19/13 13:45	0.10	0.00	Y	T/D	SUSPECT 355 LINE FAULT BEYOND MONITORED DEVICES
P	Canaan	1	11/24/13 17:16	11/24/13 21:38	4.37	0.18	Y	T/D	355 Breaker Trip at Lost Nation
Q	Canaan	1	11/27/13 11:35	11/27/13 16:00	4.42	0.18	Y	T/D	355 Breaker Trip at Lost Nation
R	Canaan	1	12/21/13 1:15	12/21/13 1:21	0.10	0.00	Y	T/D	355 Breaker Trip at Lost Nation
A	Eastman	S	10/15/13 10:47	11/8/13 8:18	573.52	23.90	Y	EMO	Brown glass replacement in substation
B	Eastman	S	12/5/13 3:55	12/5/13 6:03	2.13	0.09	Y	T/D	High MX/Reacted to system condition. TB-37 issue.
A	Eastman	1	1/28/13 7:17	2/11/13 15:12	343.92	14.33	Y	A.I.	Annual Inspection
B	Eastman	1	7/5/13 13:36	7/5/13 14:43	1.12	0.05	Y	TRIP	High bearing temp
C	Eastman	1	7/7/13 10:20	7/7/13 11:01	0.68	0.03	Y	TRIP	Reverse Power.
A	Eastman	2	1/3/13 23:14	1/4/13 1:15	2.02	0.08	N	EMO	Creep Alarm
B	Eastman	2	1/5/13 5:24	1/9/13 13:53	104.48	4.35	Y	TRIP	Hydraulic Line Failure
C	Eastman	2	1/10/13 7:17	1/14/13 17:50	108.55	4.44	Y	EMO	Repair Besto Bell seal.
D	Eastman	2	10/10/13 8:02	11/8/13 8:56	696.90	29.04	N	A.I.	Annual Inspection
E	Eastman	2	12/29/13 22:15	12/29/13 23:28	1.22	0.05	Y	T/D	1 X 4 circuit trip
F	Eastman	2	12/29/13 23:28	12/30/13 11:38	12.17	0.51	Y	TRIP	Failed to start.
A	Garvins	S	5/9/13 9:21	5/9/13 16:21	7.00	0.29	Y	EMO	Install fish louvers
B	Garvins	S	10/4/13 18:11	10/5/13 9:56	15.75	0.66	Y	EMO	Oil sheen
C	Garvins	S	10/8/13 9:13	10/8/13 10:11	0.97	0.04	Y	EMO	Black Start test
D	Garvins	S	11/8/13 11:54	11/8/13 16:09	4.25	0.18	Y	EMO	G-4 oil leak clean up
E	Garvins	S	11/25/13 8:31	11/25/13 12:01	3.50	0.15	Y	EMO	Diver safety - work on tuff booms
F	Garvins	S	12/6/13 8:43	12/6/13 10:32	1.82	0.08	Y	EMO	Remove fish louvers
A	Garvins	1	7/29/13 7:40	8/7/13 13:07	221.45	9.23	N	A.I.	Annual Inspection
B	Garvins	1	11/27/13 21:04	11/29/13 11:07	38.05	1.59	Y	TRIP	Turbine pitch actuator problem.
A	Garvins	2	6/10/13 15:19	6/10/13 19:36	4.28	0.18	Y	TRIP	Failure of cooling fan motor
B	Garvins	2	7/29/13 7:40	7/29/13 14:05	6.42	0.27	Y	EMO	Diver safety
C	Garvins	2	8/19/13 7:00	8/23/13 14:14	103.23	4.30	N	A.I.	A.I.
D	Garvins	2	12/13/13 14:22	12/13/13 19:08	4.77	0.20	Y	TRIP	Over speed switch problem
E	Garvins	2	12/16/13 11:56	12/18/13 9:40	45.73	1.91	Y	TRIP	Exciter voltage suppressor failure
A	Garvins	3	5/10/13 17:07	5/10/13 18:26	1.32	0.05	Y	TRIP	Reverse Power.
B	Garvins	3	7/26/13 18:52	7/26/13 23:31	4.65	0.19	Y	TRIP	Relay and timer failure
C	Garvins	3	9/30/13 7:00	10/4/13 13:51	102.85	4.29	N	A.I.	Annual Inspection
A	Garvins	4	5/31/13 17:50	5/31/13 20:28	2.63	0.11	Y	TRIP	High spider bearing temp
B	Garvins	4	9/25/13 10:04	9/25/13 10:13	0.15	0.01	Y	EMO	Clean brushes.
C	Garvins	4	11/5/13 16:00	11/8/13 10:42	66.70	2.78	N	EMO	Sump Pump Failure.
D	Garvins	4	12/16/13 9:08	12/20/13 13:01	99.88	4.16	N	A.I.	Annual Inspection
A	Gorham	S	6/10/13 0:54	6/10/13 1:22	0.47	0.02	Y	T/D	Transformer differential at Berlin Substation.
B	Gorham	S	10/7/13 17:33	10/7/13 18:33	1.00	0.04	Y	T/D	X178 operation causing outage in entire north country.
A	Gorham	1	8/12/13 7:40	8/16/13 15:12	103.53	4.31	N	A.I.	Annual Inspection
A	Gorham	2	8/12/13 7:41	8/16/13 15:12	103.52	4.31	N	A.I.	Annual Inspection
A	Gorham	3	8/28/13 16:44	8/28/13 17:39	0.92	0.04	Y	TRIP	RTU Issue
B	Gorham	3	8/30/13 23:59	9/2/13 23:54	71.92	3.00	Y	TRIP	RTU Issue
C	Gorham	3	9/3/13 8:02	9/5/13 14:45	54.72	2.28	N	A.I.	Annual Inspection
D	Gorham	3	9/11/13 21:23	9/11/13 23:28	2.08	0.09	Y	T/D	0352 operation, tripped and reclosed.
E	Gorham	3	10/27/13 23:21	10/28/13 7:47	8.43	0.35	Y	TRIP	Actuator oil pump failure
G	Gorham	3	11/18/13 8:36	11/18/13 13:54	5.30	0.22	Y	TRIP	Actuator oil pump failure
A	Gorham	4	3/9/13 19:53	3/9/13 22:20	2.45	0.10	Y	TRIP	Actuator oil pump failure
B	Gorham	4	9/9/13 6:20	9/13/13 9:49	99.48	4.15	N	A.I.	Annual Inspection
A	Hooksett	1	5/21/13 8:33	5/21/13 9:05	0.53	0.02	Y	EMO	Clean Exciter.
B	Hooksett	1	5/21/13 13:07	5/21/13 14:22	1.25	0.05	Y	EMO	Exciter brush replacement
C	Hooksett	1	7/12/13 1:51	7/12/13 3:30	1.65	0.07	Y	Trip	Stuck mercoid switch

PSNH Hydro Outage List -2013

	Site	Unit Number	Date & Time OFF line	Date & Time ON line	Outage Duration - Hours	Outage Duration - Days	Lost Generation (Y or N)	Outage Type	Cause of Outage
D	Hooksett	1	7/12/13 4:02	7/12/13 4:08	0.10	0.00	Y	EMO	Clean mercoid switch
E	Hooksett	1	8/26/13 7:00	8/30/13 16:03	105.05	4.38	Y	A.I.	Annual Inspection
A	Jackman	1	10/28/13 8:25	11/5/13 16:10	199.75	8.32	N	A.I.	Annual Inspection
B	Jackman	1	11/6/13 10:43	11/6/13 10:49	0.10	0.00	N	TRIP	Over speed.
C	Jackman	1	11/7/13 17:06	11/7/13 21:24	4.30	0.18	N	TRIP	High Field Current.
D	Jackman	1	11/12/13 16:54	11/12/13 18:44	1.83	0.08	N	TRIP	High Field Current.
E	Jackman	1	11/12/13 20:40	11/13/13 14:01	17.35	0.72	N	TRIP	High Field Current.
F	Jackman	1	11/13/13 14:33	11/13/13 14:51	0.30	0.01	N	TRIP	High Field Current.
G	Jackman	1	11/15/13 12:11	11/15/13 13:08	0.95	0.04	N	TRIP	High Field Current.
H	Jackman	1	11/15/13 15:22	11/15/13 15:35	0.22	0.01	N	TRIP	High Field Current.
I	Jackman	1	11/16/13 16:04	11/16/13 18:38	2.57	0.11	N	TRIP	High Field Current.
J	Jackman	1	11/18/13 17:12	11/19/13 13:59	20.78	0.87	N	TRIP	High Field Current.
K	Jackman	1	11/19/13 16:25	11/20/13 17:20	24.92	1.04	N	TRIP	High Field Current.
L	Jackman	1	11/26/13 12:29	11/26/13 12:41	0.20	0.01	N	TRIP	High Field Current.
M	Jackman	1	11/27/13 9:02	11/27/13 11:05	2.05	0.09	N	TRIP	High Field Current.
N	Jackman	1	11/27/13 11:21	11/27/13 11:27	0.10	0.00	N	TRIP	High Field Current.
O	Jackman	1	11/27/13 11:35	11/27/13 11:54	0.32	0.01	N	TRIP	High Field Current.
P	Jackman	1	12/1/13 9:59	12/1/13 11:09	1.17	0.05	N	TRIP	High Field Current.
A	Lost Nation	1	7/3/13 17:18	7/3/13 19:45	2.45	0.10	Y	Trip	Starting Diesel Trouble.
B	Lost Nation	1	8/10/13 6:57	8/10/13 11:19	4.37	0.18	N	EMO	Vibration Trip or Trouble.
C	Lost Nation	1	9/13/13 10:23	9/13/13 13:20	2.95	0.12	Y	Trip	Thermocouple failure
D	Lost Nation	1	9/24/13 11:28	9/24/13 11:38	0.17	0.01	N	T/D	Sub-station trip at Berlin causing TB-31 at Lost Nation to Trip.
E	Lost Nation	1	10/7/13 9:44	10/11/13 13:46	100.03	4.17	N	A.I.	Annual Inspection
A	Smith	1	2/5/13 6:40	2/5/13 15:27	8.78	0.37	Y	T/D	T work at Berlin Substation
B	Smith	1	3/27/13 6:57	3/28/13 12:08	29.18	1.22	Y	T/D	T work on S-136
C	Smith	1	9/16/13 5:10	9/29/13 11:21	318.18	13.26	Y	A.I.	Annual Inspection
D	Smith	1	10/7/13 17:33	10/7/13 18:31	0.97	0.04	Y	T/D	X 178 operation.
A	White Lake	1	1/24/13 8:54	1/24/13 9:22	0.47	0.02	Y	TRIP	Computer mother board failure
B	White Lake	1	5/6/13 8:14	5/10/13 15:59	103.75	4.32	N	A.I.	Annual Inspection

**ATTACHMENT WHS – 2**

**PUC OUTAGE REPORTS**

# PSNH

## FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-01

**Station/Unit:** Merrimack Station, Unit No. 1

**Dates:** January 8 - January 11, 2013

**Duration:** 2.9 Days

**Immediate Cause:**

Planned Preventative Maintenance – The unit was removed from service to clean the air heater.

**Discussion/Remedy:**

Unit 1 was removed from service to clean the air heater and perform preventative maintenance. Prior to performing the air heater, an inspection of the upper and lower air heater seals (circumferential and radial) was performed. "A" air heater required some of the top circumferential seals to be replaced. In addition to the air heater inspection, a boiler inspection was also completed. The boiler inspection revealed one tube leak 3' from the front wall. The leak was located above floor tubes. The tube was repaired with a pad weld.

The critical path activity for this outage was the air heater wash. In parallel to the critical path activity, a number of backlog jobs were completed.

**Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

**Mechanical:**

- Opened "A", "B" and "C" cyclone doors.
- Inspected 1A and 1B air heater motor couplings.
- Inspected and adjusted 1B air heater reverse limit switch.
- Repaired refractory on the slag tank neck.
- Removed and cleaned all upper slag tank upper agitating nozzles.
- Pad welded air heater steam drip drain line in 1A fan room.
- Repaired the top 12" of the slag tank neck.
- Repaired the drain piping to the 1A slag tank water pump.



**Station/Unit:**

Merrimack Station, Unit No. 1

- Replaced piping on the 1B boiler feed pump outboard gland water heat exchanger piping, braided hose and fittings.
- Replaced warm 1A boiler feed pump warm-up valve and piping.
- Replaced vacuum breaker on 1B fan coils, outlet side.
- Replaced 1<sup>st</sup> point heater steam side vent valve.
- Repaired 1B coal feeder belt.
- Replaced broken roller on 1C coal feeder.
- Replaced four sections of 1A air heater top circumferential seals.
- Inspected IK-1 and IK-3 sootblower nozzles.
- Inspected and repaired flyash hopperette #6.
- Inspected and tested 1A coal silo valve gate.
- Replaced IR-1 and IR-2 sootblowers.
- Replaced vent valve for TRCV-3 1-A SSH attemperation control valve.
- Repaired 1A forced draft fan room door.

**Boiler:**

- Performed complete boiler inspection.
- Repaired boiler tube as noted above.
- Water washed both air preheaters.
- Cleaned reagent probes.
- Replaced wear blocks in 1C scroll burner.
- Pad welded the coal inlet elbow on 1C cyclone door.

**Electrical:**

- Inspected and replaced 12 collector ring brushes.
- Inspected, cleaned and verified operation of the Texas nuke mechanisms.
- Verified operational check on 1B boiler feedpump breaker.
- Verified operation of shaft stop alarm on 1A air heater.
- Replaced broken wires in "A", "B" and "C" field of the original precipitator.

**Instrument:**

- Replaced boiler drum level probe.
- Replaced T/C well for point #1336 air outlet temperature on 1B air heater.

**Chemical:**

- Brush cleaned south side condenser tubes.
- Brush cleaned north side condenser tubes.
- Brush cleaned the cooling water heat exchanger.

**North American:**

**Station/Unit:**

Merrimack Station, Unit No. 1

- Vacuumed the SCR inlet, SCR outlet, and breech room and economizer by-pass dampers.
- Water washed 1A and 1B air preheaters.

**Turbine:**

- Tightened bolts on oil piping flange for the turbine governor auxiliary.
- Repaired and modified the turbine throttle pressure regulator cut-out valve handle.

# PSNH

## FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-02

**Station/Unit:** Merrimack Station, Unit No. 2

**Dates:** March 21 – March 24, 2013

**Duration:** 3.7 Days

**Immediate Cause:** Cyclone Tube Leaks

### **Discussion/Remedy:**

With energy prices anticipated to be low and water consumption increasing, Unit 2 was removed from service after 89.45 days of continuous operation, the tenth longest in the unit's history. A boiler inspection revealed "F" cyclone had the majority of the tube leaks. This cyclone had three barrel tube leaks, with one leak located four feet in from the neck and at the 6 o'clock position washing away tube material on the adjacent tubes. Other leaks were at the ten o'clock position, four feet in from the neck. "E" cyclone had a tube leak on the secondary arch bends. "C" cyclone had a tube leak on the lead neck tube, at the five o'clock position looking into the cyclone. "G" cyclone had a leak in the twelve o'clock position on the re-entrant throat. All tubes were pad welded back to original wall thickness. When all tubes were repaired, a waterside pressure test was performed and the unit was returned to service in reserve status. The fall maintenance overhaul work scope includes new pin studs and refractory for the cyclones.

The critical path activity for this outage was the cyclone repairs. In parallel to the critical path activity, a number of backlog jobs were completed.

### **Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

### **Mechanical:**

- Opened and closed boiler and cyclone doors.
- Inspected the forced draft fan inlet cones and ductwork.
- Greased and inspected 2-A and 2-B forced draft fan inlet damper vanes.

**Station/Unit:**

Merrimack Station, Unit No. 2

- Changed oil in the inboard and outboard 2-A and 2-B gas recirc fan motor bearings.
- Changed oil in the inboard and outboard 2-A and 2-B gas recirc fan bearings.
- Reworked oil sight glasses for better visibility.
- Performed alignment and checked balance of 2B fan.
- Repaired casing leak on 2A fan below the shaft on the inboard side.
- Repaired leaks on the secondary fan coil inlets.
- Changed out all vacuum breakers on the secondary fan coil inlets.
- Replaced slag crusher.
- Replaced slag crusher sprocket and chain.
- Replaced venture and section of piping.
- Replaced slag breakers.
- Repaired worn area on slag rodder elbow.
- Repaired elbow leak on the 4<sup>th</sup> point heater continuous vent line.
- Repaired hole on 2D coal feeder downcomer pipe.
- Replaced discharge valves from the feed pump gland water reinjection pump.
- Open/closed heat exchangers for cleaning.

**Boiler:**

- Performed a complete boiler inspection.
- Repaired boiler tube leaks as described above.
- Cleaned SCR reagent probes.
- Repaired casing leaks inside the air heater cold side.
- Repaired casing leaks inside the air heater hot side.
- Repaired leaks in the crawl space.
- Repaired cooling water leak and replaced two wear blocks in "A" cyclone.

**Electrical:**

- Replaced breaker handle on the "normal feed to the inverter".
- Inspected the original precipitator.

**Instrument:**

- Replaced root valve, calibrated DP gauge, set limit and installed new locking screw for DP switch on the polisher regeneration system.
- Installed new gauges and flexible lines for the inlet and outlet pressure on the main boiler feed pump.

**Chemical:**

- Brush cleaned north and south heat exchangers.
- Brush cleaned both sides of the main condenser.

**Station/Unit:**

Merrimack Station, Unit No. 2

- Cleaned water boxes.

**North American:**

- Vacuumed the crawl space under the gas recirc duct.
- Vacuumed tempering duct.
- Vacuumed gas recirc duct.
- Completed vacuuming turbine deck drains (Safety Job).

# PSNH

## FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-03

**Station/Unit:** Merrimack Station, Unit No. 2

**Dates:** April 21 – May 10, 2013

**Duration:** 19 Days

**Immediate Cause:** Planned Corrective Maintenance

### **Discussion/Remedy:**

Unit-2 was declared unavailable on April 21 at 15:00 to perform repairs to the #1 High Pressure Feedwater Heater and replace the heater outlet valve (V6-M). Feedwater was leaking internally in the heater to the steam side of the shell. This required the unit to be operated with the heater bypassed.

These two maintenance items were addressed simultaneously. The heater head and locking ring were removed while the valve was cut out. Intentional flooding of the heater shell identified which tubes were leaking. Eddy current testing of the non-leaking tubes indicated other tubes which were proactively plugged. The locking ring and end cover were reinstalled on the heater. During the heater work, a replacement valve was welded into the feedwater pipe on the heater outlet line. Post-repair heat treatment, testing, and x-rays were accomplished on these items upon completion. The unit was declared available on May 10, 2013 at 16:06.

The critical path activity for this outage was the feedwater heater. In parallel to the critical path activity, a number of backlog jobs were completed.

### **Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

### **Mechanical:**

- Replaced LCV-106 1<sup>st</sup> Point Heater drain valve.
- Replaced control air moisture separator.
- Swapped 2B Cooling Water Pump motor.

**Station/Unit:**

Merrimack Station, Unit No. 2

- Replaced coupling on Slag Pump Gland Water Pump
- Replaced DPCV-21 Start-up Boiler Feed Pump gland water valve
- Replaced gasket on Boiler 210 drain valve

**Boiler:**

- Swapped out IR Sootblowers 4,8,12, 13,14,16, 19, 20 & 24.
- Repalced seal air header for sootblowers
- Inspected / service coal conveying Redlers

**Electrical:**

- Disconnected / reconnected 2B Cooling Water Pump motor for change-out.
- Repaired seal-tight on Slag Water Pump motor feed
- Replaced speed switch on Slag Tank Crusher
- Replaced flow switches on Circ Water Pump gland water supplies
- Replaced limit switches on 2G Secondary Air Damper
- Adjusted limits on 2<sup>nd</sup> Point Extraction steam valve
- Replaced worn drive tray on Start-up Boiler Feed Pump 4160 V switchgear
- Connect / disconnect post-weld heat treatment equipment in support of feedwater heater work
- Inspected / repaired precipitator rappers and AVC #10 controller

**Instrument:**

- Repaired 2G Coal Feeder load cell stabalizers
- Repaired 2D Coal Feeder heat sink hardware
- Calibrated cooling water sump level alarm switches
- Adjusted condensate polisher differential pressure indication
- Replaced thermocouple for one bolier reheat outlet temperature indicators

**Valves:**

- Overhauled the 207 Secondary Superheater Bypass Valve
- Repacked the PCV-37 check valve

# PSNH

## FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-04

**Station/Unit:** Schiller / Unit No. 4

**Dates:** May 5 - May 15, 2013

**Duration:** 10.01 days

**Unit Status Prior:** Offline

**Immediate Cause:** Preventative Maintenance Outage

**Discussion / Remedy:** Unit 4 was placed on a scheduled maintenance outage on Sunday May 5<sup>th</sup> at 12:00, to accommodate the installation of the generator hydrogen coolers. Failures and recent tube analysis warranted the replacement of these coolers. The last time Unit 4 had run was on Friday May 3<sup>rd</sup>.

The decision to take the outage beginning on May 5<sup>th</sup> was made due to a combination of factors, which were; low forecasted energy prices, a discounted rate for Siemens since tooling mobilization fees would not apply due to already being onsite from the Unit 5 hydrogen cooler replacement job and utilization of the same core Siemens employees that worked on Unit 5's hydrogen cooler.

Siemens personnel arrived onsite Monday May 6<sup>th</sup> at 07:00 to begin preparations for the replacement of the generator hydrogen coolers. With forecasted low energy prices, the work was scheduled for straight time only, with minimal overtime hours to be expended on a case basis. Instrumentation for the coolers was removed by PSNH I&C employees. Siemens then removed the water piping to the old coolers to facilitate their removal. Once the coolers were removed, the new coolers were fitted into place and checked for alignment and proper spacing. Siemens then installed the cooler covers and gaskets.

Once Siemens reinstalled the water piping and PSNH I&C personnel completed the reinstallation of all associated hydrogen cooler instrumentation, an air test was performed, followed by a hydrostatic test to check the coolers and associated piping for leaks; all tests performed on the hydrogen coolers and piping passed.

PSNH Operators then purged the generator in preparation to add hydrogen. As hydrogen was being added the seal oil was not maintaining level in the tank preventing hydrogen to maintain pressure in the generator.

Siemens disassembled the hydrogen side seal oil tank and found the internal float and associated parts were slightly bent. When the generator is purged of hydrogen, the seal oil floods the hydrogen side seal oil tank causing a high level. Upon inspection the determination was made that the high level caused the float control to rise to a higher level. Inspection of the equipment suggested that the float "hung up" on a bent portion



of the shaft. Under normal operation, the float valve would not rise to the level where the shaft was damaged.

Replacement parts were ordered in parallel with PSNH's Generation Maintenance shop's attempt to fix the damaged parts and pieces. Ultimately the original components were fixed and reinstalled in the seal oil tank. The seal oil system was then put back in service and found to work satisfactorily. *(The replacement parts have since been received and are in stock, these parts can be utilized on units 4, 5, and 6 as needed)*

Once it was determined the seal oil system was operating correctly, the unit was placed on reserve shut down on Wednesday 5/15/13 at 12:10 ending the maintenance outage. Additional work performed during the outage included repacking the auxiliary steam valve; inspection of the soot blowing system, replacement of the south water-wall drain valves. A boiler inspection was completed and a hydrostatic test was performed on the boiler, with it passing successfully.

Various PM's and other corrective maintenance activities were completed on the turbine, including calibration work on turbine devices, inspections on the turbine throttle valves, governor servo motor, turbine seal oil system, gland steam system, and the generator gland water valves.

Other balance of plant work included removal and inspection of the 4B Circulator Pump which had been experiencing low water lubrication flow to the lower bearing and no flow to the middle bearing. The pluggage was cleared and the pump reinstalled. The 4A condensate pump thrust bearing was also replaced.

## PSNH

### FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-05

**Station/Unit:** Merrimack Station, Unit No. 1

**Dates:** May 6 – May 17, 2013

**Duration:** 11.3 Days

**Immediate Cause:** Planned Corrective Maintenance

#### **Discussion/Remedy:**

With the Unit off-line in reserve status and energy prices expected to remain low, Unit 1 was declared unavailable to make repairs to the 1B Forced Draft Fan shaft. The fan had been experiencing excessive thrusting while operating under certain loads. In 2013 an inspection was performed which showed that the groove in the shaft for the thrust collar had worn, loosening the fit of the collar. An OEM Howden representative was brought on site to observe the fan operating, review the inspection findings, and help determine possible remedies.

With a plan in place for this outage, the fan was disassembled. The rotating assembly was shipped to Energy Resources to repair the shaft. In parallel with the shaft repairs, the inlet dampers on the fan were refurbished. A new coupling was installed on the fan prior to reassembly. The fan was aligned, balanced, and the unit returned to available status on May 17, 2013.

As ISO market power prices during this outage were below the cost that Merrimack Station generates at, the work was done during day shifts only to minimize the amount of overtime costs.

The critical path activity for this outage was the fan repair. In parallel to the critical path activity, a number of backlog jobs were completed.

#### **Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

#### **Mechanical:**

**Station/Unit:**

Merrimack Station, Unit No. 1

- The 1A Forced Draft Fan shaft was inspected during this outage to ensure that it did not have a similar problem.
- Installed lock-out devices on the four FGD recycle pump suction valves.
- Inspected / cleaned silo discharge gates
- Replaced 1B Coal Feeder belt

**Boiler:**

- Inspected / repaired seal air piping to boiler ports and sootblowers.

**Electrical:**

- Remove and reinstalled 1B Forced Draft Fan motor in support of rotor repair
- Cleaned & tested all high pressure heater valves.
- Replaced relay on Cold Reheat steam line drain

**Instrument:**

- Remove and reinstalled 1B Forced Draft Fan instrumentation in support of rotor repair
- Replaced DA Tank high level switch.
- Calibrated 1B Coal Feeder after belt replacement

**Valves:**

- Disassemble and lapped continuous blow-down valve.
- Disassemble and lapped PCV-39 auxiliary steam valve

# PSNH

## FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-06

**Station/Unit:** Merrimack Station, Unit No. 2

**Dates:** July 25 – July 29, 2013

**Duration:** 3.8 Days

**Immediate Cause:** Expansion Joint Repair

### **Discussion/Remedy:**

With the unit in reserve status and energy prices anticipated to remain low, Unit 2 was declared unavailable to repair a damaged non-metallic expansion joint in flue section D-05. This expansion joint repair created an opportunity to perform other maintenance tasks and repairs as noted below. Two cyclone tube leaks were found and repaired during this outage. An inspection of the upper furnace, backpass and penthouse did not locate any other water side leaks.

In "F" cyclone, the first repair involved pad welding two tubes at the secondary arch, with the other leak on a barrel tube 3' in from the neck at the 1:00 o'clock position. A cooling water leak was repaired in 2G cyclone radial burner water jacket. This required removal of ceramic wear blocks to weld repair the water jacket. Both the boiler and cyclone water jacket were pressure tested when the repairs were complete and the unit was returned to service in reserve status.

The targeted work for this outage was the fan repair. In parallel to the critical path activity, a number of backlog jobs were completed.

### **Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

### **Mechanical:**

- Opened and closed boiler and cyclone doors.
- Pressure washed 2A and 2B condenser vacuum pumps.
- Replaced mechanical seal on the slag tank fill pump.
- Replaced mechanical seal on the slag sluice pump.

**Station/Unit:**

Merrimack Station, Unit No. 2

- Replaced mechanical seal on the slag tank service water pump.
- Repaired the slag sluice piping.
- Cleaned suction strainer's on 2A and 2B condensate pumps.
- Replaced section of 3" sootblowing piping.
- Replaced drain valve and repaired secondary fan coil drip return trap.
- Cleaned sight glass and changed oil on 2B turning gear motor gearbox.
- Installed temporary patch on the north slag neck trough.
- Washed out 2A and 2B slag neck troughs.
- Repaired slag tank overflow piping and warm up line.
- Disassembled, inspected, cleaned, reassembled and tested 2-E ignitor.
- Replaced upper knife gates on the four economizer hoppers.
- Replaced the flexitallic gaskets at the MBFP and SUBFP recirc line flanges on the DA.
- Replaced flyash re-injection slip joint flex pipe at 2A cyclone.
- Disassembled and inspected 2B coal feeder blast gate.
- Disassembled and inspected 2D coal feeder blast gate.
- Repacked cold reheat valve PCV-37.
- Installed indicators on 2A and 2B precipitator purge blower outlet dampers.
- Replaced the flash tank free blow valve in the DA shack.
- Replaced IR-4 sootblower with a rebuilt unit.

**Boiler:**

- Performed a complete boiler inspection.
- Repaired boiler tube leaks as described above.
- Repaired casing leak in the north section of D-05 SCR duct.
- Repaired casing leak on elevation 345' (71/2 south).
- Repaired top section of the south expansion joint in the D-05 SCR duct.
- Repaired casing leak on the hot side of the air heater.

**Electrical:**

- Performed #2 station battery load test.

**Instrument:**

- Rebuilt FCV-12A reheat attemperation valve.
- Replaced pressure gauge on FCV-12 reheat attemperation manual valve station.

**North American:**

- Vacuumed out remaining material in the coal silos.

**Chemical:**

- Brush cleaned east and west sides of the condenser.

## PSNH

### FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-07

**Station/Unit:** Wyman Station, Unit No. 4

**Dates:** August 7 – August 11, 2013

**Duration:** 4.9 Days

**Immediate Cause:** Planned Corrective Maintenance

**Discussion/Remedy:**

The Maintenance Outage #20132552 on Unit #4, was requested with ISO-NE to perform a high pressure Boiler wash on the superheater, reheater and economizer sections, to ensure a successful CCA Summer Audit Test. The Boiler wash was also part of the 2013/2014 Winter Readiness Plan for participation in the ISO-NE Winter Reliability Program. Due to past experience with #4 Boiler, back end temps and heat input can be a limiting factor for operation at high loads. The decision to perform the wash proved to be a large contributor to a successful winter run.

**Additional Work Completed During the Outage:**

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work.

## PSNH

### FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-08

**Station/Unit:** Schiller Station, Unit No. 5

**Dates:** October 25 – November 2, 2013

**Duration:** 7.3 Days

**Immediate Cause:** Planned Corrective Maintenance

#### **Discussion/Remedy:**

On Friday October 25<sup>th</sup> the unit was taken offline electrically in order to facilitate a required maintenance outage scheduled to last 10 days. With power market prices predicted to steadily rise into the winter season the decision was made to take the outage while power prices were predicted to remain relatively flat. The decision was made to have two shifts working critical path during the outage in order to expedite the work that was required. Critical path was determined to be the plugged cyclones.

The reasons for taking the maintenance outage were 1) indications of a plugged cyclone, 2) a bad shaft bearing on A wood feeder screw, and 3) the circulating water motor bearing vibration. Once the unit was taken offline electrically, PSNH personnel began to cool down the boiler as well as begin preparations for pulling all six of the cyclone covers to assess the amount of pluggage. Bed material was left in the unit during shutdown to evaluate its condition prior to having the vacuum vendor remove the material.

Upon removal of the cyclone covers, it was discovered that cyclones 1,3,5,6 were in relatively good shape with some cleaning work required. Cyclone 2 had slightly more work required to clear, and cyclone 4 required the most work as was suspected given the operating characteristics, prior to shutting down the unit.

Thielsch Engineering was brought into inspect the condition of the in-bed tubes. All in-bed tube wall thicknesses were measured, and areas of concern were found to only require pad welding to be performed. Based on the number of tubes needing welding, a second shift was added.

Corrosion Monitoring Services came in to inspect the air preheater, which was found to be in generally good condition.

**Station/Unit:**

Schiller Station, Unit No. 5

PSNH personnel replaced the shaft and bearings associated with the A wood feeder screw due to its wear damage, and replaced bearings on the B wood feeder screw as needed. Once the screws were completed the wood chutes were inspected. Some wear spots were found on the wood chutes, with one chute thought to have worn enough to create a sticking point for the woodchip material. All wear spots found were re-lined; with particular emphasis placed on the sticking point. PSNH personnel replaced the bad bearing on the circulating water motor. PSNH personnel also inspected both A and B wood silos. Sootblowers were inspected and 2 lances were replaced. PSNH personnel were able to complete other minor PM's. An inspection of the bag house was performed on all 8 modules, by PSNH personnel and RPS. About 100 bags were replaced by RPS as a result of the inspection. Selected bags were sent for analysis to two separate laboratories to assess the failure mechanism of the bags. Further analysis will provide more information as to the potential to utilize newly manufactured materials or technology which may be better suited for the baghouse.

After all inspections were completed the unit was then turned back over to Operations. The unit was phased on Saturday November 2, 2013 at 03:55 ending the maintenance outage.

The targeted work for this outage was the plugged cyclones. In parallel to the critical path activity, other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work.



## PSNH

### FOSSIL STATION OUTAGE REPORT

**PUC Outage Report No.:** OR-2013-09

**Station/Unit:** Merrimack Station, Unit No. 2

**Dates:** December 29 – December 31, 2013

**Duration:** 2.7 Days

**Immediate Cause:** Reheat Superheater Tube Repair

#### **Discussion/Remedy:**

Unit 2 was removed from service due to a sudden and significant tube leak in the reheat superheater section of the boiler. This horizontal reheater failure occurred in row one on the north side, seven tubes down. Flyash erosion caused tube thinning, and led to the tube failure. The affected tube section was replaced with a dutchman and the tube above it was also replaced due to wastage from the number seven leak. A thorough boiler inspection was completed and a number of cyclone tube leaks were located and repaired.

In 2A cyclone, the repairs involved two barrel tube leaks, one at three o'clock, 25" from the neck and the other at four o'clock, 35" from the neck.

In 2B cyclone there were two barrel tube leaks, both on barrel tubes in the flat studs. One was twenty-one inches from the neck, four inches up into the flat studs. The other was seventeen inches from the neck and sixteen inches up into the flat studs.

2C cyclone also had two tube leaks, one of which was on a barrel tube, at the 11 o'clock position, 24" from the neck. The other leak was at the seven o'clock position on the neck, looking out of the cyclone.

2F cyclone had two barrel tube leaks. One near the secondary air damper knee bends, just below the overlay, 16" from the neck. The other was 3' from the neck, 14' from the bottom center of the cyclone and seven o'clock position looking towards the furnace.

2G cyclone had one leak, looking out of the cyclone, seven o'clock position, 24" up on the neck.

All cyclone tubes were pad welded back to original wall thickness. New studs were welded on the cyclone tubes and refractory was reinstalled once all the tube leaks were repaired. A final boiler pressure test was performed with no other waterside leaks found and the unit was returned to service.

The critical path activity for this outage was tube repair. In parallel to the critical path activity, a number of backlog jobs were completed.

#### **Additional Work Completed During the Outage:**

**Station/Unit:**

Merrimack Station, Unit No. 2

Other work performed during the outage included jobs that were in the priority outage backlog, jobs that were found during the boiler inspection that was completed at the beginning of the outage and other corrective and preventative work. An abbreviated list of some of these activities is provided below.

**Mechanical:**

- Opened and closed boiler and cyclone doors.
- Inspected 2B forced draft fan outlet damper.

**Boiler:**

- Performed a complete boiler inspection.
- Repaired cyclone and reheater tube leaks as described above.
- Inspected and pressure tested secondary fan coils.

**Electrical:**

- Repaired precipitator "A" field.

**North American:**

- Vacuumed gas recirculation duct.
- Vacuumed tempering duct.
- Vacuumed D-01, D-02, ducts and economizer hoppers.

**ATTACHMENT WHS – 3**

**PSNH FOSSIL STEAM UNIT AVAILABILITY**

# PSNH FOSSIL STEAM UNIT AVAILABILITY

January 2013 through December 2013

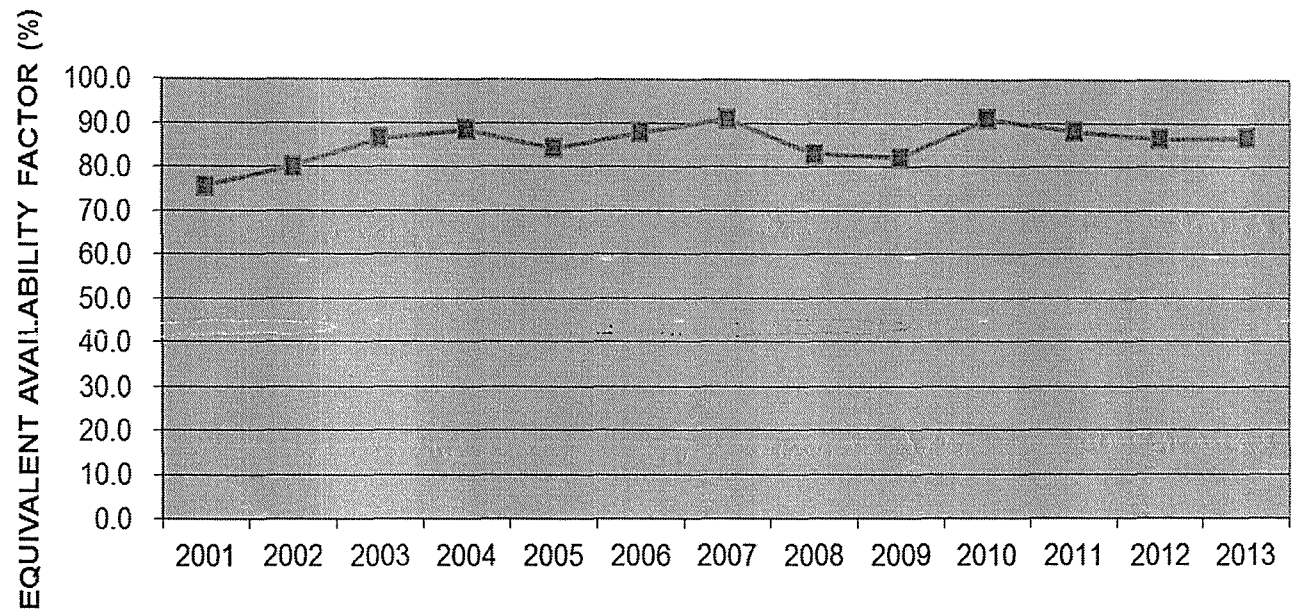
## PSNH Fossil Steam Unit Availability January 2013 through December 2013

	Merrimack Unit 1	Merrimack Unit 2	Newington Unit 1	Schiller Unit 4	Schiller Unit 5	Schiller Unit 6
January	89.7%	99.5%	98.9%	89.4%	97.0%	87.1%
February	99.5%	99.7%	99.9%	92.8%	99.5%	98.9%
March	99.4%	89.5%	100.0%	99.9%	99.2%	31.7%
April	95.1%	68.8%	62.1%	100.0%	41.4%	62.4%
May	63.5%	68.8%	100.0%	67.6%	91.1%	99.0%
June	99.9%	99.5%	100.0%	99.9%	99.7%	93.9%
July	99.2%	86.9%	98.2%	99.2%	99.3%	99.0%
August	95.8%	97.9%	100.0%	99.8%	99.9%	99.0%
September	99.6%	49.4%	100.0%	100.0%	99.8%	99.0%
October	87.1%	0.0%	100.0%	100.0%	80.4%	99.0%
November	29.7%	0.0%	100.0%	99.9%	95.9%	99.0%
December	99.4%	70.1%	100.0%	100.0%	98.8%	90.6%

## Planned Maintenance Outages January 2013 through December 2013

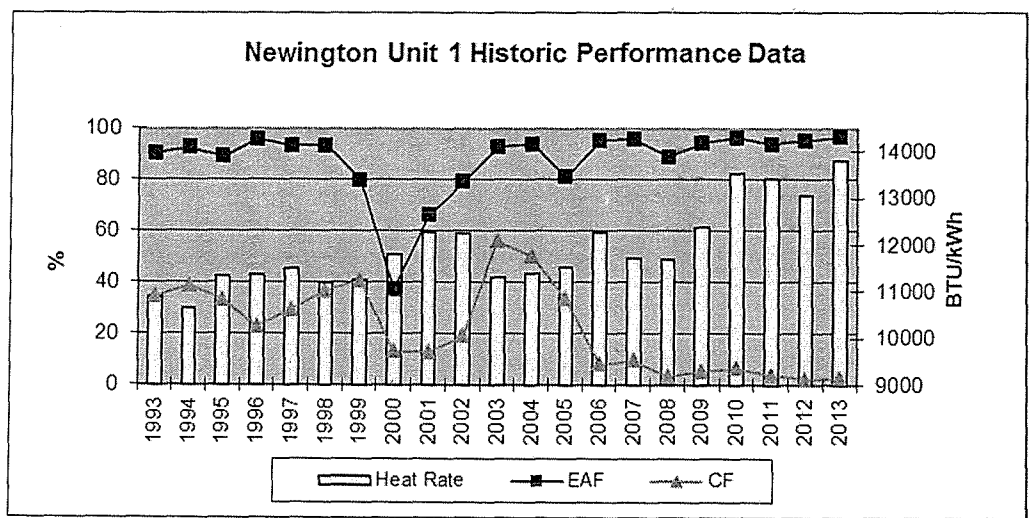
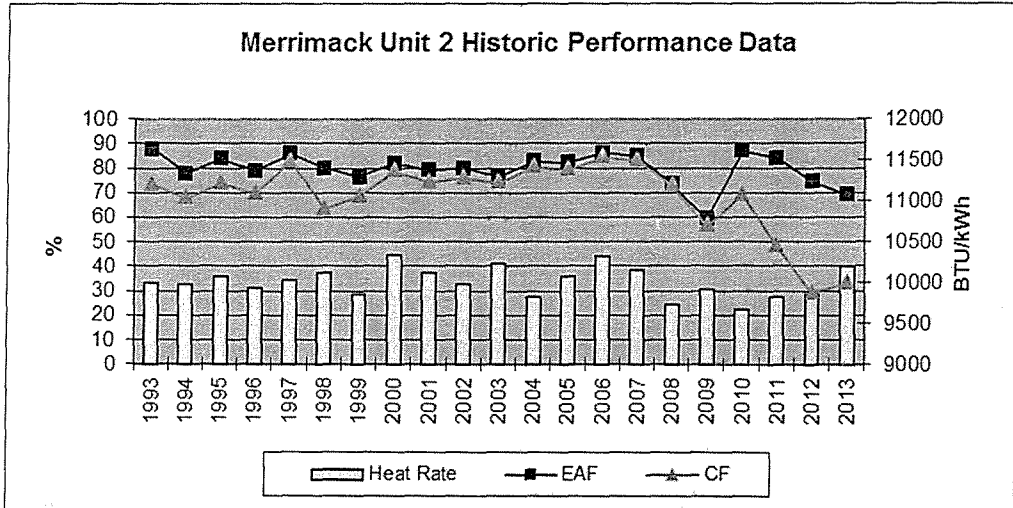
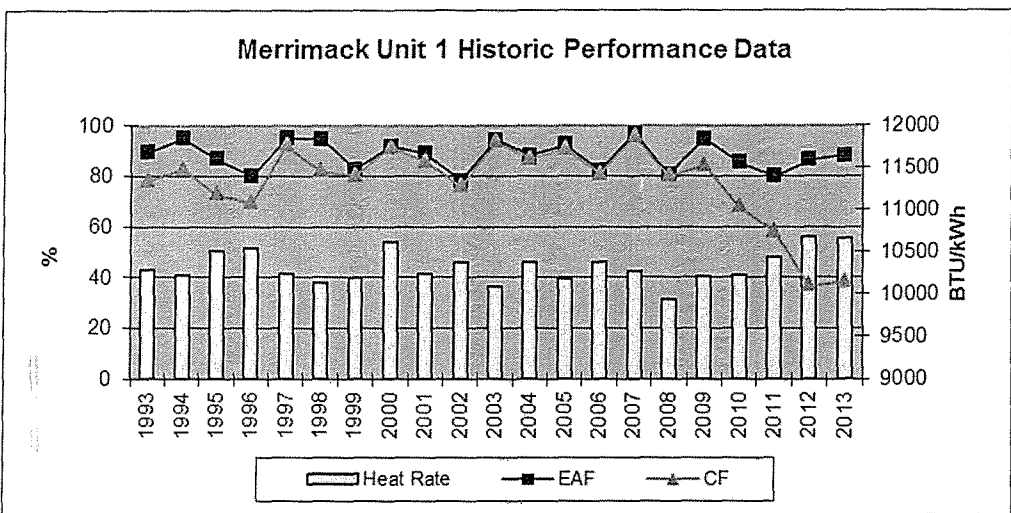
Unit	Month(s)
Merrimack 1	Oct-Nov
Merrimack 2	Sep-Dec
Newington	Apr
Schiller 5	Apr-May
Schiller 6	Mar-Apr

PSNH FOSSIL SYSTEM WEIGHTED EAF  
2013

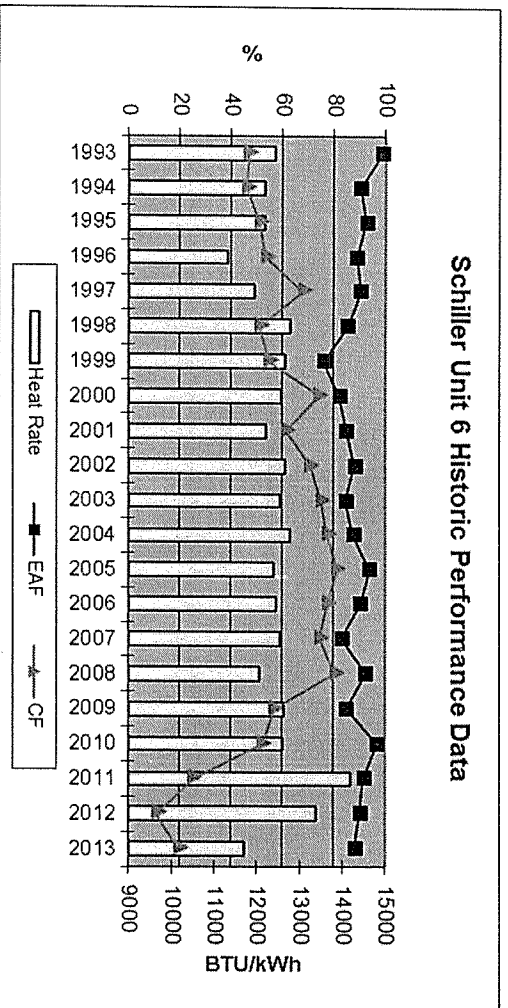
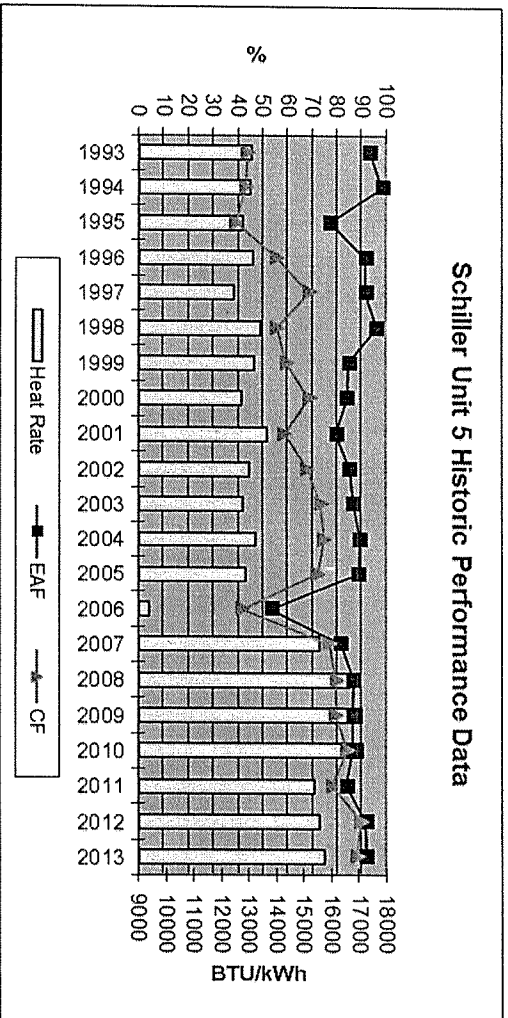
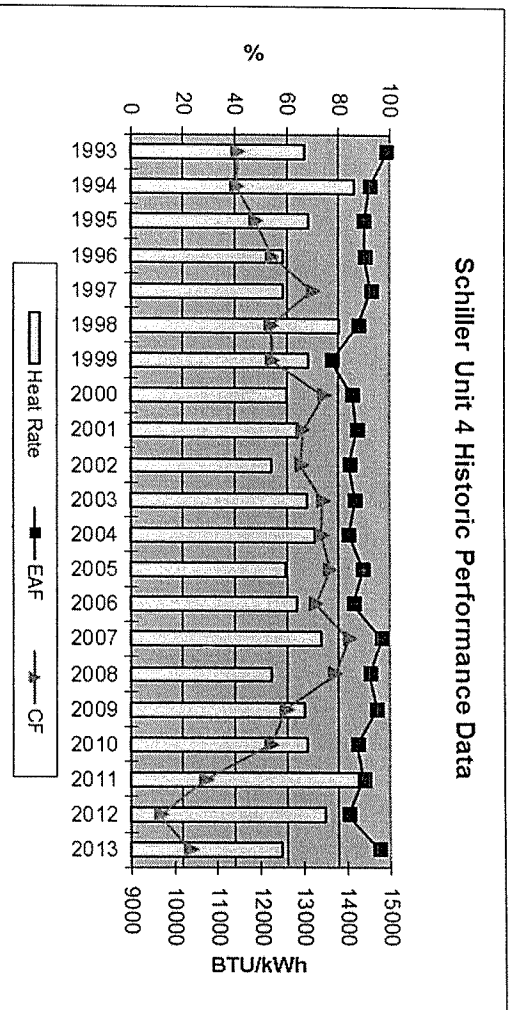


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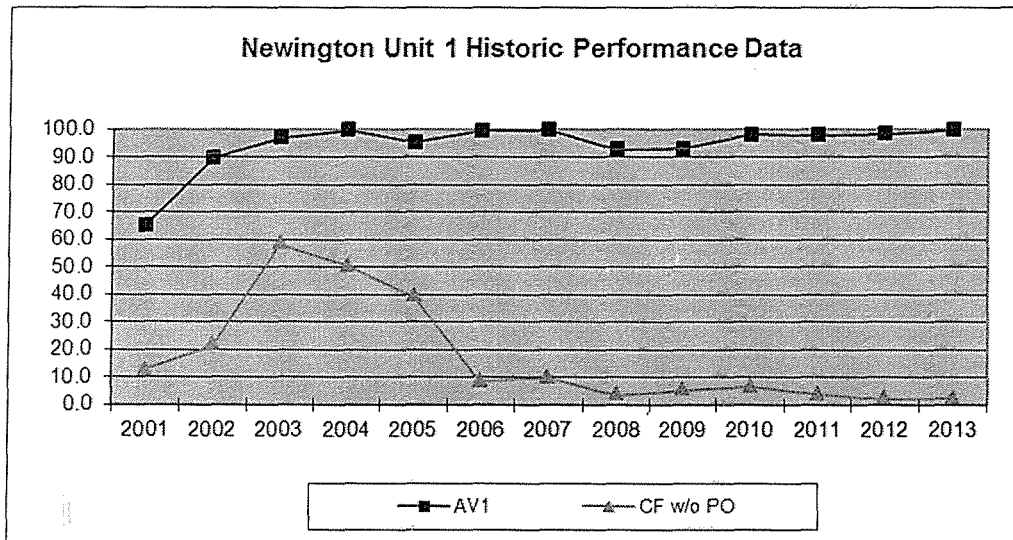
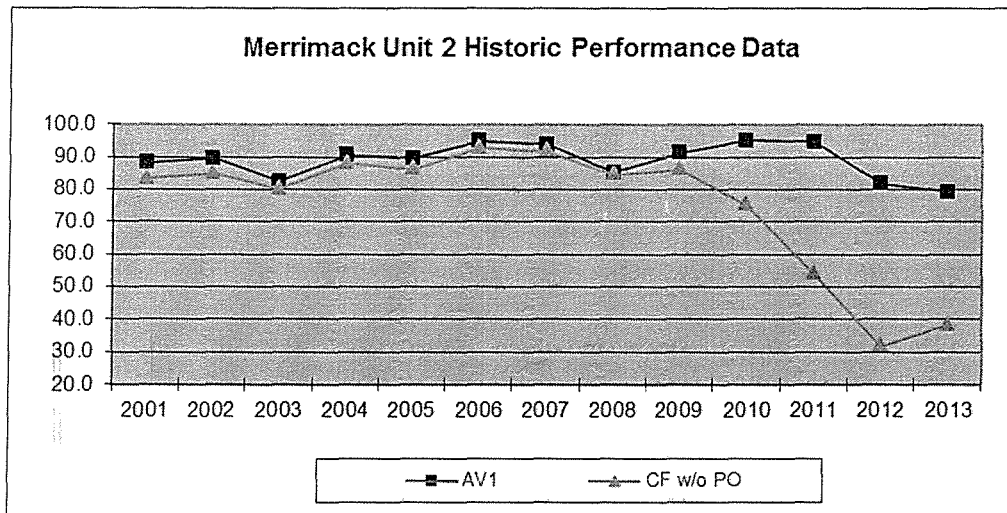
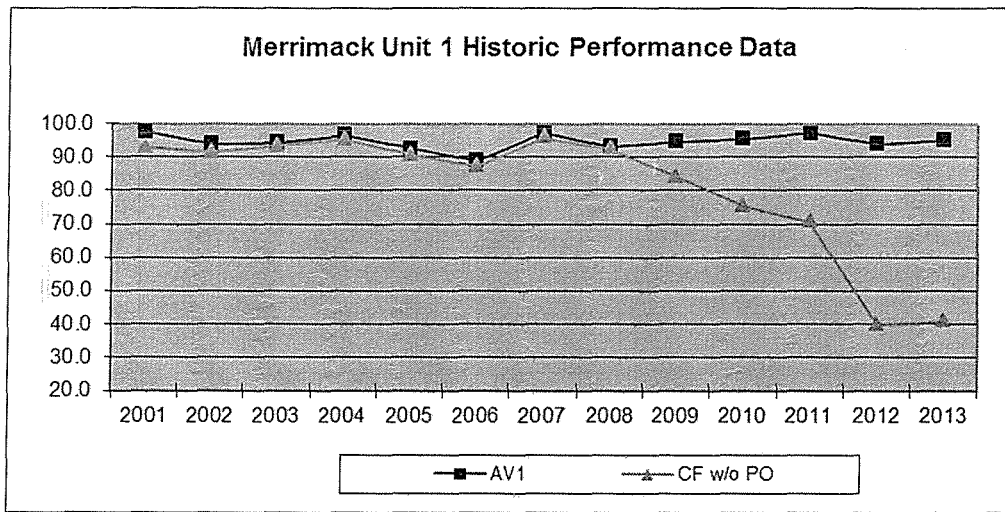
# Fossil Plant Graphs – Planned Outages Included



# Fossil Plant Graphs – Planned Outages Included



# Fossil Plant Graphs – Planned Outages Omitted





# Fossil Plant Graphs – Planned Outages Omitted

