**ELECTRIC POWER RESEARCH INSTITUTE
ENVIRONMENTAL CONTROL TECHNOLOGY CENTER**

REPORT TO THE STEERING COMMITTEE

Monthly Technical Progress Report

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EXECUTIVE SUMMARY

General Operations

Operations and maintenance continued this month at the Electric Power Research Institute's (EPRI's) Environmental Control Technology Center (ECTC). Testing for the Hazardous Air Pollutants (HAP) study was conducted using the Carbon Injection System (the 4.0 MW Spray Dryer Absorber and the Pulse-Jet Fabric Filter). Testing also continued across the B&W/CHX Heat Exchanger this month as the effects of increased particulate loading are being studied. The 1.0 MW Cold-Side Selective Catalytic Reduction (SCR) unit and the 4.0 MW Pilot Wet Scrubber remained idle this month in a cold-standby mode and were inspected regularly.

On September 13, 1996, the ECTC completed an independent test block for a third-party company, Air Purification Inc. (API). For this testing, the ECTC's staff (O&M and Testing) were contracted to conduct performance and validation testing across a new, integrated emissions control device, the Rotorfilter™. This testing was conducted for a thirty (30) day period simultaneously with the B&W/CHX test block. The HAP testing resumed as this third-party test block was completed.

Pilot Testing Highlights

Testing in September at the Electric Power Research Institute's (EPRI's) Environmental Control Technology Center (ECTC) included tests from the Pilot Trace Elements Removal (TER) test block as part of EPRI's overall program to develop control technology options for reduction of trace element emissions. This experimental program investigates mercury removal and mercury speciation under different operating conditions. The 1996 program is being performed on the 4.0 MW wet FGD pilot unit and the spray dryer/pulse jet fabric filter (SDA/PJFF) pilot units.

The 1996 Trace Elements Removal (TER) test block is a continuation of the 1995 TER test block and will focus on up to five research areas, depending on experimental results. These areas are:

- Mercury speciation methods;
- Effect of FGD system operating variables on mercury removal;
- Novel methods for elemental mercury control;
- Catalytic methods for converting elemental mercury to oxidized mercury; and
- Electrostatic charging of particulate material in the FGD inlet flue gas stream.

FACILITY STATUS

General

The NYSEG Kintigh Station provided flue gas to the Center 100% of the time during this performance period. As the Kintigh Station operated with a variety of coals, fluctuations in the Center's inlet SO₂ concentrations were experienced.

Safety training for the month was conducted by the O&M Superintendent, Maintenance Supervisor and Shift Supervisors. A safety video discussing Personal Fall Protection was reviewed. Inspections of the ECTC Facility and safety equipment (SCR air-packs, fire extinguishers, etc.) were completed and recorded this month. All systems were found to be in good condition. By continuing to emphasize safe work habits at the Center, we have raised the total number of days without a lost time injury to 1579 as of 9/30/96. However, the regularly scheduled safety meeting with the NYSEG Kintigh Station was postponed this month due to a conflict in the schedules of the ECTC and NYSEG representatives.

Carbon Injection System

The equivalent and actual availability for the ECTC Carbon Injection System (SDA/PJFF configuration) testing this month were both 100% during this period. The System did not operate during the following periods this month:

- September 13 for 3 hours due to an ECTC outage to isolate the Air Purification, Inc. Rotorfilter™ equipment in preparation for removal.

The Hazardous Air Pollutants (HAP) test block continued this month with the Carbon Injection System and the following tests: HAP-52; HAP-53A; HAP-53B; HAP-53C; HAP-54A; HAP-54B; HAP-54C; HAP-54D; and HAP-55. These mercury oxidation/removal tests were conducted as elemental mercury was injected (spiked) into the flue gas. Sampling for mercury was conducted at the PJFF inlet and outlet, and at the SDA inlet and outlet. The operational parameters for the System during this test block included: a flue gas flow of 8,000 scfm; inlet SO₂ concentrations as received (no spiking) from the NYSEG Station; and a PJFF outlet temperature of 300°F. There was no required maintenance on the Carbon Injection System or its equipment during this performance period.

B&W/Condensing Heat Exchanger (CHX) Project

Operations and testing across the CHX unit for the DOE/PRDA program continued this month. Based on the results of the last B&W inspection (mid-July '96), a decision was made to blend a slipstream of particulate rich flue gas into the CRG ductwork currently supplying the unit. A modification to the damper control

system was completed during this reporting period which now allows the inlet particulate mass loading to be maintained at an average value of 0.2 lb./MMBTU. As this modification was completed, no further maintenance was required.

A representative from B&W was on-site September 12-13 to conduct an inspection of the pilot CHX unit as part of the DOE/PRDA program. With the addition of increased levels of particulate to the unit, the measurements from this inspection/sampling period will serve as the next benchmark in the wear analysis test program. The results from the measurements taken during this performance period will be reviewed and reported next month.

Air Purification, Inc. (API) Rotorfilter™ Testing

In the third-party testing program for API this month, the ECTC staff (O&M and testing) completed the technical work scope and the disassembly/removal of the Rotorfilter™ apparatus and its associated components. Recall that the primary objectives of this thirty (30) day test program were to demonstrate the performance of the Rotorfilter™ and to quantify its efficiencies for the simultaneous removal of particulate matter (PM), SO_x, and NO_x from the ECTC flue gas. On September 13, the ECTC completed the activities of this test block with the injection of various process additives. The operational parameters for the Rotorfilter™ unit this month included: a gas flow of 850 scfm; inlet SO₂ concentrations as received from the NYSEG flue gas inlet, with some spiking up to 2500 ppm; and inlet gas temperatures of 300°F to 340°F.

The following maintenance work was completed on the Rotorfilter™ unit during this performance period:

- Several components in the Rotorfilter™ variable speed drive (VSD) motor were replaced after extensive troubleshooting by the ECTC staff.

Miscellaneous

The following general maintenance work was completed at the ECTC during this performance period:

- The Rotorfilter™ equipment was removed and returned to API.
- The SO₂ tank injection system vapor lines were re-insulated and lagged.
- Damper 27 (DMP-27) continues to be operated manually until repairs can be scheduled.
- Modifications were completed to the sampling shed on the PJFF outlet ductwork to house the on-line mercury analyzer.
- Equipment inspections and calibrations began in preparation for the EPRI SO_x/NO_x demonstration project later this year.

Financial Report

The Financial Report for the four Operations and Maintenance contract tasks are summarized below for the month of September 1996, the year to date, and the contract total. All expenses reported below are expressed in terms of U. S. currency dollars.

Task Definitions:

Task 100: Operations and Maintenance Labor
Task 200: Purchased Materials
Task 300: Engineering Support
Task 400: Training
DOE Grant: Funding from EPRI to Parsons
DOE Annual Grant applied under '96 PRDA testing at ECTC

Table i.
Monthly Operating Costs by Task

	September	Year to Date	Contract Total
Task 100	\$ 79,930	\$ 567,494	\$ 14,238,961
Task 200	\$ 45,498	\$ 181,567	\$ 8,152,691
Task 300	\$ 11,489	\$ 20,690	\$ 1,159,593
Task 400	\$ -----	\$ 1,416	\$ 53,091
DOE Grant	\$ -----	\$ 116,176	\$ 116,176
TOTAL*	\$ 136,917	\$ 887,343	\$ 23,720,512

* Operating costs were corrected (errors reported in Jan. '96 through August '96). DOE grant funds to EPRI (due to Parson under PRDA O&M) reported.

The attached graph illustrates the budgeted and actual expenses for ECTC O&M activities through September 1996.

Figure i.
1996 Operation & Maintenance Costs

PILOT AND MINI-PILOT TEST ACTIVITY

Testing Overview

Testing in September at the Electric Power Research Institute's (EPRI's) Environmental Control Technology Center (ECTC) included tests from the Pilot Trace Elements Removal (TER) test block as part of EPRI's overall program to develop control technology options for reduction of trace element emissions. This experimental program investigates mercury removal and mercury speciation under different operating conditions. The 1996 program is being performed on the 4.0 MW wet FGD pilot unit and the spray dryer/pulse jet fabric filter (SDA/PJFF) pilot units.

The 1996 Trace Elements Removal (TER) test block is a continuation of the 1995 TER test block and focuses on five research areas, depending on experimental results. These research areas include:

- Mercury speciation methods;
- Effect of FGD system operating variables on mercury removal;
- Novel methods for elemental mercury control;
- Catalytic methods for converting elemental mercury to oxidized mercury; and
- Electrostatic charging of particulate material in the FGD inlet flue gas stream.

Tests included in this report are from the first part of August and the latter half of September. Results from mid-August to mid-September (Rotorfilter™ testing) were covered in the August progress report. The current work continued to focus on catalytic oxidation of elemental mercury¹. Tests included the evaluation of five potential catalyst materials: catalysts CT-9, CT-15 (both carbon-based catalysts), CT-6, FAB-2B (bulk bituminous fly ash the first pilot ESP hopper), and the fine ash that escapes the ESP and accumulates on the fabric filter bags during operation.

¹Testing of catalyst materials has not been performed long enough to distinguish whether the material reacts with Hg⁰ or catalyzes the oxidation of Hg⁰. For purposes of this report, the test material is assumed to catalyze Hg⁰ oxidation.

Summary of Operations

A detailed summary of operations for the period is presented in Table 1. A simplified flow diagram of the ESP/SDA/PJFF gas path used during PJFF testing is shown in Figure 1.

Table 1. August/September Process Operating Conditions Summary

Date	Test ID	Gas Sampling Summary	Process Summary
Thu., 8/1	HAP-47 CT-15 on Method 29T Filter (Unconditioned)	First set of gas samples taken without mercury spiking in the CRG (47A). Second set of gas samples were taken after conditioning the CT-15 carbon for 1 hr with mercury-spiked flue gas.	After changing out 9 bags in the pulse jet fabric filter the day before, a second visolite test revealed 5 more bags that needed to be replaced. A second visolite test showed no leaks in the pulse jet. The unit was brought back on line in the evening.
Fri., 8/2	HAP-48 CT-15 on Method 29T Filter (Conditioned)	Four sets of gas samples were completed at the CRG with and without CT-15 (carbon-based) for comparison.	To prolong the life of the bags, the pulse jet was only cleaned once per shift allowing a maximum of 6 "H ₂ O DP across the pulse jet.
Sat. - Sun. 8/3 - 8/4		PJFF run with minimal pulsing. 5-minute cleaning cycle once per hour was started on Sunday evening.	
Mon., 8/5	HAP-49 Baseline; 300 °F PJFF outlet. 29 µg/Nm ³ Hg ⁰ spike.	Sampled at three locations for baseline conditions. The cleaning cycle was stopped before sampling and one 5-minute clean was made between each sample.	PJFF DP running at 2.7 "H ₂ O.
Tue., 8/6	HAP-50A FAB-2B 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 1 of sampling around the pulse jet with 40# of FAB-2B catalyst on the pulse jet bags.	In 20# increments, the catalyst was added to the PJFF and the cleaning cycles were stopped. The PJFF DP was 3.9 "H ₂ O after adding the catalyst to the bags. Sampling started within 2 hours of adding the catalyst.
Wed., 8/7	HAP-50B FAB-2B 8000 scfm 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 2 of sampling around the pulse jet with 40# of FAB-2B catalyst on the pulse jet bags.	PJFF DP was 4.2 "H ₂ O at 08:00 hourly.
Thu., 8/8	HAP-50C FAB-2B 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 3 of sampling around the pulse jet with 40# of FAB-2B catalyst on the pulse jet bags.	PJFF DP was 4.5 "H ₂ O at 08:00 hourly.

Table 1. August/September Process Operating Conditions Summary (cont.)

Date	Test ID	Gas Sampling Summary	Process Summary
Fri., 8/9	HAP-50D FAB-2B 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 4 of sampling around the pulse jet with 40# of FAB-2B catalyst on the pulse jet bags..	PJFF DP was 4.7 "H ₂ O at 08:00 hourly. The unit was taken off-line for a brief outage to prepare for the upcoming Rotorfilter test block.
Sat-Wed. 8/10 - 8/14			Unit off-line to prepare for upcoming test block. Unit brought back on-line on the evening of 8/14 with 5-minute cleans each hour.
Thu., 8/15	HAP-51A CT-6 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 1 of sampling around the pulse jet fabric filter with 20# of CT-6 (iron oxide based) on the bags.	After the cleaning cycle was stopped, 20# of CT-6 was added to the pulse jet fabric filter. Sampling began within 2 hours of adding the catalyst. The PJFF DP was 3.1 "H ₂ O after adding the catalyst.
Tue., 8/16	HAP-51B CT-6 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 2 of sampling around the pulse jet fabric filter with 20# of CT-6 on the bags.	PJFF DP was 3.4 "H ₂ O at 08:00 hourly. Unit was taken off-line at noon.
8/17-9/17	Rotorfilter Test Block	Refer to August PR for details.	
Wed., 9/18	HAP-52 Baseline 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 2.9 "H ₂ O at 8:00. After gas sampling, the cleaning cycle was stopped to allow fine fly ash to accumulate on the pulse jet bags.
Thu., 9/19	HAP-53A FAB-2C 8000 scfm 300°F outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 1 of accumulated fine fly ash. Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 3.8 "H ₂ O at 8:00.
Fri., 9/20	HAP-53B FAB-2C 8000 scfm 300°F outlet 28.98 µg/Nm ³ Hg ⁰ spike.	Day 2 of accumulated fine fly ash. Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 4.9 "H ₂ O at 8:00.

Table 1. August/September Process Operating Conditions Summary (cont.)

Date	Test ID	Gas Sampling Summary	Process Summary
9/21-9/22			Fly ash continued to accumulate on the bags increasing the PJFF DP to 5.8 "H ₂ O over the weekend.
Mon., 9/23	HAP-53C FAB-2C 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 5 of accumulated fine fly ash. Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 6.4 "H ₂ O at 8:00. After gas sampling, 5# of CT-9 (carbon-based catalyst) were added to the PJFF increasing the DP to 6.7 "H ₂ O.
Tue., 9/24	HAP-54A Incremental CT-9 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 1 of incremental CT-9 additions. With 5# of catalyst added to bags, sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 7.0 "H ₂ O at 8:00. After gas sampling, another 5# of CT-9 (carbon-based catalyst) were added to the PJFF increasing the DP to 7.8 "H ₂ O.
Wed., 9/25	HAP-54B Incremental CT-9 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 2 of incremental CT-9 additions. With another 5# of catalyst added to bags, sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 7.9 "H ₂ O at 8:00. After gas sampling, another 10# of CT-9 (carbon-based catalyst) were added to the PJFF increasing the DP to 8.5 "H ₂ O.
Thu., 9/26	HAP-54C Incremental CT-9 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 3 of incremental CT-9 additions. With another 10# of catalyst added to bags, sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 8.7 "H ₂ O at 8:00. After gas sampling, another 6# of CT-9 (carbon-based catalyst) were added to the PJFF increasing the DP to 9.5 "H ₂ O.
Fri., 9/27	HAP-54D Incremental CT-9 8000 scfm; 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 4 of incremental CT-9 additions. With another 6# of catalyst added to bags, sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF DP was 9.7 "H ₂ O at 8:00. After gas sampling, the cleaning cycle was started and the unit was cleaned over the weekend.
9/28-9/29			Continued to run clean raw gas through the PJFF with regular cleaning.
Mon., 9/30	HAP-55 Baseline 8000 scfm 300 °F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The cleaning cycle was stopped before sampling for the baseline. The PJFF DP was 2.8 "H ₂ O. Before each gas sample, the PJFF was cleaned (pulsed) for 5 minutes. After gas sampling, the cleaning cycle was returned to 5 minutes each hour.

Figure 1. Flow Diagram for Pilot Hg° Oxidation

Almost all of the particulate was removed in the ESP before the flue gas was drawn through the SDA/PJFF and discharged to the TGR. During the August-September tests, elemental mercury was injected at the SDA outlet, and gas samples were collected at the SDA inlet (pre-spike), PJFF inlet (post-spike), and the PJFF outlet (post-catalyst) using Method 29T. Use of these injection and sampling locations minimizes the gas residence time in the duct.

Three different catalysts were tested for extended periods of time in the PJFF to determine their ability to oxidize elemental mercury. Catalysts were tested by slug-feeding catalyst solids into the duct upstream of the PJFF to coat them onto the PJFF bags. Fiberglass bags coated with polytetrafluoroethylene (PTFE) were used throughout August and September. These bags have proven to be more chemically resistant than the acrylic bags used in May and less reactive with mercury than the Ryton bags used previously. After coating the catalyst onto the PJFF bags, the PJFF was not cleaned until testing of the catalyst was complete; therefore, small amounts of fly ash escaping the ESP accumulated on the bags during each test. A test was also run during which no catalyst was added, but elemental mercury oxidation was monitored with the accumulation of the fine fly ash on the bags (HAP-53A).

After testing each catalyst, the catalyst was cleaned off the PJFF bags by passing “dirty” flue gas (i.e., no particulate removed by the ESP) through the PJFF for one to two days with pulse cleaning initiated at 6 inches of H₂O pressure drop across the bags. Elemental mercury oxidation across the PJFF was then determined at baseline

conditions (i.e., no catalyst) by thoroughly cleaning the accumulated fly ash off the PJFF bags. This cleaning was accomplished by passing “clean” flue gas (i.e., almost all of the particulate removed by the ESP) through the PJFF with 5-minute cleaning cycles every hour. Pulse-cleaning of the PJFF was stopped immediately before the next catalyst material was added to the PJFF. Baseline measurements (after cleaning but with no catalyst material added) were made twice during the August-September testing.

Summary of Results

Results obtained from August 1 to August 16 and September 18 to September 27 are discussed below. Test conditions are presented in Table 2, and test results are summarized in Table 3. Complete analytical data tables and process data summary reports for all of the HAPs tests completed in August and September are appended to this report.

In Table 2, the total reduction in elemental mercury across the PJFF (as measured by the mercury concentration difference in the inlet and outlet KMnO_4 impingers) can be attributed to three different mechanisms. In each of these mechanisms, elemental mercury is believed to first adsorb onto the solid surface before undergoing any chemical change. In the first mechanism, adsorbed elemental mercury is oxidized and then released back into the outlet gas stream. Evidence of this mechanism is indicated by an increase in oxidized mercury across the PJFF (as measured by the mercury concentration difference in the inlet and outlet Tris impingers). In the second mechanism, the elemental mercury is oxidized, but the oxidized form remains adsorbed to the PJFF solids. In the third mechanism, adsorbed elemental mercury remains on the PJFF solids without changing chemical form.

Table 2. HAP Test Conditions (August-September)

Test ID	Test Description	Spike Location	Post-Catalyst Sample Location	Spike Res. Time (sec.)	SDA Gas Flow (scfm)	PJFF ΔP ("H ₂ O)	PJFF Catalyst Conditions Temp. (°F) ^a	Mass (lb)
HAP-47A	Catalyst CT-15 (Car-bon-based) On M29T filter. No Spiking.	No Spiking	CRG	12	6500	NA	307	NA
HAP-47B	Catalyst CT-15 (Car-bon-based) On M29T filter. Hg Spiking.	ESP Fan Inlet	CRG	12	6500	NA	307	NA
HAP-48	Catalyst CT-15 (Car-bon-based) On M29T filter. Hg Spiking. Conditioned.	ESP Fan Inlet	CRG	12	9000	NA	296	NA
HAP-49	Baseline	SDA Outlet	PJFF Outlet	12	8001	2.7	300	0
HAP-50A	Catalyst CT-9 on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	3.9	302	40
HAP-50B	Catalyst CT-9 on PJFF bags. Day 2	ESP Fan Inlet	CRG Duct	12	8000	4.3	300	40
HAP-50C	Catalyst CT-9 on PJFF bags. Day 3	ESP Fan Inlet	CRG Duct	12	8000	4.5	300	40
HAP-50D	Catalyst CT-9 on PJFF bags. Day 4	SDA Outlet	PJFF Outlet	12	8003	4.7	299	40
HAP-51A	Catalyst CT-6 on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	2.9	302	20
HAP-51B	Catalyst CT-6 on PJFF bags. Day 2	SDA Outlet	PJFF Outlet	12	8004	3.3	300	20
HAP-52	Baseline	SDA Outlet	PJFF Outlet	12	8000	2.9	300	0
HAP-53A	Accumulated FAB-2C on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8001	3.9	300	NM
HAP-53B	Accumulated FAB-2C on PJFF bags. Day 2	SDA Outlet	PJFF Outlet	12	8000	5.0	299	NM
HAP-53C	Accumulated FAB-2C on PJFF bags. Day 5	SDA Outlet	PJFF Outlet	12	7999	6.5	299	NM
HAP-54A	Incremental CT-9 on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	7.1	298	5
HAP-54B	Incremental CT-9 on PJFF bags. Day 2	SDA Outlet	PJFF Outlet	12	8000	7.9	299	5+5
HAP-54C	Incremental CT-9 on PJFF bags. Day 3	SDA Outlet	PJFF Outlet	12	8000	8.8	301	5+5+10
HAP-54D	Incremental CT-9 on PJFF bags. Day 4	SDA Outlet	PJFF Outlet	12	8000	9.7	301	5+5+10 +6

^aPJFF outlet temperature for PJFF tests or filter temperature when testing with M29 filters. NM is not measurable.

Table 3. Summary of HAP Test Results (August-September)

Test ID	Test Description	Spike Location	Flue Gas Mercury Concentrations (µg/Nm³) ^a							Red. in KMnO₄ % Hg ⁰ Oxid.	Incr. in Tris % Hg ⁰ Oxid.	Overall % Hg ⁰ Oxid.	Overall % Hg ⁰ Adsorb	% Rem. of Total Hg
			SDA Inlet (Prespike)		PJFF Inlet (Postspike)		PJFF Outlet (Post Catalyst)		Hg ⁰ Spike					
			Tris	KMnO₄	Tris	KMnO₄	Tris	KMnO₄						
HAP-47A	Catalyst CT-15 (Carbon-based) On M291 filter. No Spiking.	No Spiking	NA	NA	6.1	0.7	8.2	0.7	NA	0	300	150	0	-31
HAP-47B	Catalyst CT-15 (Carbon-based) On M291 filter. Hg Spiking.	ESP Fan Inlet	NA	NA	21.9	61.4	56.8	23.3	NA	62	57	59	0	4
HAP-48	Catalyst CT-15 (Carbon-based) On M291 filter. Hg Spiking. Conditioned.	ESP Fan Inlet	NA	NA	15.0	37.3	42.5	16.8	NA	55	74	64	0	-13
HAP-49	Baseline	SDA Outlet	5.1	1.8	6.9	26.4	17.1	19.8	26.4	25	39	32	0	-11
HAP-50A	Catalyst FAB-2B on PJFF bags. Day 1	SDA Outlet	6.6	0.9	9.1	27.1	27.3	13.2	28.7	51	67	59	0	-12
HAP-50B	Catalyst FAB-2B on PJFF bags. Day 2	ESP Fan Inlet	5.3	0.8	7.1	25.0	22.7	13.3	26.0	47	62	55	0	-12
HAP-50C	Catalyst FAB-2B on PJFF bags. Day 3	ESP Fan Inlet	7.3	0.9	9.4	22.8	26.2	12.5	24.0	45	74	59	0	-20
HAP-50D	Catalyst FAB-2B on PJFF bags. Day 4	SDA Outlet	6.7	1.0	9.5	33.8	35.3	14.9	35.6	56	76	66	0	-16
HAP-51A	Catalyst CT-6 on PJFF bags. Day 1	SDA Outlet	6.8	2.0	9.2	31.1	19.0	28.1	31.5	10	32	21	0	-17
HAP-51B	Catalyst CT-6 on PJFF bags. Day 2	SDA Outlet	8.6	1.9	10.4	30.9	26.8	29.8	30.8	4	53	28	0	-37
HAP-52	Baseline	SDA Outlet	7.6	1.2	13.2	44.6	32.0	23.4	49.0	48	42	45	0	4
HAP-53A	Accumulated FAB-2C on PJFF bags. Day 1	SDA Outlet	7.2	1.0	14.5	50.3	43.7	20.4	56.6	59	58	59	0	1
HAP-53B	Accumulated FAB-2C on PJFF bags. Day 2	SDA Outlet	8.4	0.9	15.1	46.0	55.2	16.5	51.8	64	87	76	0	-17
HAP-53C	Accumulated FAB-2C on PJFF bags. Day 5	SDA Outlet	7.3	1.0	14.3	44.3	48.5	8.8	50.3	80	77	79	0	2
HAP-54A	Incremental CT-9 on PJFF bags. Day 1	SDA Outlet	7.9	1.0	16.7	37.1	44.3	3.1	44.9	92	74	74	17	12
HAP-54B	Incremental CT-9 on PJFF bags. Day 2	SDA Outlet	7.3	0.9	15.4	31.4	36.9	2.0	38.6	94	68	68	25	17
HAP-54C	Incremental CT-9 on PJFF bags. Day 3	SDA Outlet	7.8	0.9	20.6	41.1	40.6	4.5	53.0	89	49	49	40	27
HAP-54D	Incremental CT-9 on PJFF bags. Day 4	SDA Outlet	9.1	0.7	21.7	15.0	20.2	3.2	26.9	79	-10	-10	89	36

^aMercury concentrations and spike values are normalized to 5% O₂.

For purposes of reporting results, if the total mercury removal across the PJFF is less than 10%, the elemental mercury oxidation fraction is assumed to be equal to the average of the reduction in KMnO_4 impingers and increase in Tris impingers. If removal is greater than 10%, mercury oxidation is assumed to be equal to the increase in Tris impingers alone, and some adsorption is assumed to occur. The actual oxidation may be higher if some of the elemental mercury is adsorbed and then oxidized but never released from the solid surface; however, this occurrence can not be confirmed with currently available analytical techniques.

Effect of CT-15—Alternate Carbon-Based Catalyst

The initial test during this period was with an alternate carbon-based catalyst tested across a M29T filter during a time when several bags were replaced in the PJFF. Testing without Hg^0 spiking showed no change in Hg^0 concentration (as measured by the reduction in the permanganate impingers) and a relatively small increase in the oxidized concentration (as measured by the Tris impingers). With Hg^0 spiking on, the overall oxidation was about 60 to 65 percent. This is not an improvement over catalyst CT-9 which is a cheaper carbon-based catalyst. Therefore, no further tests are planned with CT-15.

Effect of FAB-2B (Bituminous Fly Ash) and Fine Ash Accumulation

Test HAP-50 was designed to test the effect of FAB-2B (bulk ash collected in first pilot ESP hopper at ECTC) on oxidation of Hg^0 by adding 40 pounds of FAB-2B to the PJFF. HAP-53 repeated measurement of the effect of fine fly ash accumulation on the PJFF bags. This ash accumulation occurs since the pilot ESP is not 100% efficient, and the fine ash that remains in the flue gas gets trapped on the PJFF bags. Figure 2 compares the Hg^0 oxidation measured during HAP-50 and HAP-53. The results shown in Figure 2 have been normalized for the baseline (immediately after bag cleaning) oxidation measured in the test preceding each test. In HAP-49, the baseline Hg^0 oxidation was 32% while it was 45% in HAP-52. HAP-49 through HAP-51 were conducted immediately following replacement of about 20% of the bags in the PJFF. It is believed that the new bags and the reduction in residual cake on the bags during maintenance activities resulted in the lower baseline oxidation. About one month elapsed between HAP-51 and HAP-52 (Rotorfilter™ tests).

From Figure 2, it is apparent that the addition of 40 pounds of bulk ash to the PJFF did not appreciably alter the oxidation caused by the accumulation of fly ash during normal operation. Initially, there may have been some effect, but the difference disappeared by Day 2. In fact, the oxidation with only fine ash accumulation appeared to be higher than with the 40 pounds of bulk ash added. However, because of uncertainties in the measurements, particularly over a month's period, we cannot conclude that fine ash alone has more of an effect than the bulk ash plus the fine ash.

Effect of Catalyst CT-6

In HAP-51, 20 pounds of CT-6 were added to the PJFF. CT-6 is an iron-based catalyst that was effective in oxidizing Hg⁰ in the laboratory but was apparently deactivated by SO₃ during M29T runs at the ECTC. Results from HAP-51 indicated that Hg⁰ oxidation with CT-6 on the bags was essentially the same as baseline oxidation, confirming the M29T results.

Effect of Incremental Addition of Catalyst CT-9

Previous testing with CT-9 showed 85 to 95% oxidation with relatively small amounts added to the PJFF. The oxidation remained high through 10 days of operation, but these tests had to be terminated because of high pressure drop across the PJFF. The lowest Hg^0 concentration at the PJFF outlet measured during any of the previous tests was in the 2 to 3 $\mu\text{g}/\text{Nm}^3$ range. HAP-54 was designed to explore the lower limit of Hg^0 by incrementally adding CT-9 to the PJFF.

Table 3 shows that an initial charge of 5 pounds of CT-9 resulted in a reduction of the outlet Hg^0 to about 3 $\mu\text{g}/\text{Nm}^3$ (a reduction of over 90%). An additional 5 pounds of CT-9 on the second day reduced the Hg^0 to 2 $\mu\text{g}/\text{Nm}^3$, again a reduction of over 90%. In both cases, significant adsorption of mercury was still occurring. On the third day, an additional 10 pounds of CT-9 was added to the PJFF. The Hg^0 concentration actually increased (corrected to 5% O_2 basis) to 4.5 $\mu\text{g}/\text{Nm}^3$. This was in large part due to the O_2 concentration in the gas from NYSEG increasing such that the spiked amount (corrected to 5% O_2) increased rather significantly. However, even the uncorrected outlet Hg^0 concentration increased from 1.6 to 2.8 $\mu\text{g}/\text{Nm}^3$. On the fourth day, an additional 6 pounds of CT-9 was added, and the Hg^0 concentration was 3.1 (corrected) and 2.2 (uncorrected). While the latter 2 days were not consistent with an expected drop in Hg^0 concentration with increasing catalyst charge, changing flue gas conditions may have had an effect (e.g., lower concentration of HCl). Time did not permit conditions to reach steady state at each catalyst loading. The data collected still indicate that there could be some lower limit of elemental mercury that can be achieved with this catalyst under these flue gas conditions.

Future Tests

The HAP test block will continue into the first half of October, while preparations for the testing of an EPRI proprietary SO_x/NO_x process should begin later in the month.

APPENDIX A
TEST SCHEDULES

		1 9 9 5													
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
PILOT		High-Velocity FGD Testing		Lime/DBA Gypsum tests		Carbon Injection	Wet FGD Toxics Testing		Carbon Injection	Wet FGD Toxics Testing- Wet coke		Outage	Carbon Injection	High-Velocity FGD Testing	Wet FGD Toxics Testing
							Lime/DBA Gypsum tests								
MINI-PILOT		UNIT DOWN						Lime/DBA Gypsum tests		UNIT DOWN					

		1 9 9 6													
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
PILOT		EPRI Wet FGD Toxics Testing		DOE/PRDA Phase I - Mercury and HAPs Control with Wet FGD			EPRI Wet FGD Toxics Testing		Third party Testing - Rotorfilter Technology		EPRI Toxics Removal Testing		EPRI SOx/NOx Process Testing		ECTC Fall Outage
MINI-PILOT		UNIT DOWN		DOE/PRDA Phase I - Multiple Pollutant Removal Using the Condensing Heat Exchanger (CHX)											

1 9 9 7														
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
PILOT with DOE PRDA Phase I & II		DOE/PRDA Phase I - Clear Liquor Scrubbing (CLS) with Anhydrite Production				EPRI, ECTC, and Third-Party Environmental Testing (API Phase II)				DOE/PRDA Phase II - Mercury and HAPs Control		DOE/PRDA Phase II - Clear Liquor Scrubbing		
		DOE/PRDA Phase I - Condensing Heat Exchanger (CHX) Testing		Reconfigure Mini-Pilot Scrubber		Unit Available for Testing								
MINI-PILOT with DOE PRDA Phase I														

ECTC Pilot-scale Testing Schedule ('95-'97)

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

August 1996 (Updated September 30, 1996)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 Haz Air Pollutants HAP-47 CT-15 On Filter at CRG No Spiking	2 Haz Air Pollutants HAP-48 CT-15 On Filter at CRG Hg Spiking	3 Haz Air Polutants Cleaning Cycle Detuned ESP 5 min./ Shift
4 Haz Air Polutants HAP-41 A	5 Haz Air Polutants HAP-49 Baseline 8000 scfm, 300F PJFF Hg Spiking	6 Haz Air Polutants HAP-50 A 40 lbs FAB-2B 8000 scfm, 300F PJFF Day 1	7 Haz Air Polutants HAP-50 B 40 lbs FAB-2B 8000 scfm, 300F PJFF Day 2	8 Haz Air Polutants HAP-50 C 40 lbs FAB-2B 8000 scfm, 300F PJFF Day 3	9 Haz Air Polutants HAP-50 D 40 lbs FAB-2B 8000 scfm, 300F PJFF Day 4	10 ROTORFILTER Outage
11 ROTORFILTER Outage	12 ROTORFILTER Outage Reconfiguring for ROTORFILTER Test Block	13 ROTORFILTER Outage	14 ROTORFILTER Outage	15 Haz Air Pollutants HAP-51 A CT-6 8000 scfm, 300F PJFF Day 1	16 Haz Air Pollutants HAP-51 B CT-6 8000 scfm, 300F PJFF Day 2	17 ROTORFILTER Outage
18 ROTORFILTER Outage	19 ROTORFILTER RF-0 Shakedown	20 ROTORFILTER RF-1 A Water Only	21 ROTORFILTER RF-1 A Water Only	22 ROTORFILTER RF-1 B Water Only	23 ROTORFILTER RF-2 A Sodium Hydroxide	24 ROTORFILTER
25 ROTORFILTER	26 ROTORFILTER RF-2 B Sodium Hydroxide	27 ROTORFILTER RF-3 A Sodium Hydroxide and Sodium Chlorite	28 ROTORFILTER RF-4 A Cascade Impactor Sampling	29 ROTORFILTER RF-4 B Cascade Impactor Sampling	30 ROTORFILTER RF-4 C Cascade Impactor Sampling	31 ROTORFILTER

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

September 1996 (Updated Sept. 30, 1996)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 ROTORFILTER	2 ROTORFILTER RF-5 A Sodium Chlorite	3 ROTORFILTER RF-1 C Water Only	4 ROTORFILTER RF-6 Phosphate Buffer and Sodium Chlorite	5 ROTORFILTER RF-7 Sodium Chlorite and Sodium Hydroxide	6 ROTORFILTER RF-8 Sodium Chlorite and Sodium Hydroxide	7 ROTORFILTER
8 ROTORFILTER	9 ROTORFILTER RF-5 B Sodium Chlorite	10 ROTORFILTER RF-1 D Water Only	11 ROTORFILTER RF-2 C Sodium Hydroxide	12 ROTORFILTER RF-6 C Phosphate Buffer and Sodium Chlorite	13 ROTORFILTER Outage Unit off-line due to drive problem	14 ROTORFILTER Outage
15 ROTORFILTER Outage	16 ROTORFILTER Outage Disassembling the ROTORFILTER Test Apparatus	17 Haz Air Pollutants Start-up	18 Haz Air Pollutants HAP-52 Baseline 8000 scfm, 300F PJFF Hg Spiking	19 Haz Air Pollutants HAP-53 A Accumulated FAB-2C 8000 scfm, 300F PJFF Day 1	20 Haz Air Pollutants HAP-53 B Accumulated FAB-2C 8000 scfm, 300F PJFF Day 2	21 Haz Air Pollutants
22 Haz Air Pollutants	23 Haz Air Pollutants HAP-53 C Accumulated FAB-2C 8000 scfm, 300F PJFF Day 5	24 Haz Air Pollutants HAP-54 A Incremental CT-9 8000 scfm, 300F PJFF 5 lbs	25 Haz Air Pollutants HAP-54 B Incremental CT-9 8000 scfm, 300F PJFF 5 + 5 lbs	26 Haz Air Pollutants HAP-54 C Incremental CT-9 8000 scfm, 300F PJFF 5 + 5 + 10 lbs	27 Haz Air Pollutants HAP-54 D Incremental CT-9 8000 scfm, 300F PJFF 5 + 5 + 10 + 6 lbs	28 Haz Air Pollutants
29 Haz Air Pollutants	30 Haz Air Pollutants HAP-55 Baseline 8000 scfm, 300F PJFF Hg Spiking					

APPENDIX B
PILOT TESTING PROCESS SUMMARY REPORTS

CRG Process Summary Report HAP-47
08/01/96 08:00:00 to 08/01/96 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
CRG Venturi gas flow (scfm)	6502	6513	6497	5	6
Facility Inlet SO2 Conc. (ppm)	1166	1197	1137	20	6
Facility Outlet SO2 Conc	940	1002	724	98	6
Facility Inlet O2 Conc.	9.27	9.60	9.00	0.19	6
Facility Outlet O2 Conc.	11.28	13.64	10.58	1.07	6
ESP fan discharge pressure	20.95	21.91	20.71	0.43	6
DRG (ESP) Inlet Temp (F)	319	332	307	9	6
CRG Temp. (F)	307	310	302		6

CRG Process Summary Report HAP-48
08/02/96 08:00:00 to 08/02/96 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
CRG Venturi gas flow (scfm)	9000	9005	8994	4	6
Facility Inlet SO2 Conc. (ppm)	1257	1292	1193	33	6
Facility Outlet SO2 Conc	1059	1092	1008	28	6
Facility Inlet O2 Conc.	8.54	8.77	8.39	0.15	6
Facility Outlet O2 Conc.	10.13	10.38	9.85	0.18	6
ESP fan discharge pressure	3.92	3.98	3.87	0.04	6
DRG (ESP) Inlet Temp (F)	316	323	311	5	6
CRG Temp. (F)	296	300	293		6

HAP-49 Process Summary Report
08/05/96 08:00:00 to 08/05/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8003	7999	1	4
Facility Inlet SO2 Conc. (ppm)	1541	1612	1393	86	4
Facility Outlet SO2 Conc	1288	1351	1160	75	4
SDA Inlet SO2 Conc. (ppm)	1353	1417	1221	77	4
SDA Outlet SO2 Conc. (ppm)	1407	1473	1282	74	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1283	1408	1107	116	4
SDA Inlet O2 Conc. (%)	7.35	8.52	6.78	0.68	4
SDA Outlet O2 Conc. (%)	7.88	8.84	7.37	0.57	4
TGR O2 Conc. (%)	8.04	8.91	7.14	0.77	4
SDA Inlet Temp. (F)	340	340	340	0	4
SDA Outlet Temp. (F)	328	328	328	0	4
ESP Outlet Temp. (F)	295	296	294	1	4
PJFF Inlet Temp. (F)	311	312	311	0	4
PJFF Outlet Temp. (F)	301	301	301	0	4
PJFF Air/Cloth Ratio	6.85	6.86	6.85	0.00	4
PJFF Cleaning Pulses/Hour	34	34	34	0	4
PJFF Delta P (in H2O)	2.70	2.74	2.67	0.02	4
NYSEG Load (MW)	640	675	538	59	4

HAP-50A Process Summary Report
08/06/96 08:00:00 to 08/06/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7996	2	5
Facility Inlet SO2 Conc. (ppm)	1571	1624	1476	55	5
Facility Outlet SO2 Conc	1303	1337	1238	37	5
SDA Inlet SO2 Conc. (ppm)	1386	1445	1243	76	5
SDA Outlet SO2 Conc. (ppm)	1430	1490	1262	87	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1332	1393	1178	80	5
SDA Inlet O2 Conc. (%)	6.67	8.19	6.03	0.82	5
SDA Outlet O2 Conc. (%)	7.24	8.69	6.61	0.78	5
TGR O2 Conc. (%)	6.92	8.62	6.16	0.92	5
SDA Inlet Temp. (F)	339	340	337	1	5
SDA Outlet Temp. (F)	328	328	326	1	5
ESP Outlet Temp. (F)	302	309	294	6	5
PJFF Inlet Temp. (F)	311	312	310	1	5
PJFF Outlet Temp. (F)	302	302	301	1	5
PJFF Air/Cloth Ratio	7.01	7.01	7.01	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	3.87	3.94	3.69	0.09	5
NYSEG Load (MW)	680	702	616	32	5

HAP-50B Process Summary Report
08/07/96 08:00:00 to 08/07/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7999	1	4
Facility Inlet SO2 Conc. (ppm)	1666	1693	1616	30	4
Facility Outlet SO2 Conc	1373	1396	1331	26	4
SDA Inlet SO2 Conc. (ppm)	1436	1470	1396	31	4
SDA Outlet SO2 Conc. (ppm)	1487	1522	1453	28	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1381	1407	1344	27	4
SDA Inlet O2 Conc. (%)	6.43	6.85	6.13	0.29	4
SDA Outlet O2 Conc. (%)	6.99	7.41	6.76	0.26	4
TGR O2 Conc. (%)	6.78	7.28	6.46	0.32	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	294	297	291	2	4
PJFF Inlet Temp. (F)	310	310	310	0	4
PJFF Outlet Temp. (F)	300	300	299	0	4
PJFF Air/Cloth Ratio	6.96	6.96	6.96	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	4.26	4.28	4.23	0.02	4
NYSEG Load (MW)	700	714	681	13	4

HAP-50C Process Summary Report
08/08/96 08:00:00 to 08/08/96 14:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8003	7998	2	6
Facility Inlet SO2 Conc. (ppm)	1495	1542	1462	27	6
Facility Outlet SO2 Conc	1266	1306	1223	27	6
SDA Inlet SO2 Conc. (ppm)	1306	1344	1279	20	6
SDA Outlet SO2 Conc. (ppm)	1383	1423	1356	21	6
TGR/PJFF Outlet SO2 Conc. (ppm)	1266	1300	1246	18	6
SDA Inlet O2 Conc. (%)	6.37	6.67	6.13	0.16	6
SDA Outlet O2 Conc. (%)	6.99	7.27	6.78	0.15	6
TGR O2 Conc. (%)	6.64	7.03	6.37	0.20	6
SDA Inlet Temp. (F)	338	338	338	0	6
SDA Outlet Temp. (F)	326	327	326	0	6
ESP Outlet Temp. (F)	296	297	294	1	6
PJFF Inlet Temp. (F)	310	310	309	0	6
PJFF Outlet Temp. (F)	300	300	299	1	6
PJFF Air/Cloth Ratio	6.92	6.93	6.92	0.00	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF Delta P (in H2O)	4.50	4.52	4.47	0.02	6
NYSEG Load (MW)	696	703	669	12	6

HAP-50D Process Summary Report
08/09/96 06:00:00 to 08/09/96 10:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7510	8003	5547	982	5
Facility Inlet SO2 Conc. (ppm)	1068	1183	789	142	5
Facility Outlet SO2 Conc	889	996	556	167	5
SDA Inlet SO2 Conc. (ppm)	909	1030	561	175	5
SDA Outlet SO2 Conc. (ppm)	967	1088	617	176	5
TGR/PJFF Outlet SO2 Conc. (ppm)	884	996	566	160	5
SDA Inlet O2 Conc. (%)	10.56	14.26	9.35	1.86	5
SDA Outlet O2 Conc. (%)	10.67	13.81	9.61	1.58	5
TGR O2 Conc. (%)	12.05	15.58	10.79	1.78	5
SDA Inlet Temp. (F)	333	341	301	16	5
SDA Outlet Temp. (F)	324	329	306	9	5
ESP Outlet Temp. (F)	292	295	288	2	5
PJFF Inlet Temp. (F)	306	311	291	8	5
PJFF Outlet Temp. (F)	296	299	288	4	5
PJFF Air/Cloth Ratio	7.76	7.76	7.76	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	4.29	4.72	2.63	0.83	5
NYSEG Load (MW)	469	536	414	46	5

HAP-51A Process Summary Report
08/15/96 08:00:00 to 08/15/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7998	1	5
Facility Inlet SO2 Conc. (ppm)	981	1101	899	75	5
Facility Outlet SO2 Conc	868	961	752	75	5
SDA Inlet SO2 Conc. (ppm)	881	999	771	78	5
SDA Outlet SO2 Conc. (ppm)	936	1062	822	83	5
TGR/PJFF Outlet SO2 Conc. (ppm)	853	983	743	82	5
SDA Inlet O2 Conc. (%)	9.30	10.05	8.20	0.73	5
SDA Outlet O2 Conc. (%)	9.60	10.25	8.63	0.62	5
TGR O2 Conc. (%)	10.59	11.63	9.00	1.01	5
SDA Inlet Temp. (F)	339	340	338	1	5
SDA Outlet Temp. (F)	327	328	326	1	5
ESP Outlet Temp. (F)	295	297	291	2	5
PJFF Inlet Temp. (F)	313	314	312	1	5
PJFF Outlet Temp. (F)	302	303	302	0	5
PJFF Air/Cloth Ratio	7.93	7.93	7.93	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	2.92	3.16	2.63	0.24	5
NYSEG Load (MW)	456	562	340	86	5

HAP-51B Process Summary Report
08/16/96 07:00:00 to 08/16/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7688	8004	6437	626	5
Facility Inlet SO2 Conc. (ppm)	1102	1175	1056	39	5
Facility Outlet SO2 Conc	903	938	876	20	5
SDA Inlet SO2 Conc. (ppm)	899	921	851	26	5
SDA Outlet SO2 Conc. (ppm)	936	951	922	12	5
TGR/PJFF Outlet SO2 Conc. (ppm)	900	912	881	11	5
SDA Inlet O2 Conc. (%)	9.60	10.19	9.20	0.37	5
SDA Outlet O2 Conc. (%)	9.66	9.98	9.39	0.22	5
TGR O2 Conc. (%)	10.81	11.30	10.46	0.28	5
SDA Inlet Temp. (F)	337	338	337	0	5
SDA Outlet Temp. (F)	325	325	325	0	5
ESP Outlet Temp. (F)	293	296	289	2	5
PJFF Inlet Temp. (F)	310	311	307	1	5
PJFF Outlet Temp. (F)	300	301	299	1	5
PJFF Air/Cloth Ratio	7.76	7.76	7.76	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	3.31	3.46	2.81	0.25	5
NYSEG Load (MW)	493	592	389	65	5

HAP-52 Process Summary Report
09/18/96 10:00:00 to 09/18/96 15:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	6
Facility Inlet SO ₂ Conc. (ppm)	1512	1698	1338	154	6
Facility Outlet SO ₂ Conc. (ppm)	1246	1408	1105	128	6
SDA Inlet SO ₂ Conc. (ppm)	1294	1455	1146	132	6
SDA Outlet SO ₂ Conc. (ppm)	1243	1424	1090	138	6
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1258	1425	1118	130	6
SDA Inlet O ₂ Conc. (%)	8.72	10.14	7.25	1.22	6
SDA Outlet O ₂ Conc. (%)	9.24	10.49	7.89	1.08	6
TGR O ₂ Conc. (%)	11.21	12.95	9.19	1.60	6
SDA Inlet Temp. (°F)	341	341	341	0	6
SDA Outlet Temp. (°F)	328	329	328	0	6
ESP Outlet Temp. (°F)	298	300	295	1	6
PJFF Inlet Temp. (°F)	313	314	312	0	6
PJFF Outlet Temp. (°F)	300	302	299	1	6
PJFF Air/Cloth Ratio	9.12	9.13	9.10	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in. H ₂ O)	2.88	2.93	2.87	0.02	6
NYSEG Load (MW)	553	642	442	82	6

HAP-53A Process Summary Report
09/19/96 08:00:00 to 9/19/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8004	8000	2	5
Facility Inlet SO ₂ Conc. (ppm)	1240	1403	1125	131	5
Facility Outlet SO ₂ Conc. (ppm)	1034	1171	937	109	5
SDA Inlet SO ₂ Conc. (ppm)	1069	1216	966	118	5
SDA Outlet SO ₂ Conc. (ppm)	1013	1159	916	113	5
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1040	1182	938	113	5
SDA Inlet O ₂ Conc. (%)	9.31	10.49	7.89	1.14	5
SDA Outlet O ₂ Conc. (%)	9.78	10.89	8.49	1.04	5
TGR O ₂ Conc. (%)	12.30	13.86	10.44	1.50	5
SDA Inlet Temp. (°F)	340	340	340	0	5
SDA Outlet Temp. (°F)	327	327	327	0	5
ESP Outlet Temp. (°F)	298	300	295	2	5
PJFF Inlet Temp. (°F)	311	312	311	0	5
PJFF Outlet Temp. (°F)	300	301	299	1	5
PJFF Air/Cloth Ratio	9.94	9.96	9.93	0.01	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF ΔP (in. H ₂ O)	3.91	3.97	3.86	0.04	5
NYSEG Load (MW)	512	644	383	115	5

HAP-53B Process Summary Report
09/20/96 07:00:00 to 09/20/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7998	1	6
Facility Inlet SO ₂ Conc. (ppm)	1093	1155	1011	48	6
Facility Outlet SO ₂ Conc. (ppm)	905	957	838	41	6
SDA Inlet SO ₂ Conc. (ppm)	967	1029	871	52	6
SDA Outlet SO ₂ Conc. (ppm)	912	980	819	57	6
TGR/PJFF Outlet SO ₂ Conc. (ppm)	915	975	834	48	6
SDA Inlet O ₂ Conc. (%)	10.31	11.07	9.86	0.40	6
SDA Outlet O ₂ Conc. (%)	10.61	11.36	10.13	0.42	6
TGR O ₂ Conc. (%)	13.34	14.44	12.64	0.61	6
SDA Inlet Temp. (°F)	339	339	339	0	6
SDA Outlet Temp. (°F)	326	327	326	0	6
ESP Outlet Temp. (°F)	295	304	288	6	6
PJFF Inlet Temp. (°F)	311	312	310	1	6
PJFF Outlet Temp. (°F)	299	301	298	1	6
PJFF Air/Cloth Ratio	10.20	10.22	10.19	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in. H ₂ O)	5.02	5.06	4.95	0.04	6
NYSEG Load (MW)	346	412	259	59	6

HAP-53C Process Summary Report
09/23/96 08:00:00 to 09/23/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7999	8001	7989	4	6
Facility Inlet SO ₂ Conc. (ppm)	1350	1486	1148	115	6
Facility Outlet SO ₂ Conc. (ppm)	1110	1222	945	95	6
SDA Inlet SO ₂ Conc. (ppm)	1212	1330	1010	115	6
SDA Outlet SO ₂ Conc. (ppm)	1100	1215	930	97	6
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1114	1227	943	97	6
SDA Inlet O ₂ Conc. (%)	9.06	10.50	8.14	0.82	6
SDA Outlet O ₂ Conc. (%)	9.48	10.84	8.71	0.74	6
TGR O ₂ Conc. (%)	11.52	13.45	10.32	1.09	6
SDA Inlet Temp. (°F)	339	339	339	0	6
SDA Outlet Temp. (°F)	326	326	326	0	6
ESP Outlet Temp. (°F)	299	302	292	3	6
PJFF Inlet Temp. (°F)	311	311	310	0	6
PJFF Outlet Temp. (°F)	299	299	298	0	6
PJFF Air/Cloth Ratio	9.39	9.39	9.36	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in. H ₂ O)	6.50	6.51	6.46	0.02	6
NYSEG Load (MW)	520	593	380	71	6

HAP-54A Process Summary Report
09/24/96 07:00:00 to 09/24/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	7
Facility Inlet SO ₂ Conc. (ppm)	1519	1592	1269	106	7
Facility Outlet SO ₂ Conc. (ppm)	1251	1319	1045	88	7
SDA Inlet SO ₂ Conc. (ppm)	1367	1445	1125	103	7
SDA Outlet SO ₂ Conc. (ppm)	1165	1253	986	82	7
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1261	1339	1047	93	7
SDA Inlet O ₂ Conc. (%)	7.59	9.81	6.96	0.95	7
SDA Outlet O ₂ Conc. (%)	8.35	10.15	7.78	0.77	7
TGR O ₂ Conc. (%)	9.39	12.25	8.47	1.22	7
SDA Inlet Temp. (°F)	339	339	339	0	7
SDA Outlet Temp. (°F)	326	326	326	0	7
ESP Outlet Temp. (°F)	298	300	295	2	7
PJFF Inlet Temp. (°F)	311	311	311	0	7
PJFF Outlet Temp. (°F)	298	299	298	1	7
PJFF Air/Cloth Ratio	8.63	8.64	8.62	0.01	7
PJFF Cleaning Pulses/Hour	0	0	0	0	7
PJFF ΔP (in. H ₂ O)	7.07	7.10	7.05	0.02	7
NYSEG Load (MW)	638	683	470	72	7

HAP-54B Process Summary Report
09/25/96 07:00:00 to 09/25/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	6
Facility Inlet SO ₂ Conc. (ppm)	1590	1686	1502	69	6
Facility Outlet SO ₂ Conc. (ppm)	1314	1399	1245	58	6
SDA Inlet SO ₂ Conc. (ppm)	1390	1477	1307	64	6
SDA Outlet SO ₂ Conc. (ppm)	1130	1199	1033	63	6
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1298	1403	1209	63	5
SDA Inlet O ₂ Conc. (%)	7.04	7.78	6.12	0.59	6
SDA Outlet O ₂ Conc. (%)	7.85	8.50	7.10	0.50	6
TGR O ₂ Conc. (%)	8.36	9.34	7.31	0.75	5
SDA Inlet Temp. (°F)	339	339	339	0	6
SDA Outlet Temp. (°F)	327	327	326	0	6
ESP Outlet Temp. (°F)	300	303	297	2	6
PJFF Inlet Temp. (°F)	312	312	311	0	6
PJFF Outlet Temp. (°F)	299	300	298	1	6
PJFF Air/Cloth Ratio	7.78	7.79	7.77	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in. H ₂ O)	7.93	7.95	7.91	0.01	6
NYSEG Load (MW)	650	678	576	34	6

HAP-54C Process Summary Report
09/26/96 08:00:00 to 09/26/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	5
Facility Inlet SO ₂ Conc. (ppm)	1092	1126	1042	34	4
Facility Outlet SO ₂ Conc. (ppm)	916	930	884	17	5
SDA Inlet SO ₂ Conc. (ppm)	998	1011	987	9	5
SDA Outlet SO ₂ Conc. (ppm)	857	884	812	25	5
TGR/PJFF Outlet SO ₂ Conc. (ppm)	934	951	925	10	5
SDA Inlet O ₂ Conc. (%)	10.27	10.69	9.92	0.25	5
SDA Outlet O ₂ Conc. (%)	10.60	10.92	10.35	0.19	5
TGR O ₂ Conc. (%)	11.29	11.93	10.82	0.37	5
SDA Inlet Temp. (°F)	340	340	340	0	5
SDA Outlet Temp. (°F)	327	328	327	0	5
ESP Outlet Temp. (°F)	298	301	295	2	5
PJFF Inlet Temp. (°F)	313	314	312	0	5
PJFF Outlet Temp. (°F)	301	302	299	1	5
PJFF Air/Cloth Ratio	7.51	7.53	7.50	0.01	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF ΔP (in. H ₂ O)	8.80	8.83	8.77	0.02	5
NYSEG Load (MW)	374	407	311	33	5

HAP-54D Process Summary Report
09/27/96 07:00:00 to 09/27/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7998	1	5
Facility Inlet SO ₂ Conc. (ppm)	1458	1487	1424	21	5
Facility Outlet SO ₂ Conc. (ppm)	1133	1151	1110	14	5
SDA Inlet SO ₂ Conc. (ppm)	1200	1218	1179	13	5
SDA Outlet SO ₂ Conc. (ppm)	1081	1111	1062	17	5
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1131	1147	1104	15	5
SDA Inlet O ₂ Conc. (%)	6.96	7.21	6.83	0.14	5
SDA Outlet O ₂ Conc. (%)	7.62	7.85	7.51	0.12	5
TGR O ₂ Conc. (%)	7.37	7.69	7.24	0.17	5
SDA Inlet Temp. (°F)	340	340	340	0	5
SDA Outlet Temp. (°F)	328	328	328	0	5
ESP Outlet Temp. (°F)	302	302	301	0	5
PJFF Inlet Temp. (°F)	313	314	313	0	5
PJFF Outlet Temp. (°F)	301	302	301	0	5
PJFF Air/Cloth Ratio	6.98	6.98	6.98	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF ΔP (in. H ₂ O)	9.68	9.70	9.67	0.01	5
NYSEG Load (MW)	673	693	649	15	5

HAP-55 Process Summary Report
09/30/96 07:00:00 to 09/30/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	6
Facility Inlet SO ₂ Conc. (ppm)	1177	1446	1047	133	6
Facility Outlet SO ₂ Conc. (ppm)	962	1218	865	120	6
SDA Inlet SO ₂ Conc. (ppm)	1054	1202	987	71	6
SDA Outlet SO ₂ Conc. (ppm)	828	1025	742	97	6
TGR/PJFF Outlet SO ₂ Conc. (ppm)	1009	1164	949	73	6
SDA Inlet O ₂ Conc. (%)	8.79	9.35	8.08	0.52	6
SDA Outlet O ₂ Conc. (%)	10.25	11.00	9.10	0.64	6
TGR O ₂ Conc. (%)	9.18	9.70	8.38	0.52	6
SDA Inlet Temp. (°F)	340	340	340	0	6
SDA Outlet Temp. (°F)	327	327	327	0	6
ESP Outlet Temp. (°F)	298	300	297	1	6
PJFF Inlet Temp. (°F)	313	313	312	0	6
PJFF Outlet Temp. (°F)	301	302	300	1	6
PJFF Air/Cloth Ratio	6.92	6.93	6.91	0.01	6
PJFF Cleaning Pulses/Hour	26	26	26	0	6
PJFF ΔP (in. H ₂ O)	2.80	2.87	2.75	0.04	6
NYSEG Load (MW)	533	591	506	32	6

APPENDIX C
ANALYTICAL SUMMARY RESULTS

ECTC PRDA HAP's Testing
Mercury Gas Sampling Results
Pre-Spiking Inlet Location
(SDA Inlet)

Test ID	Date	Start Time	ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
<i>C-15 on Filter No Hg Spike</i>												<u>CRG-1</u>	<u>CRG-1</u>	<u>CRG-1</u>	<u>CRG-1</u>
HAP-47A	Thu-8/1	08:20	U1576	29.27	10.45	5.51	-	0.78	560.2	-	468.7	3.99	-	0.47	4.46
<i>C-15 on Filter (Hg Spike)</i>												10.38	-	29.07	39.45
HAP-47B	Thu-8/1	12:00	U1578	27.22	13.43	12.99	-	42.91	574.3	-	486.8	Base <u>CRG-1</u>	Base <u>CRG-1</u>	Base <u>CRG-1</u>	Base <u>CRG-1</u>
<i>Conditioned C-15 (Hg Spike)</i>												9.63	-	24.44	34.07
HAP-48	Fri-8/2	08:36	U1585	28.92	10.14	12.84	-	38.13	572.7	-	489.4	11.23	-	24.70	35.93
HAP-48	Fri-8/2	09:56	U1587	30.97	10.27	16.19	-	43.56	567.3	-	463.5	10.01	-	26.18	36.19
HAP-48	Fri-8/2	11:11	U1589	35.37	10.43	16.74	-	54.49	558.2	-	448.6	9.49	-	25.39	34.88
HAP-48	Fri-8/2	12:24	U1591	29.49	9.99	13.02	-	39.70	567.6	-	497.8				
Averages												10.09		25.18	35.27
<i>Baseline</i>												4.13	-	0.75	4.88
HAP-49	Mon-8/5	07:45	U1593	34.02	7.18	6.54	-	1.48	566.8	-	459.2	4.72	-	3.17	7.90
HAP-49	Mon-8/5	08:30	U1596	35.14	6.73	7.69	-	6.32	569.7	-	465.9	4.68	-	0.93	5.61
HAP-49	Mon-8/5	09:15	U1599	32.98	6.85	6.90	-	1.72	590.7	-	469.9				
Averages												4.51		1.62	6.13
<i>40# FAB-2B (Day 1)</i>												6.31	-	1.01	7.32
HAP-50A	Tue-8/6	07:45	U1605	35.64	6.39	10.58	-	2.04	561.3	-	464.6	6.09	-	0.77	6.86
HAP-50A	Tue-8/6	08:30	U1608	34.86	6.07	10.13	-	1.55	553.2	-	458.8	5.83	-	0.75	6.57
HAP-50A	Tue-8/6	09:15	U1611	34.77	6.01	9.37	-	1.50	570.6	-	456.6				
Averages												6.07		0.84	6.92
<i>40# FAB-2B (Day 2)</i>												5.22	-	0.77	5.98
HAP-50B	Wed-8/7	07:45	U1614	34.83	6.45	8.37	-	1.48	573.4	-	476.4	4.68	-	0.75	5.43
HAP-50B	Wed-8/7	08:30	U1617	35.49	6.12	7.81	-	1.57	561.7	-	448.9	4.90	-	0.69	5.59
HAP-50B	Wed-8/7	09:15	U1620	35.79	6.12	8.05	-	1.47	575.1	-	445.1				
Averages												4.93		0.74	5.67
<i>40# FAB-2B (Day 3)</i>												6.64	-	0.89	7.53
HAP-50C	Thu-8/8	07:45	U1623	38.77	6.13	11.75	-	1.89	578.7	-	480.6	6.75	-	0.77	7.53
HAP-50C	Thu-8/8	08:30	U1626	31.82	6.13	9.96	-	1.40	569.6	-	463.1	6.86	-	0.79	7.65
HAP-50C	Thu-8/8	09:15	U1629	33.71	6.35	10.65	-	1.40	573.2	-	503.7				
Averages												6.75		0.82	7.57
<i>40# FAB-2B (Day 4)</i>												4.91	-	0.64	5.55
HAP-50D	Fri-8/9	07:45	U1632	37.43	9.76	8.80	-	1.39	551.4	-	454.7	4.72	-	0.78	5.50
HAP-50D	Fri-8/9	08:30	U1635	34.41	9.46	7.73	-	1.54	554.8	-	457.3	4.86	-	0.80	5.66
HAP-50D	Fri-8/9	09:15	U1638	38.49	9.37	8.52	-	1.66	579.9	-	490.3				
Averages												4.83		0.74	5.57
<i>20# CT-6 (Day 1)</i>												5.61	-	1.73	7.34
HAP-51A	Thu-8/15	07:45	U1641	34.69	8.21	8.90	-	3.41	577.1	-	465.9	4.77	-	1.51	6.28
HAP-51A	Thu-8/15	08:30	U1644	37.51	9.61	7.87	-	3.13	600.4	-	478.5	6.09	-	1.46	7.55
HAP-51A	Thu-8/15	09:15	U1647	35.71	6.45	9.47	-	3.25	605.8	-	424.6				
Averages												5.49		1.57	7.06
<i>20# CT-6 (Day 2)</i>												5.78	-	1.20	6.98
HAP-51B	Fri-8/16	07:45	U1650	36.86	9.33	10.16	-	2.77	553.7	-	422.0	5.94	-	1.31	7.25
HAP-51B	Fri-8/16	08:30	U1653	39.70	9.63	10.50	-	3.00	592.7	-	457.7	6.25	-	1.40	7.65
HAP-51B	Fri-8/16	09:15	U1656	33.71	10.42	9.40	-	2.81	591.6	-	443.9				
Averages												5.99		1.30	7.29

**ECTC PRDA HAP's Testing
Mercury Gas Sampling Results
Post-Spiking Inlet Location
(PJFF Inlet)**

ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
									CRG-2	CRG-2	CRG-2	CRG-2
U1577	30.31	10.45	7.65	-	0.72	562.4	-	486.8	5.38	-	0.44	5.81
U1579	29.71	13.43	36.55	-	18.40	576.6	-	470.4	26.87	-	11.04	37.90
									I-C	I-C	I-C	I-C
									CRG-2	CRG-2	CRG-2	CRG-2
U1289	29.96	10.14	39.72	-	18.28	582.4	-	500.5	29.25	-	11.57	40.82
U1291	31.59	10.27	41.95	-	21.03	586.2	-	460.7	29.49	-	11.62	41.11
U1188	37.76	10.43	51.50	-	25.76	557.7	-	435.3	28.81	-	11.25	40.06
U1190	30.77	9.99	39.63	-	17.98	556.4	-	487.8	27.14	-	10.80	37.94
									28.67		11.31	39.98
U1594	34.94	7.87	9.63	-	45.24	528.9	-	441.7	5.52	-	21.67	27.19
U1597	39.55	7.44	10.80	-	52.87	568.4	-	444.2	5.88	-	22.50	28.38
U1600	43.18	7.55	11.84	-	48.22	569.8	-	520.7	5.92	-	22.03	27.95
									5.77		22.06	27.84
U1606	36.22	7.12	16.28	-	45.42	553.9	-	467.9	9.43	-	22.23	31.66
U1609	37.82	6.81	13.65	-	54.22	557.1	-	448.8	7.62	-	24.37	31.99
U1612	30.37	6.75	10.14	-	41.45	555.6	-	483.6	7.03	-	25.01	32.04
									8.03		23.87	31.89
U1615	35.12	7.17	11.50	-	44.51	560.6	-	449.1	6.95	-	21.56	28.52
U1618	43.45	6.86	11.34	-	55.18	580.4	-	455.8	5.74	-	21.93	27.67
U1621	36.54	6.86	10.29	-	44.03	557.7	-	486.2	5.95	-	22.19	28.14
									6.21		21.90	28.11
U1624	34.54	6.87	13.90	-	35.27	551.0	-	513.0	8.40	-	19.85	28.25
U1627	34.84	6.87	15.07	-	40.18	568.0	-	468.1	9.31	-	20.45	29.76
U1630	33.90	7.08	11.37	-	37.47	550.5	-	474.7	6.99	-	19.88	26.87
									8.23		20.06	28.29
U1633	35.94	10.32	10.39	-	44.63	569.2	-	474.3	6.23	-	22.31	28.55
U1636	34.25	10.03	10.72	-	46.68	559.3	-	445.1	6.63	-	22.98	29.62
U1639	33.71	9.95	10.26	-	45.45	573.2	-	464.2	6.61	-	23.71	30.32
									6.49		23.00	29.49
U1642	38.12	8.84	13.02	-	49.15	586.7	-	472.3	7.59	-	23.07	30.67
U1645	38.28	10.17	11.53	-	53.58	556.8	-	447.6	6.35	-	23.73	30.09
U1648	35.62	7.17	11.96	-	50.43	561.7	-	451.0	7.15	-	24.19	31.34
									7.03		23.67	30.70
U1651	39.70	9.91	11.93	-	41.99	583.7	-	494.6	6.64	-	19.82	26.46
U1654	36.18	10.19	11.59	-	38.77	569.7	-	501.7	6.91	-	20.37	27.28
U1657	34.08	10.95	11.83	-	45.42	549.0	-	423.6	7.22	-	21.39	28.61
									6.93		20.52	27.45

**ECTC PRDA HAP's Testing
Mercury Gas Sampling Results
PJFF Outlet Location
(PJFF Outlet)**

ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
U1595	32.46	8.52	18.44	-	27.24	601.0	-	474.5	12.94	-	15.09	28.02
U1598	36.32	8.11	22.83	-	31.20	582.3	-	485.4	13.87	-	15.80	29.66
U1601	35.29	8.22	22.63	-	29.70	571.5	-	515.1	13.88	-	16.42	30.31
									13.56 15.77 29.33			
U1607	36.32	7.80	39.34	-	21.59	554.2	-	484.0	22.74	-	10.90	33.64
U1610	34.85	7.52	39.07	-	21.59	545.5	-	456.6	23.17	-	10.72	33.89
U1613	31.36	7.46	33.65	-	19.54	557.1	-	491.6	22.65	-	11.60	34.25
									22.85 11.07 33.93			
U1616	36.06	7.86	32.45	-	24.44	560.5	-	435.3	19.11	-	11.18	30.28
U1619	39.10	7.56	35.21	-	23.28	562.1	-	485.2	19.17	-	10.94	30.12
U1622	36.40	7.56	32.40	-	21.66	548.2	-	493.5	18.49	-	11.12	29.61
									18.92 11.08 30.00			
U1625	33.81	7.57	33.60	-	19.37	572.6	-	504.0	21.56	-	10.94	32.50
U1628	32.55	7.57	34.10	-	18.66	561.8	-	466.2	22.30	-	10.13	32.42
U1631	31.08	7.77	32.10	-	15.68	559.1	-	537.3	21.88	-	10.27	32.15
									21.91 10.45 32.36			
U1634	39.81	10.85	41.47	-	20.99	576.4	-	487.3	22.75	-	9.73	32.48
U1637	34.09	10.58	37.73	-	18.77	547.8	-	451.8	22.97	-	9.42	32.39
U1640	37.70	10.49	40.01	-	19.59	566.5	-	495.8	22.78	-	9.76	32.54
									22.83 9.64 32.47			
U1643	34.75	9.45	21.11	-	38.46	597.7	-	489.6	13.75	-	20.53	34.28
U1646	33.23	10.71	22.11	-	40.24	543.6	-	434.5	13.70	-	19.93	33.63
U1649	36.24	7.86	24.35	-	39.04	540.7	-	499.1	13.76	-	20.37	34.13
									13.74 20.28 34.02			
U1652	33.71	10.46	26.71	-	31.90	546.7	-	471.8	16.41	-	16.92	33.33
U1655	31.81	10.73	26.54	-	38.77	536.1	-	473.5	16.94	-	21.86	38.80
U1658	31.33	11.44	25.18	-	33.78	571.9	-	435.9	17.41	-	17.81	35.22
									16.92 18.86 35.78			

ID	Tris/EDTA					KMnO4					Total Vapor				
	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Rem'l (%)	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Rem'l (%)	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Rem'l (%)
	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(%)	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(%)	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(ug/Nm3)	(%)
-	<u>CRG-1</u> 6.1	<u>CRG-2</u> 8.2	-	-	-34.7	<u>CRG-1</u> 0.7	<u>CRG-2</u> 0.7	-	-	7.4	<u>CRG-1</u> 6.8	<u>CRG-2</u> 8.8	-	-	-30.2
-	21.9	56.8	-	-	-158.8	61.4	23.3	-	-	62.0	83.4	80.1	-	-	3.9
-	Base <u>CRG-1</u> 14.2	I-C <u>CRG-2</u> 43.1	-	-	-203.8	Base <u>CRG-1</u> 36.0	I-C <u>CRG-2</u> 17.0	-	-	52.7	Base <u>CRG-1</u> 50.2	I-C <u>CRG-2</u> 60.1	-	-	-19.8
-	16.8	44.0	-	-	-162.5	36.8	17.3	-	-	53.0	53.6	61.3	-	-	-14.4
-	15.1	43.6	-	-	-187.9	39.6	17.0	-	-	57.0	54.8	60.6	-	-	-10.7
-	13.8	39.4	-	-	-185.9	36.9	15.7	-	-	57.5	50.7	55.1	-	-	-8.8
	15.0	42.5			-185.0	37.3	16.8			55.0	52.3	59.3			-13.4
U1595	4.8	6.7	16.6	1.9	-146.5	0.9	26.4	19.3	25.5	26.7	5.7	33.1	35.9	27.5	-8.4
U1598	5.3	6.9	17.2	1.6	-148.1	3.6	26.5	19.6	23.0	26.1	8.9	33.5	36.8	24.6	-10.0
U1601	5.3	7.0	17.4	1.7	-146.8	1.0	26.2	20.6	25.2	21.6	6.3	33.3	37.9	26.9	-14.1
	5.1	6.9	17.1	1.8	-147.1	1.8	26.4	19.8	24.6	24.8	7.0	33.3	36.9	26.3	-10.8
U1607	6.9	10.9	27.6	4.0	-153.7	1.1	25.6	13.2	24.5	48.4	8.0	36.5	40.8	28.5	-11.8
U1610	6.5	8.6	27.5	2.1	-220.1	0.8	27.5	12.7	26.7	53.7	7.4	36.1	40.2	28.7	-11.5
U1613	6.2	7.9	26.8	1.7	-239.0	0.8	28.1	13.7	27.3	51.2	7.0	36.0	40.5	29.0	-12.5
	6.6	9.1	27.3	2.6	-204.3	0.9	27.1	13.2	26.2	51.1	7.5	36.2	40.5	28.7	-11.9
U1616	5.7	8.0	23.3	2.3	-189.1	0.8	25.0	13.6	24.1	45.5	6.6	33.0	36.9	26.4	-11.7
U1619	5.0	6.5	22.8	1.5	-251.6	0.8	24.8	13.0	24.0	47.5	5.8	31.3	35.9	25.5	-14.5
U1622	5.3	6.7	22.0	1.5	-226.9	0.7	25.1	13.2	24.4	47.3	6.0	31.8	35.3	25.8	-10.7
	5.3	7.1	22.7	1.7	-222.5	0.8	25.0	13.3	24.2	46.7	6.1	32.0	36.0	25.9	-12.3
U1625	7.1	9.5	25.7	2.4	-170.0	1.0	22.5	13.0	21.5	42.0	8.1	32.0	38.7	23.9	-21.1
U1628	7.3	10.5	26.6	3.3	-152.1	0.8	23.2	12.1	22.3	47.9	8.1	33.7	38.6	25.6	-14.6
U1631	7.5	8.0	26.5	0.5	-229.1	0.9	22.8	12.4	22.0	45.6	8.4	30.9	38.9	22.5	-25.9
	7.3	9.4	26.2	2.1	-183.8	0.9	22.8	12.5	21.9	45.2	8.2	32.2	38.7	24.0	-20.5
U1634	7.0	9.3	35.8	2.3	-283.9	0.9	33.4	15.3	32.5	54.1	7.9	42.8	51.2	34.9	-19.7
U1637	6.5	9.7	35.3	3.1	-264.4	1.1	33.5	14.5	32.5	56.9	7.6	43.2	49.7	35.6	-15.1
U1640	6.7	9.6	34.7	2.9	-262.6	1.1	34.3	14.9	33.2	56.7	7.8	43.9	49.6	36.1	-12.9
	6.7	9.5	35.3	2.8	-270.3	1.0	33.8	14.9	32.7	55.9	7.8	43.3	50.2	35.5	-15.9
U1643	7.0	10.0	19.0	3.0	-90.5	2.2	30.4	28.4	28.2	6.4	9.2	40.4	47.5	31.2	-17.6
U1646	6.7	9.4	21.3	2.7	-126.9	2.1	35.1	31.0	33.0	11.6	8.8	44.5	52.3	35.6	-17.6
U1649	6.7	8.3	16.8	1.6	-102.7	1.6	28.0	24.8	26.4	11.4	8.3	36.3	41.6	28.0	-14.6
	6.8	9.2	19.0	2.4	-106.7	2.0	31.1	28.1	29.2	9.8	8.8	40.4	47.1	31.6	-16.6
U1652	7.9	9.6	24.9	1.7	-159.9	1.6	28.6	25.7	26.9	10.2	9.6	38.2	50.6	28.6	-32.5
U1655	8.4	10.2	26.4	1.9	-157.8	1.8	30.2	34.0	28.3	-12.9	10.2	40.4	60.4	30.2	-49.6
U1658	9.5	11.5	29.2	2.0	-153.7	2.1	34.0	29.8	31.9	12.4	11.6	45.5	59.0	34.0	-29.5
	8.6	10.4	26.8	1.9	-157.1	1.9	30.9	29.8	29.1	3.2	10.4	41.4	56.7	30.9	-37.2

ID	Spike Recovery			Oxidation/Removal				Removal of Total Mercury (%)
	Actual Spiked (µg/Nm3)	Spiked Theo Hg (µg/Nm3)	Percent Spike Rec (%)	Reduction in KMnO4 % Hg(0) Oxidized	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	
-	-	-	-	7.4	292.8	150.1	0.0	-30.2
-	-	-	-	62.0	56.7	59.4	0.0	3.9
-	-	-	-	52.7	80.3	66.5	0.0	-19.8
-	-	-	-	53.0	73.9	63.4	0.0	-14.4
-	-	-	-	57.0	71.8	64.4	0.0	-10.7
-	-	-	-	57.5	69.5	63.5	0.0	-8.8
				55.1	73.8	64.4	0.0	-13.4
U1595	22.55	28.98	77.8	26.7	37.3	32.0	0.0	-8.4
U1598	20.87	28.98	72.0	26.1	38.7	32.4	0.0	-10.0
U1601	22.62	28.98	78.1	21.6	39.4	30.5	0.0	-14.1
	22.01		76.0	24.8	38.5	31.7	0.0	-10.8
U1607	24.71	28.98	85.3	48.4	65.2	56.8	0.0	-11.8
U1610	25.47	28.98	87.9	53.7	68.8	61.3	0.0	-11.5
U1613	25.79	28.98	89.0	51.2	67.2	59.2	0.0	-12.5
	25.32		87.4	51.2	67.1	59.1	0.0	-11.9
U1616	22.83	28.98	78.8	45.5	61.0	53.2	0.0	-11.7
U1619	22.50	28.98	77.6	47.5	65.8	56.7	0.0	-14.5
U1622	22.83	28.98	78.8	47.3	60.8	54.0	0.0	-10.7
	22.72		78.4	46.7	62.5	54.6	0.0	-12.3
U1625	21.09	28.98	72.8	42.0	72.0	57.0	0.0	-21.1
U1628	22.61	28.98	78.0	47.9	69.2	58.6	0.0	-14.6
U1631	19.60	28.98	67.6	45.6	80.6	63.1	0.0	-25.9
	21.10		72.8	45.2	73.9	59.6	0.0	-20.4
U1634	23.27	28.98	80.3	54.1	79.3	66.7	0.0	-19.7
U1637	24.39	28.98	84.2	56.9	76.3	66.6	0.0	-15.1
U1640	24.93	28.98	86.0	56.7	73.2	64.9	0.0	-12.9
	24.20		83.5	55.9	76.2	66.1	0.0	-15.9
U1643	23.69	28.98	81.8	6.4	29.8	18.1	0.0	-17.6
U1646	24.11	28.98	83.2	11.6	34.0	22.8	0.0	-17.6
U1649	24.16	28.98	83.4	11.4	30.3	20.9	0.0	-14.6
	23.99		82.8	9.9	31.5	20.7	0.0	-16.7
U1652	19.83	28.98	68.4	10.2	53.6	31.9	0.0	-32.5
U1655	20.39	28.98	70.4	-12.9	53.6	20.3	0.0	-49.6
U1658	21.34	28.98	73.6	12.4	51.9	32.2	0.0	-29.5
	20.52		70.8	3.5	53.0	28.2	0.0	-37.0

**EPRI ECTC HAP's Testing
Mercury Gas Sampling Results
Pre-Spiking Inlet Location
(SDA Inlet)**

Test ID	Date	Start Time	ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
Baseline															
HAP-52	Wed-9/18	10:00	U1659	30.29	10.02	7.84	-	1.54	572.1	-	465.3	5.61	-	0.89	6.50
HAP-52	Wed-9/18	11:00	U1662	37.81	9.35	9.51	-	1.90	574.7	-	446.2	5.48	-	0.85	6.32
HAP-52	Wed-9/18	12:00	U1665	44.64	7.76	11.54	-	2.49	603.4	-	448.9	5.91	-	0.95	6.86
Averages												5.66		0.90	6.56
Accumulated FAB-2C Day 1															
HAP-53A	Thu-9/19	08:00	U1668	34.78	10.50	7.61	-	1.39	539.5	-	409.8	4.47	-	0.62	5.09
HAP-53A	Thu-9/19	09:00	U1671	34.01	10.50	8.04	-	1.30	546.1	-	483.1	4.89	-	0.70	5.59
HAP-53A	Thu-9/19	10:00	U1674	36.44	10.12	8.04	-	1.59	597.1	-	428.9	4.99	-	0.71	5.70
Averages												4.78		0.68	5.46
Accumulated FAB-2C Day 2															
HAP-53B	Fri-9/20	08:00	U1677	31.58	10.48	8.52	-	1.06	529.2	-	454.6	5.41	-	0.58	5.99
HAP-53B	Fri-9/20	09:00	U1680	30.05	10.67	8.19	-	1.11	538.7	-	414.6	5.56	-	0.58	6.14
HAP-53B	Fri-9/20	10:00	U1683	30.91	9.78	8.95	-	1.22	533.4	-	466.6	5.85	-	0.70	6.55
Averages												5.61		0.62	6.23
Accumulated FAB-2C Day 5															
HAP-53C	Mon-9/23	08:30	U1686	35.06	10.61	7.99	-	1.29	556.9	-	405.6	4.81	-	0.57	5.37
HAP-53C	Mon-9/23	09:30	U1689	33.26	9.44	7.85	-	1.43	588.6	-	428.8	5.26	-	0.70	5.96
HAP-53C	Mon-9/23	10:30	U1692	31.23	9.46	7.77	-	1.27	563.4	-	518.4	5.31	-	0.80	6.11
Averages												5.13		0.69	5.81
Incremental CT-9 5#															
HAP-54A	Tue-9/24	08:00	U1695	35.65	7.87	11.20	-	1.69	540.6	-	456.1	6.43	-	0.82	7.25
HAP-54A	Tue-9/24	09:00	U1698	34.53	7.15	11.45	-	1.60	555.8	-	465.0	6.98	-	0.81	7.80
HAP-54A	Tue-9/24	10:00	U1701	33.30	6.91	11.06	-	1.64	551.5	-	465.9	6.94	-	0.87	7.80
Averages												6.78		0.83	7.62
Incremental CT-9 5+5#															
HAP-54B	Wed-9/25	08:00	U1704	30.79	7.45	8.69	-	1.52	590.8	-	419.4	6.32	-	0.78	7.10
HAP-54B	Wed-9/25	09:00	U1707	28.05	6.63	8.71	-	1.44	558.8	-	422.4	6.57	-	0.82	7.39
HAP-54B	Wed-9/25	10:00	U1710	32.53	6.08	9.99	-	1.44	560.6	-	478.2	6.52	-	0.80	7.32
Averages												6.47		0.80	7.27
Incremental CT-9 5+5+10#															
HAP-54C	Thu-9/26	08:00	U1713	33.28	10.31	8.34	-	1.06	537.1	-	472.6	5.10	-	0.57	5.67
HAP-54C	Thu-9/26	09:00	U1716	34.40	9.87	9.13	-	1.18	552.9	-	476.1	5.56	-	0.62	6.18
HAP-54C	Thu-9/26	10:00	U1719	33.81	10.07	8.88	-	1.17	534.6	-	485.0	5.32	-	0.64	5.96
Averages												5.33		0.61	5.93
Incremental CT-9 5+5+10+6#															
HAP-54D	Fri-9/27	07:00	U1722	30.14	9.00	10.23	-	0.92	537.8	-	447.1	6.92	-	0.52	7.44
HAP-54D	Fri-9/27	08:00	U1725	35.07	9.00	11.58	-	1.01	555.0	-	469.2	6.94	-	0.51	7.45
HAP-54D	Fri-9/27	09:00	U1728	28.90	9.00	9.57	-	0.81	528.1	-	461.7	6.62	-	0.49	7.12
Averages												6.83		0.51	7.34
Baseline															
HAP-55	Mon-9/30	08:00	U1731	36.32	9.00	6.61	-	1.55	548.3	-	482.8	3.78	-	0.78	4.56
HAP-55	Mon-9/30	09:00	U1734	33.75	9.00	7.46	-	1.40	547.3	-	475.7	4.58	-	0.74	5.33
HAP-55	Mon-9/30	10:00	U1737	32.75	9.00	6.24	-	1.35	541.6	-	456.2	3.91	-	0.71	4.62
Averages												4.09		0.74	4.83
Description															
HAP-00		08:00		-	9.00	-	-	-	-	-	-	#####	-	#####	#####
HAP-00	Fri-1/1	09:00	U3	-	9.00	-	-	-	-	-	-	#####	-	#####	#####
HAP-00	Fri-1/1	10:00	U6	-	9.00	-	-	-	-	-	-	#####	-	#####	#####
Averages												#####		#####	#####

**EPRI ECTC HAP's Testing
Mercury Gas Sampling Results
Post-Spiking Inlet Location
(PJFF Inlet)**

ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
U1660	31.00	10.32	13.45	-	51.38	543.4	-	495.5	8.93	-	31.11	40.04
U1663	35.05	9.78	16.28	-	65.69	564.2	-	460.5	9.93	-	32.70	42.63
U1666	40.90	8.31	17.58	-	72.03	586.3	-	482.6	9.55	-	32.20	41.75
									9.47		32.00	41.47
U1669	34.03	10.90	15.25	-	65.58	545.3	-	427.2	9.26	-	31.19	40.45
U1672	37.76	10.95	17.56	-	76.64	555.0	-	440.1	9.78	-	33.84	43.62
U1675	41.46	10.49	16.70	-	75.12	573.7	-	456.0	8.76	-	31.30	40.06
									9.26		32.11	41.37
U1678	32.25	10.85	14.83	-	60.86	550.7	-	416.3	9.59	-	29.76	39.35
U1681	31.39	11.00	15.65	-	45.62	537.7	-	522.8	10.15	-	28.78	38.94
U1684	34.09	10.13	14.65	-	64.05	579.3	-	430.1	9.43	-	30.61	40.04
									9.73		29.72	39.44
U1687	32.09	10.93	16.13	-	50.31	542.0	-	483.0	10.32	-	28.68	39.00
U1690	39.83	9.79	17.08	-	67.06	580.6	-	482.1	9.43	-	30.75	40.19
U1693	33.73	9.78	13.58	-	54.79	592.6	-	495.3	9.04	-	30.47	39.51
									9.60		29.97	39.57
U1696	32.28	8.56	21.53	-	54.58	531.6	-	445.0	13.43	-	28.50	41.94
U1699	37.46	7.98	24.87	-	61.50	544.6	-	490.5	13.70	-	30.51	44.21
U1702	35.18	7.88	21.24	-	55.98	568.6	-	506.1	13.01	-	30.51	43.51
									13.38		29.84	43.22
U1705	33.95	8.13	21.55	-	47.86	544.4	-	485.4	13.09	-	25.92	39.01
U1708	32.97	7.49	20.62	-	49.56	552.9	-	461.3	13.10	-	26.27	39.37
U1711	42.82	7.04	23.60	-	62.12	607.6	-	487.9	12.69	-	26.81	39.50
									12.96		26.33	39.29
U1714	32.45	10.64	20.16	-	53.36	560.2	-	424.0	13.19	-	26.41	39.60
U1717	36.69	10.29	22.52	-	52.79	583.1	-	490.6	13.56	-	26.74	40.30
U1720	31.69	10.45	20.37	-	50.36	574.9	-	467.6	14.00	-	28.15	42.15
									13.58		27.10	40.68
U1723	32.57	9.50	24.19	-	11.88	577.7	-	482.1	16.25	-	6.66	22.91
U1726	28.39	9.50	22.58	-	19.29	527.0	-	433.1	15.88	-	11.15	27.03
U1729	31.18	9.50	21.14	-	26.59	571.5	-	452.2	14.68	-	14.61	29.29
									15.60		10.81	26.41
U1732	38.15	9.00	12.32	-	60.47	580.0	-	481.5	7.10	-	28.91	36.00
U1735	37.36	9.00	12.97	-	55.53	612.4	-	471.5	8.05	-	26.55	34.60
U1738	32.33	9.00	12.09	-	53.44	581.4	-	452.6	8.23	-	28.34	36.58
									7.79		27.93	35.73
U1	-	9.50	-	-	-	-	-	-	#####	-	#####	#####
U4	-	9.50	-	-	-	-	-	-	#####	-	#####	#####
U7	-	9.50	-	-	-	-	-	-	#####	-	#####	#####
									#####		#####	#####

**EPRI ECTC HAP's Testing
Mercury Gas Sampling Results
PJFF Outlet Location
(PJFF Outlet)**

ID	Gas Volume (dscf)	O2 (%)	Tris Sample [Hg] (ng/ml)	H2O2 Sample [Hg] (ng/ml)	KMnO4 Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H2O2 Sample Mass (g)	KMnO4 Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H2O2 [Hg] In Gas (µg/Nm ³)	KMnO4 [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
U1661	31.79	12.94	28.01	-	22.74	506.4	-	523.9	16.91	-	14.20	31.10
U1664	36.86	12.23	32.38	-	19.45	583.9	-	563.3	19.43	-	11.26	30.69
U1667	39.05	9.99	33.15	-	30.92	576.5	-	489.2	18.54	-	14.67	33.21
									18.29		13.38	31.67
U1670	39.20	13.88	36.56	-	27.23	549.4	-	389.6	19.41	-	10.25	29.67
U1673	41.93	13.88	35.95	-	17.74	610.9	-	485.3	19.84	-	7.78	27.62
U1676	39.90	13.32	37.90	-	23.44	571.4	-	444.7	20.56	-	9.90	30.46
									19.94		9.31	29.25
U1679	29.24	13.71	35.46	-	12.04	547.1	-	490.8	25.14	-	7.66	32.80
U1682	31.17	13.96	35.30	-	13.70	562.2	-	438.5	24.12	-	7.30	31.43
U1685	35.42	13.32	46.60	-	14.87	536.8	-	483.1	26.75	-	7.68	34.43
									25.34		7.55	32.89
U1688	38.59	13.58	44.07	-	8.75	579.4	-	514.5	25.06	-	4.42	29.48
U1691	45.65	12.02	56.74	-	12.82	563.6	-	451.7	26.54	-	4.80	31.34
U1694	47.56	12.06	54.46	-	10.50	568.1	-	552.5	24.64	-	4.62	29.26
									25.42		4.62	30.03
U1697	36.21	9.82	52.22	-	3.88	575.8	-	431.6	31.45	-	1.75	33.21
U1700	41.78	8.85	63.39	-	5.30	587.9	-	519.6	33.79	-	2.50	36.29
U1703	41.99	8.62	66.54	-	5.84	559.3	-	520.4	33.57	-	2.74	36.31
									32.94		2.33	35.27
U1706	39.92	9.32	52.03	-	2.89	580.1	-	430.3	28.64	-	1.18	29.82
U1709	41.27	8.38	53.02	-	4.67	587.8	-	424.1	28.61	-	1.82	30.43
U1712	40.42	7.71	55.70	-	3.81	562.2	-	492.3	29.35	-	1.76	31.11
									28.87		1.58	30.45
U1715	42.02	11.46	42.87	-	6.24	528.6	-	502.4	20.43	-	2.82	23.26
U1718	40.50	10.79	50.91	-	6.09	528.8	-	466.0	25.18	-	2.65	27.84
U1721	37.05	11.13	50.55	-	5.48	574.3	-	500.6	29.68	-	2.80	32.48
									25.10		2.76	27.86
U1724	25.99	10.00	32.01	-	3.04	545.4	-	454.7	25.44	-	2.01	27.46
U1727	18.08	10.00	8.54	-	3.04	562.3	-	436.4	10.06	-	2.78	12.84
U1730	15.85	10.00	4.70	-	1.82	557.2	-	437.8	6.26	-	1.90	8.16
									13.92		2.23	16.15
U1733	46.64	11.00	33.77	-	28.84	559.5	-	455.5	15.35	-	10.67	26.02
U1736	43.32	11.00	35.21	-	24.57	557.1	-	470.8	17.15	-	10.11	27.27
U1739	41.37	11.00	36.15	-	25.91	542.6	-	434.7	17.96	-	10.31	28.27
									16.82		10.37	27.19
U2	-	10.00	-	-	-	-	-	-	#####	-	#####	#####
U5	-	10.00	-	-	-	-	-	-	#####	-	#####	#####
U8	-	10.00	-	-	-	-	-	-	#####	-	#####	#####
									#####		#####	#####

ID	Tris/EDTA					KMnO4					Total Vapor				
	Pre-Spike Inlet (µg/Nm3)	Post-Spike Inlet (µg/Nm3)	Outlet [Hg] (µg/Nm3)	Hg Spiked (µg/Nm3)	Hg Rem'l (%)	Pre-Spike Inlet (µg/Nm3)	Post-Spike Inlet (µg/Nm3)	Outlet [Hg] (µg/Nm3)	Hg Spiked (µg/Nm3)	Hg Rem'l (%)	Pre-Spike Inlet (µg/Nm3)	Post-Spike Inlet (µg/Nm3)	Outlet [Hg] (µg/Nm3)	Total Hg Spiked (µg/Nm3)	Hg Rem'l (%)
U1661	8.2	13.4	33.6	5.2	-150.8	1.3	46.6	28.2	45.3	39.5	9.5	60.0	61.8	50.5	-2.9
U1664	7.5	14.2	35.5	6.6	-150.4	1.2	46.6	20.5	45.5	55.9	8.7	60.8	56.0	52.1	7.9
U1667	7.1	12.0	26.9	4.9	-123.8	1.1	40.6	21.3	39.5	47.5	8.3	52.6	48.3	44.3	8.3
	7.6	13.2	32.0	5.6	-141.7	1.2	44.6	23.4	43.4	47.6	8.8	57.8	55.3	49.0	4.4
U1670	6.8	14.7	43.6	7.8	-197.5	0.9	49.4	23.0	48.4	53.4	7.8	64.0	66.6	56.3	-4.0
U1673	7.5	15.6	44.6	8.1	-186.5	1.1	53.9	17.5	52.8	67.5	8.5	69.4	62.1	60.9	10.6
U1676	7.3	13.3	42.8	6.0	-221.5	1.0	47.6	20.6	46.6	56.7	8.4	61.0	63.5	52.6	-4.1
	7.2	14.5	43.7	7.3	-201.8	1.0	50.3	20.4	49.3	59.2	8.2	64.8	64.0	56.6	0.8
U1679	8.2	15.1	55.2	6.9	-265.1	0.9	46.9	16.8	46.0	64.2	9.1	62.0	72.0	52.9	-16.1
U1682	8.6	16.2	54.8	7.6	-237.4	0.9	46.1	16.6	45.2	64.0	9.5	62.3	71.4	52.8	-14.6
U1685	8.3	13.9	55.7	5.5	-301.4	1.0	45.1	16.0	44.1	64.5	9.3	58.9	71.7	49.6	-21.7
	8.4	15.1	55.2	6.7	-268.0	0.9	46.0	16.5	45.1	64.2	9.3	61.1	71.7	51.8	-17.5
U1688	7.4	16.4	54.1	9.0	-229.7	0.9	45.6	9.5	44.7	79.1	8.3	62.0	63.6	53.7	-2.6
U1691	7.3	13.5	47.3	6.2	-251.2	1.0	43.9	8.6	42.9	80.5	8.2	57.4	55.9	49.1	2.6
U1694	7.4	12.9	44.1	5.5	-242.1	1.1	43.5	8.3	42.4	81.0	8.5	56.4	52.4	47.9	7.1
	7.3	14.3	48.5	6.9	-241.0	1.0	44.3	8.8	43.3	80.2	8.3	58.6	57.3	50.2	2.4
U1697	7.8	17.3	45.0	9.4	-160.5	1.0	36.7	2.5	35.7	93.2	8.8	53.9	47.5	45.1	11.9
U1700	8.1	16.8	44.5	8.8	-164.3	0.9	37.5	3.3	36.5	91.2	9.0	54.3	47.8	45.3	12.0
U1703	7.9	15.9	43.4	8.0	-173.7	1.0	37.2	3.5	36.2	90.5	8.9	53.1	46.9	44.2	11.5
	7.9	16.7	44.3	8.7	-166.2	1.0	37.1	3.1	36.1	91.6	8.9	53.8	47.4	44.9	11.8
U1706	7.5	16.3	39.2	8.8	-141.3	0.9	32.2	1.6	31.3	95.0	8.4	48.5	40.9	40.1	15.7
U1709	7.3	15.5	36.3	8.2	-133.7	0.9	31.1	2.3	30.2	92.6	8.2	46.6	38.6	38.4	17.3
U1712	7.0	14.5	35.3	7.5	-143.0	0.9	30.7	2.1	29.9	93.1	7.9	45.3	37.4	37.4	17.3
	7.3	15.4	36.9	8.2	-139.4	0.9	31.4	2.0	30.5	93.6	8.2	46.8	39.0	38.6	16.8
U1715	7.6	20.4	34.3	12.7	-68.3	0.9	40.8	4.7	39.9	88.4	8.5	61.1	39.0	52.7	36.2
U1718	8.0	20.3	39.5	12.3	-94.9	0.9	39.9	4.2	39.1	89.6	8.9	60.2	43.6	51.3	27.5
U1721	7.8	21.2	48.1	13.4	-126.8	0.9	42.7	4.5	41.7	89.4	8.7	63.9	52.7	55.2	17.6
	7.8	20.6	40.6	12.8	-96.7	0.9	41.1	4.5	40.2	89.1	8.7	61.7	45.1	53.0	27.1
U1724	9.2	22.6	37.0	13.4	-63.7	0.7	9.3	2.9	8.6	68.4	9.9	31.9	39.9	22.0	-25.3
U1727	9.3	22.1	14.6	12.8	33.7	0.7	15.5	4.0	14.8	73.9	9.9	37.6	18.7	27.7	50.3
U1730	8.8	20.4	9.1	11.6	55.4	0.7	20.3	2.8	19.7	86.4	9.5	40.7	11.9	31.3	70.9
	9.1	21.7	20.2	12.6	8.5	0.7	15.0	3.2	14.4	76.2	9.8	36.7	23.5	27.0	32.0
U1733	5.0	9.5	24.6	4.4	-159.5	1.0	38.5	17.1	37.5	55.7	6.1	48.0	41.6	41.9	13.3
U1736	6.1	10.7	27.4	4.6	-155.6	1.0	35.4	16.2	34.4	54.3	7.1	46.1	43.6	39.0	5.4
U1739	5.2	11.0	28.7	5.8	-161.8	0.9	37.8	16.5	36.8	56.3	6.2	48.8	45.2	42.6	7.2
	5.5	10.4	26.9	4.9	-159.0	1.0	37.2	16.6	36.3	55.4	6.4	47.6	43.5	41.2	8.7
U2	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
U5	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
U8	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####
	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####

ID	Spike Recovery			Oxidation/Removal				
	Actual	Spiked	Percent	Reduction	Increase	Overall	Overall	Removal
	Spiked	Theo Hg	Spike Rec	in KMnO4	in Tris			
	(ug/Nm3)	(ug/Nm3)	(%)	% Hg(0) Oxidized	% Hg(0) Oxidized	% Hg(0) Oxidized	% Hg(0) Adsorbed	of Total Mercury (%)
U1661	33.72	28.98	116.3	39.5	43.3	41.4	0.0	-2.9
U1664	36.54	28.98	126.1	55.9	45.7	50.8	0.0	7.9
U1667	35.17	28.98	121.4	47.5	36.7	42.1	0.0	8.3
	35.14		121.3	47.7	42.1	44.9	0.0	4.3
U1670	35.55	28.98	122.7	53.4	58.6	56.0	0.0	-4.0
U1673	38.27	28.98	132.0	67.5	53.9	60.7	0.0	10.6
U1676	34.55	28.98	119.2	56.7	61.9	59.3	0.0	-4.1
	36.12		124.6	59.5	58.0	58.7	0.0	1.2
U1679	33.57	28.98	115.9	64.2	85.4	74.8	0.0	-16.1
U1682	32.99	28.98	113.8	64.0	83.8	73.9	0.0	-14.6
U1685	33.70	28.98	116.3	64.5	92.9	78.7	0.0	-21.7
	33.42		115.3	64.2	87.3	75.8	0.0	-17.4
U1688	33.80	28.98	116.6	79.1	82.6	80.9	0.0	-2.6
U1691	34.41	28.98	118.7	80.5	77.1	78.8	0.0	2.6
U1694	33.57	28.98	115.9	81.0	71.8	76.4	0.0	7.1
	33.93		117.1	80.2	77.2	78.7	0.0	2.2
U1697	35.07	28.98	121.0	93.2	75.7	75.7	17.5	11.9
U1700	36.88	28.98	127.3	91.2	73.8	73.8	17.4	12.0
U1703	36.25	28.98	125.1	90.5	74.0	74.0	16.4	11.5
	36.07		124.4	91.6	74.5	74.5	17.1	11.8
U1706	32.26	28.98	111.3	95.0	71.3	71.3	23.6	15.7
U1709	32.42	28.98	111.9	92.6	66.7	66.7	25.9	17.3
U1712	32.65	28.98	112.7	93.1	67.7	67.7	25.4	17.3
	32.44		112.0	93.6	68.6	68.6	25.0	16.7
U1715	34.10	28.98	117.7	88.4	34.1	34.1	54.3	36.2
U1718	34.36	28.98	118.6	89.6	48.1	48.1	41.5	27.5
U1721	36.39	28.98	125.6	89.4	63.1	63.1	26.3	17.6
	34.95		120.6	89.1	48.6	48.6	40.5	27.0
U1724	15.79	28.98	54.5	68.4	155.3	155.3	-87.0	-25.3
U1727	19.88	28.98	68.6	73.9	-48.1	-48.1	122.0	50.3
U1730	22.47	28.98	77.5	86.4	-55.7	-55.7	142.1	70.9
	19.38		66.9	78.4	-9.7	-9.7	88.1	36.0
U1733	31.45	28.98	108.5	55.7	39.2	47.4	0.0	13.3
U1736	29.28	28.98	101.0	54.3	47.2	50.7	0.0	5.4
U1739	31.95	28.98	110.3	56.3	47.0	51.7	0.0	7.2
	30.89		106.6	55.5	44.4	49.9	0.0	8.7
U2	#VALUE!	28.98	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
U5	#VALUE!	28.98	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
U8	#VALUE!	28.98	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	#VALUE!		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

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