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ENVIRONMENTAL CONTROL TECHNOLOGY CENTER

REPORT TO THE STEERING COMMITTEE

June 1996

Approved Final Technical Report

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This report is a compilation of monthly progress reports by EPRI contractors (Radian International, Parsons Power) connected with the Environmental Control Technology Center (ECTC). This report is intended to provide timely information regarding the status of testing and research to the ECTC co-sponsoring organizations.

All data, results, and remarks contained in this report should be considered preliminary based on the information available to date. Any speculation or conclusions discussed in this report are subject to change as additional information becomes available.

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LIST OF COMMON ABBREVIATIONS

A-S-H.....	Allen Sherman Hoff
BES.....	Bulk Entrainment Separator
CRG.....	Clean Raw Gas
CLS.....	Clear Liquor Scrubbing
DBA.....	Di-Basic Acid
DRG.....	Dirty Raw Gas
ECTC.....	Environmental Control Technology Center
EDR.....	Electrodialysis Reversal Membrane Unit
ESP.....	Electrostatic Precipator
FF.....	Fabric Filter
FGD.....	Flue Gas Desulfurization
FLRT.....	First Loop Reaction Tank
FRP.....	Fiberglass Reinforced Plastic
G/C.....	Gilbert/Commonwealth Inc.
GEESI.....	General Electric Environmental Services Inc.
HME.....	Horizontal Mist Eliminator
HSSD.....	High Sulfur Spray Dryer
HYPAS.....	Hybrid Pollution Abatement System
ID.....	Induced Draft
L/G.....	Liquid to Gas Ratio, (gal/1000ft ³)
MFT.....	Master Fuel Trip
MRT.....	Main Reaction Tank
NTU.....	Number of Transfer Units
NYSEG.....	New York State Gas & Electric
O&M.....	Operations & Maintenance
PJFF.....	Pulse Jet Fabric Filter
RTD.....	Resistance Temperature Detector
RWST.....	Recycle Water Storage Tank
SCBA.....	Scott Air Packs
SDA.....	Spray Dry Absorber
UMIST.....	Univ. of Manchester Inst. of Science & Technology
VME.....	Vertical Mist Eliminator
VSD.....	Variable Speed Drive
WDPF.....	Westinghouse Distributed Process Control System

EXECUTIVE SUMMARY

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 Pollutant (HAP) test block was conducted using the 4.0 MW Spray Dryer Absorber System (SDA) and Pulse Jet Fabric Filter (PJFF) - Carbon Injection System. Investigations also continued across the B&W/CHX Heat Exchanger unit, while the 1.0 MW Selective Catalytic Reduction (SCR) unit remained idle this month in a cold-standby mode as monthly inspections were conducted.

Pilot Testing Highlights

Testing efforts in June were focused on the HAP test block and the Trace Elements Removal (TER) test block. Both programs were conducted on the 4.0 MW wet FGD pilot unit and PJFF unit. The HAP test block was temporarily concluded in June to further review the test data. This program began in March as part of the DOE Advanced Power Systems Program; the mission of this program is to accelerate the commercialization of affordable, high-efficiency, low-emission, coal-fueled electric generating technologies. The 1996 HAP test block focuses on three research areas, including:

- Catalytic oxidation of vapor-phase elemental mercury;
- Enhanced particulate-phase HAPs removal by electrostatic charging of liquid droplets; and
- Enhanced mercury removal by addition of additives to FGD process liquor.

The HAP test block was jointly funded by EPRI and DOE as a PRDA Project. By mid-June, PRDA funds were no longer being used to conduct this test block, and EPRI-base funds were used to continue the TER test block, which was stopped in March to begin the HAP test block. The TER test block is 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 TER test block is a continuation of the 1995 TER test block, and focuses on up to five research areas, including:

- 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.

As shown above, the research areas of the HAP and TER test blocks are very similar; therefore, TER testing, which was restarted in June, will not be differentiated from HAP testing.

SECTION I 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, and a test burn with an alternate fuel (Bushwood), 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. Safety videos were reviewed this month on topics involving heat exposure and personal protective equipment (PPE). 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 1487 as of 6/30/96. An ECTC luncheon was held on June 7, 1996 for all employees in recognition of this ongoing safety record and the completion of 4 years without a lost time accident.

The monthly safety meeting with the NYSEG Kintigh Station was held on June 20, 1996 with both NYSEG and ECTC representatives. The topics of discussion during this meeting included the current alternate fuels blending and cofiring activities, and a review of future safety training programs to be conducted at the Station.

CARBON INJECTION SYSTEM

The equivalent and actual availabilities for the ECTC Carbon Injection System testing this month were both 94% during this period. This system did not operate during the following periods this month:

- June 2-3 for 12 hours due to repairs to the ECTC Digital Control System (DCS) involving the WDPF DPU-1 RTD.
- June 12-13 for 32 hours due to the inspection and cleaning of the ESP.

The Hazardous Air Pollutants (HAP) test block continued this month with tests HAP-34; HAP-35; HAP-35R; HAP-36; HAP-36A; HAP-38; HAP-39; HAP-39A; HAP-39B; HAP-39C; HAP-39DN; HAP-39E; HAP-39F; HAP-39G; HAP-39H; HAP-39I; and HAP-39J. Mercury removal investigations were conducted during this test block as elemental mercury was injected at different locations throughout the ECTC flue gas path. Gas sampling was conducted at the PJFF inlet and outlet locations, the SDA inlet and outlet sample ports, or at locations along the Clean Raw Gas (CRG) ductwork. Tests HAP-37 and HAP-37A were conducted across gas sampling trains in the CRG ductwork as the new PJFF filter media (PTFE/fiberglass) was used as the filter in the sampling trains. Test HAP-39K involved a characterization of the

PJFF inlet and outlet gas streams for SO_3 concentrations. The operational parameters for the Carbon Injection System during this test block included: gas flows of 4,000 and 8,000 scfm; inlet SO_2 concentrations as received from the NYSEG combustion boiler flue gas; and PJFF outlet temperatures of 300°F.

The following maintenance work was completed on the Carbon Injection System during this performance period:

- The apparatus for mercury spiking was relocated and installed at various injection points.
- The ESP was inspected and the inlet plenum was cleaned. Minor problems were noted with "A" field and have been documented/scheduled for future repairs.

B&W/CHX HEAT EXCHANGER PROJECT

The Condensing Heat Exchanger (CHX) long-term operation/testing project for the DOE/PRDA program with B&W and CHX corp. continued this month. The CHX unit returned to normal operation this month following a brief troubleshooting exercise and repairs to the ECTC DCS which involved WDPF DPU-1 RTD. There were no inspections of the unit conducted by B&W or its representative this month.

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

- A timer board was replaced in DPU-1 for the control system.

MISCELLANEOUS

In a memorandum dated June 21, 1996, Air Purification Inc. (API) requested the use of the EPRI ECTC to perform verification testing related to their integrated air emissions control device, including the Rotorfilter™ model R-3000. From this request and earlier information from discussions with API, the ECTC will be identifying the technical approach, cost, and terms to conduct such a third-party test program at the Center. The primary objectives of this pilot-scale test program will be to demonstrate the performance of the Rotorfilter™ model R-3000, a condensing heat exchanger, and other related process equipment, and to quantify the removal efficiencies of this system for particulate matter (PM), SO_x , and NO_x from the ECTC flue gas. This testing is anticipated to occur for a one-month period beginning in mid-August 1996.

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

- Based upon the results from a system performance review, it was determined that all valves on the SO₂ vapor lines leading from the main SO₂ tank/vaporization skid will need replacement. The materials of construction to be specified for these new valves will be upgraded. As the new valves are received, they will be scheduled for installation during the next scheduled outage period (Aug. '96).
- A damage report was filed for Damper 27 (DMP 27) this month; this damper will be manually operated until the necessary repairs can be scheduled.
- The PJFF opacity monitor was repaired.
- A work platform was fabricated and installed in the ECTC process building to allow safe access to a CEM sample probe box.
- The outage/work list of activities necessary to install the Air Purification Inc. (API) Rotorfilter™ system for third-party testing in Aug. '96 was prepared and reviewed so that preliminary work can begin.
- Modifications to the sampling shed on the PJFF outlet elevation began to allow for the installation and testing of a new continuous mercury analyzer at this location.

FINANCIAL REPORT

The Financial Report for the four Operations and Maintenance contract tasks are summarized below for the month of June 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

Table i.

Monthly Operating Costs by Task

	June	Year to Date	Contract Total
Task 100	\$ 43,798	\$ 276,070	\$ 13,932,012
Task 200	\$ 11,744	\$ 72,000	\$ 8,043,299
Task 300	\$ 2,771	\$ 16,237	\$ 1,155,110
Task 400	\$ 267	\$ 2,830	\$ 53,031
TOTAL	\$ 58,580	\$ 367,137	\$ 23,183,452

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

Figure i.
1996 Operation & Maintenance Costs

SECTION II PILOT AND MINI-PILOT TEST ACTIVITY

PILOT

Testing in June at EPRI's Environmental Control Technology Center (ECTC) included tests from the Hazardous Air Pollutants (HAP) test block and the Trace Elements Removal (TER) test block. Both programs were conducted on the 4.0 MW wet FGD pilot unit and pulse jet fabric filter (PJFF). The HAP test block was temporarily concluded in June to further review the test data. This program began in March as part of the DOE Advanced Power Systems Program, whose mission is to accelerate the commercialization of affordable, high-efficiency, low-emission, coal-fueled electric generating technologies. The 1996 HAP test block focused on three research areas. These areas in order of priority included:

- Catalytic oxidation of vapor-phase elemental mercury;
- Enhanced particulate-phase HAPs removal by electrostatic charging of liquid droplets; and
- Enhanced mercury removal by addition of additives to FGD process liquor.

The HAP test block was jointly funded by EPRI and DOE as a PRDA project. By mid-June, PRDA funds were no longer being used to conduct this test block, and EPRI-base funds were used to continue the TER test block, which was stopped in March to begin the HAP test block. The TER test block is part of EPRI's overall base program to develop control technology options for the reduction of trace element emissions. This experimental program investigates mercury removal and mercury speciation under different operating conditions. The 1996 TER test block is a continuation of the 1995 TER test block and focuses on five research areas. These 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.

As shown above, the research areas of the HAP and TER test blocks are very similar; therefore, TER testing, which was restarted in June, will not be differentiated from HAP testing.

Tests in June continued to focus on catalytic oxidation of vapor-phase elemental mercury ¹. Tests included evaluation of baseline oxidation values across the new PTFE-coated, fiberglass PJFF bags. The PTFE-fiberglass material was also tested on Method 29T (M29T) filters at the CRG duct with and without flue gas conditioning. Two different gas rates (4000 scfm and 8000 scfm) were evaluated with fine Kintigh fly ash on the pulse jet bags. Catalyst CT-9 (a carbon-based catalyst) was also tested continuously for ten days.

Summary of Operations

A detailed summary of operations for June is presented in Table 1. A simplified flow diagram of the ESP/SDA/PJFF gas path used during June's PJFF testing is shown in Figure 1. As mentioned in previous reports, almost all of the flue gas particulate was removed in the ESP before the flue gas was drawn through the SDA/PJFF and discharged to the TGR. During the PJFF 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. Use of these injection and sampling locations minimizes the gas residence time in the duct. When testing with M29T filters at the CRG duct, elemental mercury was spiked at the ESP fan inlet, and two M29T gas sampling trains were run side-by-side at the CRG duct. Catalyst was placed on the filter of one train while a blank filter was used in the other train to give pre-catalyst mercury values.

At the end of May, new PJFF bags were installed to replace the failed acrylic bags. As discussed in previous reports, two different sets of acrylic bags quickly failed under the conditions tested. These failures are believed to be caused by SO₃ condensation. The new bags consist of polytetrafluoroethylene (PTFE) coated on fiberglass. These bags should be more chemical resistant than the acrylic bags. After installing the bags, they were conditioned with "dirty" flue gas (i.e., no particulate removed by the ESP) for about 2 days with pulse cleaning initiated at 6 inches pressure drop across the bags.

After conditioning the new PTFE bags, baseline tests were conducted at 4000 scfm and 8000 scfm (HAP-34 through HAP-36). During these tests, the bags were initially pulsed clean to determine the amount of elemental mercury oxidized across the "clean" PTFE bags. The small amount of fly ash passing through the ESP to the PJFF was then allowed to accumulate on the bags to determine the effect of this fly ash on the baseline oxidation. At the conclusion of these baseline and fine fly ash

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.

accumulation tests, the ESP had to be repaired because of sparking in one field. During this downtime, the new PTFE bag material was tested for mercury oxidation in the CRG duct on a Method 29T filter.

After fixing the ESP, the baseline test was repeated at 8000 scfm (HAP-38). However, at this time, the amount of elemental mercury spiked in the duct was much larger than the desired value. During tests HAP-38 through HAP-39C, the spiked elemental mercury concentration exceeded $120 \mu\text{g}/\text{Nm}^3$. The cause of the high injection rate is not known; however, mercury contamination in the nitrogen sweep stream of the injector is suspected to be the cause. The problem was resolved by replacing all mercury injection lines and using the spare injector.

At the end of the month, the flue gas SO_3 and SO_2 concentrations were measured at the PJFF inlet and outlet. These measurements were taken to determine if catalyst CT-9 was oxidizing SO_2 to SO_3 in the PJFF. Flue gas SO_3 was captured in isopropyl alcohol impingers, and SO_2 was captured in nitric acid/peroxide impingers. Both types of impinger solutions were analyzed for liquid SO_4^{2-} using ion chromatography.

Summary of Results

Results obtained from June 4 through June 28 are discussed below. Test conditions and results during this time are summarized in Table 2. Complete analytical data tables and process data summary reports for the tests completed in June 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 a 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. In the second mechanism, the elemental mercury is oxidized, but the oxidized form remains adsorbed to the PJFF solids. Finally, adsorbed elemental mercury may remain on the PJFF solids without changing chemical form.

Reduction of elemental mercury across the PJFF by the first mechanism is indicated by a mercury concentration increase between the outlet and inlet Tris impingers. If the increase in the Tris impinger concentrations is equal to the decrease in KMnO_4 impinger concentrations, all of the elemental mercury is oxidized and released into the flue gas. Evidence of the second and third mechanisms is indicated by a total mercury removal across the PJFF of greater than about 10%. In this case, the increase in the Tris impinger concentrations will not be equal to the decrease in KMnO_4 impinger concentrations. If the total mercury outlet concentration is lower than the inlet concentration, this difference can be attributed to adsorption of either naturally-occurring oxidized mercury, elemental mercury, and/or elemental

mercury that has been oxidized; however, the actual mercury form that adsorbs can not be determined at this time.

For the purpose 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. 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.

Effect of Flue Gas Flow Rate

Tests HAP-34 through HAP-36 and HAP-38 evaluated the effect of flue gas flow rate on the removal and oxidation of elemental mercury across the PTFE bags both with and without fine Kintigh fly ash. The initial baseline tests were conducted by thoroughly pulse-cleaning the PJFF bags before sampling. After conducting a "clean" baseline test, fly ash escaping the ESP was allowed to continuously accumulate on the bags by not pulse cleaning the bags. Accumulation of fly ash was indicated by a daily increase in the PJFF pressure drop.

Figure 2 illustrates the percent reduction in elemental mercury concentration across the PJFF, the percent of inlet elemental mercury oxidized across the PJFF, and the total mercury removal across the PJFF as a function of operating time at both gas rates. The represents the baseline data in which the PTFE bags were thoroughly cleaned. Data on subsequent days were collected after fly ash had accumulated on the bags. Due to problems with the ESP, fly ash was only accumulated for one day at 8000 scfm.

As shown in Figure 2, an average of 65% of the inlet elemental mercury was removed across the PJFF at 4000 scfm. After the first day of operation, about 45% of the elemental mercury was oxidized based on the increase in Tris impinger concentrations. These values of elemental mercury removal and oxidation were thought to be too high for baseline values so the gas rate was increased. The flue gas flow rate determines the gas residence time and therefore the gas-catalyst contact time in the PJFF. Previous ECTC data indicate that elemental mercury removal/oxidation decreases as the residence time decreases.

Figure 2 indicates that increasing the gas rate from 4000 scfm to 8000 scfm decreased the total elemental mercury removal from about 53% to 36% at baseline conditions and from 83% to 53% after accumulating fly ash for one day. Surprisingly, increasing the gas rate did not have a statistically significant effect on elemental mercury oxidation. At baseline conditions, elemental mercury oxidation was 16% at 4000 scfm compared to about 28% at 8000 scfm. After accumulating fly ash for one day, mercury oxidation increased to 45% at 4000 scfm and to 38% at 8000 scfm. An explanation for the low oxidation at baseline conditions at 4000 scfm is not available.

At 8000 scfm, oxidation was measured at baseline conditions twice. During the second baseline test (HAP-38), the elemental mercury concentration spiked into the flue gas was $178 \mu\text{g}/\text{Nm}^3$. Despite this huge increase in elemental mercury, the percentage of elemental mercury removed and oxidized across the PJFF did not change significantly. This result suggests that the rate limiting step in the removal and oxidation of elemental mercury is not dependent on the elemental mercury concentration.

At both 4000 scfm and 8000 scfm, the total removal of mercury across the PJFF was generally 10% or higher. At 4000 scfm, removal was greater than 20% during the first two days of operation. These data suggest that mercury is continuously adsorbed by the fly ash that accumulates on the PTFE bags. Since the fly ash and naturally occurring mercury should be at steady-state due to the relatively long contact time before entering the PJFF, adsorption of mercury probably results from the increase in mercury concentration due to mercury injection.

Effect of PTFE Material on Elemental Mercury Oxidation

To determine the effect of the new PTFE material on elemental mercury oxidation, some of the PTFE bag material was placed on a filter in a M29T gas sampling train at the CRG duct. The filter and duct were maintained at 300°F . A blank filter train was run simultaneously to determine mercury speciation in the duct upstream of the bag material. The PTFE material was first tested with essentially no exposure to flue gas, and then it was tested again after being exposed overnight to flue gas containing fly ash.

Elemental mercury oxidation across the PTFE material as a function of cumulative dry gas volume is shown in Figure 3. Although the new PTFE material initially oxidized about 7% of the elemental mercury, oxidation dropped to zero after a short time of flue gas exposure. After conditioning the material with flue gas containing fly ash, oxidation remained at zero. This result was surprising given the relatively large oxidation values across the PJFF. The most likely reason for the difference between PJFF oxidation and the M29T results is the difference in contact time between the flue gas and the conditioned material. In the PJFF at 8000 scfm, the gas velocity across the bags is about 8 ft/min. In the M29T filter, the velocity is about 30 ft/min. This difference in contact velocity could significantly affect oxidation.

Effect of CT-9 Catalyst on Oxidation and Removal of Hg^0

In June, catalyst CT-9 (a carbon-based catalyst) was coated on the PJFF bags to determine its ability to oxidize mercury. Twenty pounds of the catalyst was introduced to the PJFF downstream of the ESP to ensure that a minimal amount of fly ash would be present with the catalyst on the bags. The PJFF was then operated continuously for ten days with no pulse-cleaning, and samples were taken each day to determine elemental mercury oxidation and removal. As described earlier, the elemental mercury concentration spiked into the duct exceeded $120 \mu\text{g}/\text{Nm}^3$ during the first three days of operation. On the fourth day, no elemental mercury was

injected into the duct while the mercury injector was replaced with a spare unit. Figure 4 illustrates the results from the long-term oxidation test with CT-9 on the bags.

In Figure 4, data at day zero is baseline data (i.e., "clean" bags with no catalyst), and the PJFF pressure drop was about 2.2 inches of water. After adding the carbon, the pressure drop increased to 6.1 inches of water. As small amounts of fly ash accumulated on the bags, the pressure drop increased 0.1-0.2 inches per day until Day 6. From Day 6 through Day 10, the pressure drop stayed constant at 6.9 inches of water (see Table 2). The ESP continued to operate normally during this period so a significant decrease in the PJFF inlet fly ash loading is not expected. In addition, the PJFF outlet opacity did not increase which might suggest a bag leak. Therefore, an explanation for the constant pressure drop is not available. The PJFF may have to be tested for bag leaks in July.

After the CT-9 catalyst was introduced, elemental mercury removal increased from about 36% with "clean" bags to over 90%. Elemental mercury oxidation increased from about 28% to 45% over the first day of operation and from 45% to 75% over the second day. During the baseline, fly ash accumulation test at 8000 scfm, total elemental mercury removal increased from about 36% to 53% after one day, and elemental mercury oxidation increased from 28% to 38%. Both elemental mercury removal and oxidation appear to increase over the baseline values after adding catalyst CT-9 to the PJFF. During the last eight days of operation, both elemental mercury removal and oxidation remained relatively constant despite changing the inlet elemental mercury concentration from about $140 \mu\text{g}/\text{Nm}^3$ to $40 \mu\text{g}/\text{Nm}^3$. These data again suggest that elemental mercury removal and oxidation are independent of the elemental mercury concentration.

Throughout the ten day test, total mercury removal across the PJFF averaged about 10%. During the first day of operation, total removal was 34% which is attributed to a high degree of adsorption onto the newly exposed catalyst. As discussed above, the relatively consistent removal of 10% again suggests that some mercury continuously adsorbs to the fly ash that accumulates on the PJFF bags.

SO₂ Oxidation Testing

With catalyst CT-9 on the PJFF bags, the SO₃ concentration was measured at the PJFF inlet and outlet to determine if CT-9 oxidized any SO₂ to SO₃. The SO₂ concentration was also measured. Table 3 summarizes the results of these measurements. The outlet SO₃ concentration appears to be lower than the inlet concentration which indicates that SO₂ is not oxidized across catalyst CT-9. The SO₂ concentration also decreased slightly across the PJFF. This result was somewhat surprising since SO₂ should not be removed across the PJFF. During these tests, the outlet O₂ concentration, as measured by the CEMs, was lower than the inlet O₂ concentration; therefore, the outlet and inlet SO₃ and SO₂ measurements could not be corrected to the same O₂ concentration. In actuality, the outlet O₂ concentration is probably higher than the inlet due to inleakage, and correcting for O₂ would increase the

outlet SO_3 and SO_2 concentrations which would decrease both the SO_3 and SO_2 removal efficiencies.

The inlet SO_2 concentration was measured to be about 2100 ppm; however, the inlet CEM indicated a concentration of about 1300 ppm. This difference is larger than expected based on the expected error in the manual and CEM measurements. This discrepancy is currently being investigated, and some SO_2 measurements may be repeated in July.

Future Tests

The TER test block will continue in July by testing the effect of different catalyst types on elemental mercury oxidation.

Table 1. June Process Operating Conditions Summary

Date	Test ID#	Gas Sampling Summary	Process Summary
Sat., 6/1			PJFF running with ΔP initiate pulse cleaning set at 6.0 in. H_2O . This results in 3 pulses per hour.
Sun., 6/2			Facility outage to repair DPU-1. PJFF back online by 03:00 Monday.
Mon., 6/3		Gas sampling equipment moved to PJFF inlet and outlet and SDA inlet.	Started pulse-cleaning for 10 min on the hour. The ΔP dropped from 5.6 to 0.83 in eight hours. Resealed PJFF doors because of excessive inleakage.
Tue., 6/4	HAP-34 Baseline 4000 scfm 300F PJFF outlet. 33.07 $\mu g/Nm^3$ Hg ⁰ spike	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). Probe at PJFF outlet shorted out. Baseline sampling with PTFE/fiberglass PJFF bags that were conditioned with fly ash from dirty raw gas for two days.	
Wed., 6/5	HAP-35 Fine Fly Ash 4000 scfm 290F PJFF outlet. 33.07 $\mu g/Nm^3$ Hg ⁰ spike.	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). No pulsing during gas sampling.	Fly ash accumulation since yesterday afternoon. ΔP increased from 0.90 at 15:00 yesterday to 1.19 (hourly avg) at 08:00 this morning. PJFF outlet temp. at 290°F because of restraints on ESP inlet temp. (275-285°F) for better particulate removal.
Thurs., 6/6	HAP-35R Fine Fly Ash 4000 scfm 300F PJFF outlet. 33.07 $\mu g/Nm^3$ Hg ⁰ spike.	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). No pulsing during gas sampling.	Repeat of fine fly ash accumulation test. Able to get to 300°F at PJFF outlet by increasing temp. limit setpoint at SDA heater and adjusting ESP setpoints to run at higher inlet temp (285-295°F). ΔP increased from 0.89 at 15:00 6/5 to 0.98 at 08:00 hourly avg. 6/6.
Fri., 6/7	HAP-36 Baseline 8000 scfm 300F PJFF outlet. 30.49 $\mu g/Nm^3$ Hg ⁰ spike.	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). Pulsing for 5 min. before each gas sampling run.	Pulse cleaning for 10 min on the hour starting 17:00 6/6 until 07:00 6/7. Recording PJFF outlet CEM values on cabinet #5 (WS inlet) to do maintenance/inspect on CEM cabinet #10.

Table 1. June Process Operating Conditions Summary (cont.)

Date	Test ID#	Gas Sampling Summary	Process Summary
Sat. - Sun. 6/8 - 6/9			Fine fly ash accumulation. The PJFF ΔP increased from 2.7 at 17:00 on 6/7 to 4.2 in. H_2O at 08:00 on 6/10.
Mon., 6/10	HAP-36A Fine Fly Ash 8000 scfm 300F PJFF outlet. 30.49 $\mu g/Nm^3$ Hg^0 spike.	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). Pulsing for 5 min. before each gas sampling run.	PJFF ΔP increased from 4.18 to 4.23 over three run's test time. ESP "A" field arcing - needed to decrease current to field.
Tue., 6/11	HAP-37 CRG Duct 9500 scfm, 300 F. 29.06 $\mu g/Nm^3$ Hg^0 spike.	Mercury injector at ESP fan inlet. Four Gas sampling runs at the CRG duct with two side-by-side trains. One as baseline and the other with 46 cm^2 piece of new PTFE/fiberglass PJFF bag material placed in M29T filter. Sampling with nozzles co-current to flue gas flow.	CRG temp. maintained at 300°F. After sampling, nozzle of sampling train with bag material was turned counter-current to flue gas flow for overnight conditioning with fly ash.
Wed., 6/12	HAP-37A CRG Duct 9500 scfm, 300 F. 29.06 $\mu g/Nm^3$ Hg^0 spike.	Mercury injector at ESP fan inlet. Four Gas sampling runs at the CRG duct with two side-by-side trains. One as baseline and the other with 46 cm^2 piece of "conditioned" PTFE/fiberglass PJFF bag material placed in M29T filter. Sampling with nozzles counter-current to flue gas flow.	Facility taken down after sampling to inspect/repair ESP because of sparking on "A" field.
Thurs., 6/13		Facility down to clean ESP inlet plenum and insulators in hot deck as well as inspection to determine cause of sparking on A field.	PJFF back online at 23:00. Last scheduled day of NYSEG bushwood test burn (first day was 5/16/96, though not burned every day since), but there should be enough bushwood to burn into tomorrow.
Fri., 6/14	HAP-38 Baseline 8000 scfm 300F PJFF outlet. 30.49 $\mu g/Nm^3$ Hg^0 spike setpoint.	Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). Pulsing for 5 min. on the hour until testing then 5 min. before each gas sampling run.	5 min pulsing on the hour started after sampling completed. Repair needed to PJFF inlet CEM probe filter. O_2 values were reading 20%. 128 $\mu g/Nm^3$ was spiked.

Table 1. June Process Operating Conditions Summary (cont.)

Date	Test ID#	Gas Sampling Summary	Process Summary
Sat. - Sun. 6/15 - 6/16			5 min pulsing on the hour until Sun. at 18:00. At this time 20 lbs. of catalyst CT-9 was deposited on PJFF bags. ΔP increased from 2.3 to 5.6 in. H ₂ O.
Mon., 6/17	HAP-39A CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spike setpoint.	Day 1 with catalyst CT-9. Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	No pulsing during the testing with catalyst candidate CT-9 on the PJFF bags. ΔP was 6.06 in. H ₂ O at 08:00 hourly average. 104 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spiked.
Tue., 6/18	HAP-39B CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spike setpoint.	Day 2 with catalyst CT-9. Mercury injector at SDA outlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.30 in. H ₂ O at 08:00 hourly average. 108 $\mu\text{g}/\text{Nm}^3$ Hg(0) spiked.
Wed., 6/19	HAP-39C CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spike setpoint.	High Hg ⁰ concentrations at the PJFF inlet continued since Friday. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). Hot box temperature and N ₂ rotameter flows checked and found to be accurate. First Tris impinger pH was 3.26 and 4.15 for Run 2 at PJFF inlet and outlet respectively.	PJFF ΔP was 6.46 in. H ₂ O at 08:00 hourly average. Run 2 sampled for longer time due to thunderstorms. 93 and 100 dscf sampled at PJFF inlet and outlet respectively. 90 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spiked.
Thurs., 6/20	HAP-39DN CT-9 8000 scfm 300F PJFF outlet. No Hg ⁰ spike.	No elemental mercury spiking. Gas sampling at the PJFF inlet and outlet. The mercury injector was taken apart, cleaned, and inspected. No mercury leaks were found. The spare mercury injector was put into service after today's sampling.	PJFF ΔP was 6.66 in. H ₂ O at 08:00 hourly average. Plastic tubing for nitrogen supply to mercury injector replaced with new tubing.
Fri., 6/21	HAP-39E CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spike setpoint.	Mercury concentrations back to previous (lower) values at the PJFF inlet. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.67 in. H ₂ O at 08:00 hourly average. 36 $\mu\text{g}/\text{Nm}^3$ Hg ⁰ spiked.
Sat. - Sun. 6/22 - 6/23			No pulsing over the weekend. The PJFF ΔP was 6.76 and 6.81 in. H ₂ O Sat. and Sun. respectively at the 08:00 hourly average.

Table 1. June Process Operating Conditions Summary (cont.)

Date	Test ID#	Gas Sampling Summary	Process Summary
Mon., 6/24	HAP-39F CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg^0 spike setpoint.	Seventh day after carbon was deposited onto the PJFF bags. Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.88 in. H_2O at 08:00 hourly average. 33 $\mu\text{g}/\text{Nm}^3$ Hg^0 spiked.
Tue., 6/25	HAP-39G CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg^0 spike setpoint.	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.91 in. H_2O at 08:00 hourly average. Scaffold complete so the PJFF outlet CEM can be inspected. 33 $\mu\text{g}/\text{Nm}^3$ Hg^0 spiked.
Wed., 6/26	HAP-39H CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg^0 spike setpoint.	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.9 in. H_2O at 08:00 hourly average. 30 $\mu\text{g}/\text{Nm}^3$ Hg^0 spiked.
Thur., 6/27	HAP-39I CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg^0 spike setpoint.	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.86 in. H_2O at 08:00 hourly average. 30 $\mu\text{g}/\text{Nm}^3$ Hg^0 spiked.
Fri., 6/28	HAP-39J CT-9 8000 scfm 300F PJFF outlet. 30.49 $\mu\text{g}/\text{Nm}^3$ Hg^0 spike setpoint. HAP-39K Sulfite test	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). After mercury sampling, ran three trains at the PJFF inlet and outlet to sample for sulfite. Used IPA in the first two impingers and peroxide/nitric in the third and fourth impingers. No ambient air was pulled through the impingers in run #1.	PJFF ΔP was 6.87 in. H_2O at 08:00 hourly average. 26 $\mu\text{g}/\text{Nm}^3$ Hg^0 spiked. During sulfite sampling, liquid level in impinger #4 increased during run #1. The sampling rate was decreased from 1 cfm to 0.5 cfm for runs 2 and 3.
Sat-Sun 6/29-6/30			Dirty raw gas to the PJFF after sampling on Friday (6/28) until Sunday (6/30) at 17:00 when switched to clean raw gas, Pulsing with ΔP initiate at 6.0 in. H_2O while on DRG and pulsing 10 min. on the hour with clean raw gas.

Table 2. HAP Test Conditions and Results

Test ID	Test Description	Spike Location	Post-Catalyst Sample Location	Spike Res. Time (sec.)	Gas Flow (scfm)	PJFF)P ("H ₂ O)	Catalyst Conditions Temp. (EF) ^a	Mass (lbs)	Flue Gas Mercury Concentrations (g/Nm ³)						Hg(0) Spike	Reduction in KMnO ₄ % Hg(0) Removed	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	% Rem. of Total Hg
									Prespike	Catalyst Inlet (Postspike)	Tris	KMnO ₄	Catalyst Outlet (Post Catalyst)	Tris	KMnO ₄					
HAP-34	Baseline with PTFE/fiberglass PJFF bags	SDA Outlet	PJFF Outlet	24	4000	0.8	300	-	6.89	0.71	17.26	27.99	21.87	13.16	37.65	53%	16%	16%	37%	23%
HAP-35	Fine fly ash accumulation	SDA Outlet	PJFF Outlet	24	4000	1.2	290	-	8.68	0.6	17.88	31.25	32.15	5.24	39.85	83%	46%	46%	38%	24%
HAP-35R	Fine fly ash accumulation	SDA Outlet	PJFF Outlet	24	4000	1.0	300	-	7.36	0.67	16.38	25.06	27.58	9.65	33.41	61%	45%	45%	17%	10%
HAP-36	Baseline with PTFE/fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	2.2	300	-	5.34	1.4	10.53	32.50	19.61	21.18	36.29	35%	28%	31%	0%	5%
HAP-36A	Fine fly ash accumulation	SDA Outlet	PJFF Outlet	12	8000	4.2	300	-	6.03	0.9	10.31	35.04	23.74	16.49	38.42	53%	38%	38%	15%	11%
HAP-37	New PTFE/fiberglass on M29T filter at CRG	ESP Fan Inlet	CRG Duct	NA	9500	NA	300	-	-	-	8.09	19.36	8.97	18.62	-	4%	5%	4%	0%	-1%
HAP-37A	Conditioned PTFE/fiberglass on M29T filter at CRG	ESP Fan Inlet	CRG Duct	NA	9500	NA	300	-	-	-	8.85	20.21	10.06	22.59	-	-12%	6%	-3%	0%	-12%
HAP-38	Baseline with PTFE/fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	2.3	300	-	5.97	1.49	29.08	156.58	68.06	98.15	178.20	37%	25%	25%	12%	10%

Mercury concentrations and spike values are normalized to 5% O₂. a=PJFF tests or filter temp. when testing with M29 filters.

Table 2. HAP Test Conditions and Results (cont.)

Test ID	Test Description	Spike Location	Post-Catalyst Sample Location	Spike Res. Time (sec.)	Gas Flow (scfm)	PJFF)P ("H ₂ O)	Catalyst Conditions Temp. (EF) ^a Mass (lbs)		Flue Gas Mercury Concentrations (:g/Nm3)						Hg(0) Spike	Reduction in KMnO4 % Hg(0) Removed	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	% Rem. of Total Hg
									Prespike		Catalyst Inlet (Postspike)		Catalyst Outlet (Post Catalyst)							
									Tris	KMnO4	Tris	KMnO4	Tris	KMnO4						
HAP-39A	Catalyst CT-9 on PTFE/fiberglass bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	6.1	300	20	8.06	0.95	41.02	109.22	91.14	7.88	141.23	93%	46%	46%	47%	34%
HAP-39B	Catalyst CT-9 on PTFE/fiberglass bags. Day 2	SDA Outlet	PJFF Outlet	12	8000	6.3	300	20	5.82	0.92	38.32	121.41	133.11	6.64	152.99	95%	78%	78%	16%	13%
HAP-39C	Catalyst CT-9 on PTFE/fiberglass bags. Day 3	SDA Outlet	PJFF Outlet	12	8000	6.5	300	20	6.76	1.09	22.08	105.72	114.93	22.00	119.95	79%	88%	84%	0%	-7%
HAP-39D	Catalyst CT-9 on PTFE/fiberglass bags. Day 4	SDA Outlet	PJFF Outlet	12	8000	6.6	300	20	-	-	8.46	0.65	6.30	0.37	-	-	-	-	-	
HAP-39E	Catalyst CT-9 on PTFE/fiberglass bags. Day 5	SDA Outlet	PJFF Outlet	12	8000	6.7	300	20	8.09	0.9	14.06	41.08	45.72	2.11	46.15	95%	77%	77%	18%	13%
HAP-39F	Catalyst CT-9 on PTFE/fiberglass bags. Day 6	SDA Outlet	PJFF Outlet	12	8000	6.9	300	20	8.03	1.24	14.06	39.96	44.98	3.38	44.75	92%	77%	77%	14%	10%
HAP-39G	Catalyst CT-9 on PTFE/fiberglass bags. Day 7	SDA Outlet	PJFF Outlet	12	8000	6.9	300	20	10.92	1.52	16.36	36.79	42.36	3.01	40.71	92%	71%	71%	21%	15%
HAP-39H	Catalyst CT-9 on PTFE/fiberglass bags. Day 8	SDA Outlet	PJFF Outlet	12	8000	6.9	300	20	5.86	0.98	11.81	35.52	37.16	3.51	40.49	90%	71%	71%	19%	14%
HAP-39I	Catalyst CT-9 on PTFE/fiberglass bags. Day 9	SDA Outlet	PJFF Outlet	12	8000	6.9	300	20	8.18	0.9	13.37	36.95	41.45	3.81	41.24	90%	76%	76%	14%	10%
HAP-39J	Catalyst CT-9 on PTFE/fiberglass bags. Day 10	SDA Outlet	PJFF Outlet	12	8000	6.9	300	20	7.81	1.11	12.93	30.55	37.44	3.13	34.56	90%	80%	85%	0%	7%

Mercury concentrations and spike values are normalized to 5% O₂. a=PJFF tests or filter temp. when testing with M29 filters.

Table 3. SO₃ and SO₂ Analyses Across the PJFF with Catalyst CT-9 on the PJFF Bags

Sample ID	Test ID#	Date	Gas Volume (dscf)	Sample Wt.		Sulfate Analysis		SO ₃ (ppm, dry)	SO ₂ (ppm, dry)	%Reduction SO ₃	%Reduction SO ₂
				IPA/H ₂ O (grams)	H ₂ O ₂ /HNO ₃ (grams)	Isopropyl Alcohol mMolar	(H ₂ O ₂ /HNO ₃) mMolar			Across PJFF	Across PJFF
PJFF In	HAP-39K	28-Jun	57.112	366.6	485.7	4.71	284.00	25.29	2021		
PJFF Out	HAP-39K	28-Jun	64.206	364.5	502.6	4.53	270.00	21.51	1768	14.9	12.5
PJFF In	HAP-39K	28-Jun	52.944	374.5	495.0	1.56	272.25	9.23	2129		
PJFF Out	HAP-39K	28-Jun	48.589	365.4	462.9	1.12	245.00	7.05	1953	23.7	8.3
PJFF In	HAP-39K	28-Jun	48.575	417.5	438.2	1.02	284.50	7.33	2147		
PJFF Out	HAP-39K	28-Jun	48.812	390.8	466.0	0.95	239.50	6.35	1913	13.4	10.9

Average	17.3	10.6
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Figure 1. Simplified Flow Diagram for Pilot Plant Elemental Mercury Oxidation Testing

Figure 2. Effect of Gas Rate and Fly Ash Accumulation on Mercury Removal and Oxidation Across the PTFE Bags

Figure 3. Oxidation of Hg^0 Across PTFE/fiberglass PJFF Bag Material on Filter of M29T Gas Sampling Train.

Figure 4. Effect of Time on Elemental Mercury Removal and Oxidation with Catalyst CT-9 the PJFF Bags

APPENDIX A
TEST SCHEDULES

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

June 1996 (Updated July 3, 1996)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						¹ Haz Air Pollutants
² Haz Air Pollutants	³ Haz Air Pollutants New PTFE/fiberglass PJFF Bags	⁴ Haz Air Pollutants HAP-34 Baseline 4000 scfm 300F PJFF Outlet	⁵ Haz Air Pollutants HAP-35 Fine Fly Ash 4000 scfm 300F PJFF Outlet	⁶ Haz Air Pollutants HAP-35R Fine Fly Ash 4000 scfm 300F PJFF Outlet	⁷ Haz Air Pollutants HAP-36 Baseline 8000 scfm 300F PJFF Outlet	⁸ Haz Air Pollutants
⁹ Haz Air Pollutants	¹⁰ Haz Air Pollutants HAP-36A Fine Fly Ash Accumulation 8000 scfm, 300°F	¹¹ Haz Air Pollutants HAP-37 PTFE/fiberglass at CRG Duct 300°F	¹² Haz Air Pollutants HAP-37A PTFE/fiberglass at CRG Duct 300°F	¹³ Haz Air Pollutants Facility Down to Repair A Field Sparking	¹⁴ Haz Air Pollutants HAP-38 Baseline 8000 scfm 300F PJFF Outlet	¹⁵ Haz Air Pollutants
¹⁶ Haz Air Pollutants Deposition of Catalyst CT-9	¹⁷ Haz Air Pollutants HAP-39A Day 1 of Catalyst CT-9	¹⁸ Haz Air Pollutants HAP-39B Day 2 of Catalyst CT-9	¹⁹ Haz Air Pollutants HAP-39C Day 3 of Catalyst CT-9	²⁰ Haz Air Pollutants HAP-39DN Day 4 of Catalyst CT-9	²¹ Haz Air Pollutants HAP-39E Day 5 of Catalyst CT-9	²² Haz Air Pollutants
²³ Haz Air Pollutants	²⁴ Haz Air Pollutants HAP-39F Day 6 of Catalyst CT-9	²⁵ Haz Air Pollutants HAP-39G Day 7 of Catalyst CT-9	²⁶ Haz Air Pollutants HAP-39H Day 8 of Catalyst CT-9	²⁷ Haz Air Pollutants HAP-39I Day 9 of Catalyst CT-9	²⁸ Haz Air Pollutants HAP-39J HAP-39K Day 10 of Catalyst CT-9 Sulfite Testing	²⁹ Haz Air Pollutants
³⁰ Haz Air Pollutants						

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

July 1996 (Updated July 11, 1996)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	¹ Haz Air Pollutants HAP-40 Baseline 8000 scfm, 300F PJFF Outlet	² Haz Air Pollutants HAP-40R Repeat Baseline 8000 scfm, 300F PJFF Outlet	³ Haz Air Pollutants HAP-41A 10 lbs of Carbon 8000 scfm, 300F PJFF Outlet	⁴ Haz Air Pollutants	⁵ Haz Air Pollutants	⁶ Haz Air Pollutants
⁷ Haz Air Pollutants	⁸ Haz Air Pollutants	⁹ Haz Air Pollutants HAP-34	¹⁰ Haz Air Pollutants HAP-35	¹¹ Haz Air Pollutants HAP-35R	¹² Haz Air Pollutants HAP-36	¹³ Haz Air Pollutants
¹⁴ Haz Air Pollutants	¹⁵ Haz Air Pollutants HAP-36A Fine Fly Ash Accumulation 8000 scfm, 300°F	¹⁶ Haz Air Pollutants HAP-37	¹⁷ Haz Air Pollutants HAP-37A	¹⁸ Haz Air Pollutants	¹⁹ Haz Air Pollutants HAP-38	²⁰ Haz Air Pollutants
²¹ Haz Air Pollutants Deposition of Catalyst CT-9	²² Haz Air Pollutants HAP-39A Day 1 of Catalyst CT-9	²³ Haz Air Pollutants HAP-39B	²⁴ Haz Air Pollutants HAP-39C	²⁵ Haz Air Pollutants HAP-39DN	²⁶ Haz Air Pollutants HAP-39E	²⁷ Haz Air Pollutants
²⁸ Haz Air Pollutants	²⁹ Haz Air Pollutants HAP-39F	³⁰ Haz Air Pollutants HAP-39G	³¹ Haz Air Pollutants HAP-39H			

PILOT

MINI-PILOT

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

PILOT

MINI-PILOT

1 9 9 6											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
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 Wet FGD Toxics Testing	Carbon injection	DOE/PRDA Phase I - Clear Liquor Scrubbing (CLS) with Anhydrite Production	
UNIT DOWN		DOE/PRDA Phase I - Multiple Pollutant Removal Using the Condensing Heat Exchanger (CHX)									

PILOT w/
DOE PRDA
Phase II →

PILOT w/ o
DOE PRDA
Phase II →

MINI-PILOT
w/o DOE
PRDA Phase II →

1 9 9 7 (Tentative Schedule)											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DOE/PRDA Phase II - Mercury and HAPs Control by Modifications to Wet FGD Processes						DOE/PRDA Phase II - Clear Liquor Scrubbing (CLS) with Anhydrite Production					
CLS Phase I	EPRI Wet FGD Toxics Testing				High Velocity FGD Testing				Advanced FGD Processes (CLS)		
DOE/PRDA Phase I - Condensing Heat Exchanger (CHX) Testing			Unit Available for Testing								

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

APPENDIX B

PILOT TESTING PROCESS SUMMARY REPORTS

HAP-34 Process Summary Report
06/04/96 10:00:00 to 06/04/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	3991	3994	3989	2	3
Facility Inlet SO2 Conc. (ppm)	1198	1239	1177	29	3
Facility Outlet SO2 Conc	911	933	888	19	3
SDA Inlet SO2 Conc. (ppm)	1084	1184	985	81	3
SDA Outlet SO2 Conc. (ppm)	1020	1048	983	27	3
TGR/PJFF Outlet SO2 Conc. (ppm)	954	979	918	26	3
SDA Inlet O2 Conc. (%)	8.82	8.99	8.47	0.25	3
SDA Outlet O2 Conc. (%)	9.24	9.42	8.91	0.23	3
TGR O2 Conc. (%)	9.06	9.31	8.63	0.31	3
SDA Inlet Temp. (F)	373	375	370	2	3
SDA Outlet Temp. (F)	347	349	346	1	3
ESP Outlet Temp. (F)	298	301	295	2	3
PJFF Inlet Temp. (F)	320	321	320	1	3
PJFF Outlet Temp. (F)	302	302	301	1	3
PJFF Air/Cloth Ratio	3.46	3.46	3.45	0.00	3
PJFF Cleaning Pulses/Hour	27	27	27	0	3
PJFF Delta P (in H2O)	0.84	0.84	0.83	0.01	3
NYSEG Load (MW)	690	691	688	1	3

HAP-35 Process Summary Report
06/05/96 07:00:00 to 06/05/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	4001	4010	3992	7	6
Facility Inlet SO2 Conc. (ppm)	1174	1269	1115	53	6
Facility Outlet SO2 Conc	925	970	875	33	6
SDA Inlet SO2 Conc. (ppm)	1067	1201	970	80	6
SDA Outlet SO2 Conc. (ppm)	1031	1147	934	68	6
TGR/PJFF Outlet SO2 Conc. (ppm)	961	1076	872	64	6
SDA Inlet O2 Conc. (%)	9.42	9.84	8.62	0.44	6
SDA Outlet O2 Conc. (%)	10.02	10.44	9.27	0.42	6
TGR O2 Conc. (%)	9.93	10.32	9.28	0.39	6
SDA Inlet Temp. (F)	365	376	360	5	6
SDA Outlet Temp. (F)	338	345	335	3	6
ESP Outlet Temp. (F)	284	288	279	3	6
PJFF Inlet Temp. (F)	311	316	309	3	6
PJFF Outlet Temp. (F)	291	294	289	2	6
PJFF Air/Cloth Ratio	3.52	3.53	3.51	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF Delta P (in H2O)	1.21	1.23	1.19	0.01	6
NYSEG Load (MW)	533	567	481	30	6

HAP-35R Process Summary Report
06/06/96 07:00:00 to 06/06/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	3999	4001	3999	1	5
Facility Inlet SO2 Conc. (ppm)	1252	1296	1156	51	5
Facility Outlet SO2 Conc	969	1007	902	37	5
SDA Inlet SO2 Conc. (ppm)	1196	1256	1112	48	5
SDA Outlet SO2 Conc. (ppm)	1044	1095	976	39	5
TGR/PJFF Outlet SO2 Conc. (ppm)	979	1030	915	38	5
SDA Inlet O2 Conc. (%)	9.22	9.89	8.69	0.38	5
SDA Outlet O2 Conc. (%)	9.85	10.56	9.23	0.43	5
TGR O2 Conc. (%)	9.68	10.48	8.99	0.48	5
SDA Inlet Temp. (F)	374	376	371	2	5
SDA Outlet Temp. (F)	347	349	345	1	5
ESP Outlet Temp. (F)	293	295	291	2	5
PJFF Inlet Temp. (F)	321	322	320	1	5
PJFF Outlet Temp. (F)	302	304	301	1	5
PJFF Air/Cloth Ratio	3.52	3.53	3.52	0.01	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	0.99	1.00	0.98	0.01	5
NYSEG Load (MW)	549	592	479	40	5

HAP-36 Process Summary Report
06/07/96 08:00:00 to 06/07/96 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)	1597	1646	1567	31	4
Facility Outlet SO2 Conc	1122	1392	902	195	4
SDA Inlet SO2 Conc. (ppm)	1414	1443	1382	27	4
SDA Outlet SO2 Conc. (ppm)	1435	1466	1412	24	4
TGR/PJFF Outlet SO2 Conc. (ppm)	967	993	915	32	4
SDA Inlet O2 Conc. (%)	7.34	7.51	7.23	0.11	4
SDA Outlet O2 Conc. (%)	7.69	7.90	7.58	0.13	4
TGR O2 Conc. (%)	9.86	10.48	9.53	0.37	4
SDA Inlet Temp. (F)	342	342	342	0	4
SDA Outlet Temp. (F)	329	329	328	0	4
ESP Outlet Temp. (F)	294	295	291	1	4
PJFF Inlet Temp. (F)	312	312	312	0	4
PJFF Outlet Temp. (F)	301	303	300	1	4
PJFF Air/Cloth Ratio	8.03	8.04	8.02	0.01	4
PJFF Cleaning Pulses/Hour	30	30	30	0	4
PJFF Delta P (in H2O)	2.22	2.29	2.20	0.04	4
NYSEG Load (MW)	661	693	588	43	4

HAP-36A Process Summary Report
06/10/96 08:00:00 to 06/10/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7993	7999	7988	5	4
Facility Inlet SO2 Conc. (ppm)	1621	1624	1619	2	4
Facility Outlet SO2 Conc	1359	1370	1347	10	4
SDA Inlet SO2 Conc. (ppm)	1451	1473	1402	28	4
SDA Outlet SO2 Conc. (ppm)	1461	1480	1410	29	4
TGR/PJFF Outlet SO2 Conc. (ppm)	967	993	915	32	4
SDA Inlet O2 Conc. (%)	7.87	7.95	7.77	0.07	4
SDA Outlet O2 Conc. (%)	8.17	8.27	8.07	0.07	4
TGR O2 Conc. (%)	9.86	10.48	9.53	0.37	4
SDA Inlet Temp. (F)	339	339	339	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	296	298	294	1	4
PJFF Inlet Temp. (F)	310	310	310	0	4
PJFF Outlet Temp. (F)	301	301	301	0	4
PJFF Air/Cloth Ratio	7.76	7.77	7.76	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	4.21	4.23	4.18	0.02	4
NYSEG Load (MW)	682	706	629	32	4

HAP-37 CRG Process Summary Report
06/11/96 08:00:00 to 06/11/96 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
CRG Venturi gas flow (scfm)	9498	9503	9493	3	6
Facility Inlet SO2 Conc. (ppm)	1531	1645	1393	99	6
Facility Outlet SO2 Conc	1282	1375	1172	81	6
Facility Inlet O2 Conc.	6.46	7.71	5.59	0.87	6
Facility Outlet O2 Conc.	8.39	9.32	7.76	0.66	6
ESP fan discharge pressure	5.09	5.24	4.92	0.11	6
DRG (ESP) Inlet Temp (F)	319	322	316	2	6
CRG Temp. (F)	306a	309a	304a	-	6

HAP-37A CRG Process Summary Report
06/12/96 08:00:00 to 06/12/96 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
CRG Venturi gas flow (scfm)	9498	9504	9483	7	6
Facility Inlet SO2 Conc. (ppm)	1514	1627	1377	85	6
Facility Outlet SO2 Conc	1250	1340	1150	66	6
Facility Inlet O2 Conc.	6.24	7.17	5.66	0.50	6
Facility Outlet O2 Conc.	8.26	8.96	7.83	0.38	6
ESP fan discharge pressure	5.21	5.31	5.00	0.10	6
DRG (ESP) Inlet Temp (F)	320	328	311	6	6
CRG Temp. (F)	308a	311a	305a	-	6

HAP-38 Process Summary Report
06/14/96 07:00:00 to 06/14/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7994	7995	7991	1	4
Facility Inlet SO2 Conc. (ppm)	1342	1435	1165	105	4
Facility Outlet SO2 Conc	1127	1205	970	93	4
SDA Inlet SO2 Conc. (ppm)	1197	1270	1056	83	4
SDA Outlet SO2 Conc. (ppm)	919	1362	-1	546	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1187	1256	1055	78	4
SDA Inlet O2 Conc. (%)	9.66	10.82	9.07	0.68	4
SDA Outlet O2 Conc. (%)	11.95	19.76	7.83	4.75	4
TGR O2 Conc. (%)	9.97	11.33	9.23	0.81	4
SDA Inlet Temp. (F)	342	342	342	0	4
SDA Outlet Temp. (F)	328	328	328	0	4
ESP Outlet Temp. (F)	294	297	291	2	4
PJFF Inlet Temp. (F)	312	312	311	0	4
PJFF Outlet Temp. (F)	302	303	301	0	4
PJFF Air/Cloth Ratio	7.12	7.12	7.11	0.00	4
PJFF Cleaning Pulses/Hour	37	37	37	0	4
PJFF Delta P (in H2O)	2.26	2.27	2.25	0.01	4
NYSEG Load (MW)	336	382	253	51	4

HAP-39A Process Summary Report
06/17/96 09:00:00 to 06/17/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7994	8001	7986	5	4
Facility Inlet SO2 Conc. (ppm)	1527	1615	1398	87	4
Facility Outlet SO2 Conc	1271	1340	1173	66	4
SDA Inlet SO2 Conc. (ppm)	1335	1414	1222	77	4
SDA Outlet SO2 Conc. (ppm)	1356	1431	1251	73	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1297	1373	1192	74	4
SDA Inlet O2 Conc. (%)	8.34	9.48	7.69	0.71	4
SDA Outlet O2 Conc. (%)	8.84	9.88	8.25	0.65	4
TGR O2 Conc. (%)	8.34	9.80	7.49	0.94	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	325	325	325	0	4
ESP Outlet Temp. (F)	297	299	295	1	4
PJFF Inlet Temp. (F)	309	309	309	0	4
PJFF Outlet Temp. (F)	300	300	299	0	4
PJFF Air/Cloth Ratio	6.93	6.94	6.92	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.08	6.09	6.07	0.01	4
NYSEG Load (MW)	512	613	345	106	4

HAP-39B Process Summary Report
06/18/96 08:00:00 to 06/18/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7998	8003	7988	6	4
Facility Inlet SO2 Conc. (ppm)	1365	1438	1249	73	4
Facility Outlet SO2 Conc	1154	1214	1069	55	4
SDA Inlet SO2 Conc. (ppm)	1197	1265	1122	55	4
SDA Outlet SO2 Conc. (ppm)	1219	1285	1149	52	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1161	1224	1089	53	4
SDA Inlet O2 Conc. (%)	9.15	9.85	8.52	0.52	4
SDA Outlet O2 Conc. (%)	9.57	10.26	8.96	0.50	4
TGR O2 Conc. (%)	9.37	10.31	8.49	0.71	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	324	325	324	0	4
ESP Outlet Temp. (F)	296	299	292	3	4
PJFF Inlet Temp. (F)	308	309	308	0	4
PJFF Outlet Temp. (F)	299	300	298	1	4
PJFF Air/Cloth Ratio	7.02	7.03	7.01	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.31	6.32	6.30	0.01	4
NYSEG Load (MW)	477	519	383	55	4

HAP-39C Process Summary Report
06/19/96 08:00:00 to 06/19/96 14:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7996	8000	7989	3	6
Facility Inlet SO2 Conc. (ppm)	1345	1479	1280	63	6
Facility Outlet SO2 Conc	1125	1235	1078	51	6
SDA Inlet SO2 Conc. (ppm)	1174	1297	1122	57	6
SDA Outlet SO2 Conc. (ppm)	1197	1313	1147	54	6
TGR/PJFF Outlet SO2 Conc. (ppm)	1137	1243	1094	49	6
SDA Inlet O2 Conc. (%)	8.90	9.21	7.85	0.47	6
SDA Outlet O2 Conc. (%)	9.30	9.57	8.42	0.40	6
TGR O2 Conc. (%)	9.09	9.48	7.90	0.55	6
SDA Inlet Temp. (F)	339	342	338	2	6
SDA Outlet Temp. (F)	326	328	325	1	6
ESP Outlet Temp. (F)	295	298	290	3	6
PJFF Inlet Temp. (F)	309	311	307	1	6
PJFF Outlet Temp. (F)	299	300	295	2	6
PJFF Air/Cloth Ratio	6.75	6.77	6.71	0.02	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF Delta P (in H2O)	6.49	6.52	6.46	0.02	6
NYSEG Load (MW)	405	513	377	48	6

HAP-39D Process Summary Report
06/20/96 08:00:00 to 06/20/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8002	8004	7999	2	4
Facility Inlet SO2 Conc. (ppm)	1355	1653	942	258	4
Facility Outlet SO2 Conc	1152	1371	856	186	4
SDA Inlet SO2 Conc. (ppm)	1234	1443	1032	145	4
SDA Outlet SO2 Conc. (ppm)	1256	1449	1066	135	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1195	1385	1012	132	4
SDA Inlet O2 Conc. (%)	8.94	11.27	7.03	1.52	4
SDA Outlet O2 Conc. (%)	9.47	11.78	7.67	1.48	4
TGR O2 Conc. (%)	9.18	12.23	6.74	1.97	4
SDA Inlet Temp. (F)	339	339	339	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	298	302	296	2	4
PJFF Inlet Temp. (F)	309	309	309	0	4
PJFF Outlet Temp. (F)	299	300	299	0	4
PJFF Air/Cloth Ratio	7.48	7.49	7.47	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.64	6.66	6.60	0.02	4
NYSEG Load (MW)	409	658	189	175	4

HAP-39E Process Summary Report
06/21/96 07:00:00 to 06/21/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8004	7999	2	5
Facility Inlet SO2 Conc. (ppm)	1355	1625	1073	216	5
Facility Outlet SO2 Conc	1118	1320	939	151	5
SDA Inlet SO2 Conc. (ppm)	1182	1411	1000	168	5
SDA Outlet SO2 Conc. (ppm)	1212	1435	1035	164	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1153	1372	984	162	5
SDA Inlet O2 Conc. (%)	8.09	9.46	6.66	1.05	5
SDA Outlet O2 Conc. (%)	8.64	9.86	7.33	0.95	5
TGR O2 Conc. (%)	8.10	9.74	6.36	1.29	5
SDA Inlet Temp. (F)	340	340	339	0	5
SDA Outlet Temp. (F)	326	326	326	0	5
ESP Outlet Temp. (F)	295	297	294	1	5
PJFF Inlet Temp. (F)	309	310	309	0	5
PJFF Outlet Temp. (F)	299	300	299	0	5
PJFF Air/Cloth Ratio	6.92	6.92	6.91	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	6.67	6.69	6.66	0.01	5
NYSEG Load (MW)	526	696	353	141	5

HAP-39F Process Summary Report
06/24/96 07:00:00 to 06/24/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	8000	1	5
Facility Inlet SO2 Conc. (ppm)	1165	1226	1111	41	5
Facility Outlet SO2 Conc	837	935	796	51	5
SDA Inlet SO2 Conc. (ppm)	1012	1062	966	33	5
SDA Outlet SO2 Conc. (ppm)	1040	1089	1003	28	5
TGR/PJFF Outlet SO2 Conc. (ppm)	985	1029	949	26	5
SDA Inlet O2 Conc. (%)	9.08	9.77	8.28	0.54	5
SDA Outlet O2 Conc. (%)	9.58	10.23	8.82	0.50	5
TGR O2 Conc. (%)	9.33	10.19	8.36	0.67	5
SDA Inlet Temp. (F)	339	339	339	0	5
SDA Outlet Temp. (F)	325	325	325	0	5
ESP Outlet Temp. (F)	293	296	290	2	5
PJFF Inlet Temp. (F)	309	309	309	0	5
PJFF Outlet Temp. (F)	299	300	298	1	5
PJFF Air/Cloth Ratio	6.95	6.96	6.95	0.01	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	6.90	6.91	6.88	0.01	5
NYSEG Load (MW)	371	525	275	97	5

HAP-39G Process Summary Report
06/25/96 07:00:00 to 06/25/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8004	7998	2	5
Facility Inlet SO2 Conc. (ppm)	1106	1281	796	171	5
Facility Outlet SO2 Conc	953	1056	778	95	5
SDA Inlet SO2 Conc. (ppm)	1057	1140	1007	48	5
SDA Outlet SO2 Conc. (ppm)	1076	1138	1041	35	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1031	1085	989	42	5
SDA Inlet O2 Conc. (%)	8.60	11.34	7.01	1.52	5
SDA Outlet O2 Conc. (%)	9.25	12.04	7.80	1.55	5
TGR O2 Conc. (%)	8.83	12.49	7.04	1.98	5
SDA Inlet Temp. (F)	344	344	344	0	5
SDA Outlet Temp. (F)	329	330	328	1	5
ESP Outlet Temp. (F)	291	295	287	3	5
PJFF Inlet Temp. (F)	311	313	309	1	5
PJFF Outlet Temp. (F)	301	303	298	2	5
PJFF Air/Cloth Ratio	7.67	7.70	7.63	0.02	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	6.88	6.91	6.87	0.02	5
NYSEG Load (MW)	456	614	202	159	5

HAP-39H Process Summary Report
06/26/96 08:00:00 to 06/26/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	8000	1	5
Facility Inlet SO2 Conc. (ppm)	1333	1435	1262	62	5
Facility Outlet SO2 Conc	1129	1235	1068	60	5
SDA Inlet SO2 Conc. (ppm)	1189	1227	1144	32	5
SDA Outlet SO2 Conc. (ppm)	1185	1220	1146	30	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1151	1185	1115	29	5
SDA Inlet O2 Conc. (%)	9.14	9.41	8.77	0.24	5
SDA Outlet O2 Conc. (%)	9.29	9.50	8.97	0.19	5
TGR O2 Conc. (%)	9.76	10.12	9.27	0.33	5
SDA Inlet Temp. (F)	339	339	339	0	5
SDA Outlet Temp. (F)	325	325	325	0	5
ESP Outlet Temp. (F)	293	296	288	3	5
PJFF Inlet Temp. (F)	309	309	308	0	5
PJFF Outlet Temp. (F)	299	300	299	0	5
PJFF Air/Cloth Ratio	7.08	7.08	7.07	0.00	5
PJFF Cleaning Pulses/Hour	0	0	0	0	5
PJFF Delta P (in H2O)	6.88	6.89	6.85	0.01	5
NYSEG Load (MW)	378	415	322	31	5

HAP-39I Process Summary Report
06/27/96 07:00:00 to 06/27/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	7999	1	4
Facility Inlet SO2 Conc. (ppm)	1196	1277	1152	48	4
Facility Outlet SO2 Conc	1007	1073	970	39	4
SDA Inlet SO2 Conc. (ppm)	1073	1145	1039	42	4
SDA Outlet SO2 Conc. (ppm)	1085	1155	1051	41	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1048	1120	1009	43	4
SDA Inlet O2 Conc. (%)	9.47	9.94	8.87	0.38	4
SDA Outlet O2 Conc. (%)	9.66	10.19	9.08	0.39	4
TGR O2 Conc. (%)	10.29	11.17	9.36	0.64	4
SDA Inlet Temp. (F)	339	339	339	0	4
SDA Outlet Temp. (F)	325	325	325	0	4
ESP Outlet Temp. (F)	293	297	290	3	4
PJFF Inlet Temp. (F)	309	309	309	0	4
PJFF Outlet Temp. (F)	300	300	299	0	4
PJFF Air/Cloth Ratio	7.59	7.59	7.58	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.88	6.89	6.86	0.01	4
NYSEG Load (MW)	297	357	253	38	4

HAP-39J Process Summary Report
06/28/96 07:00:00 to 06/28/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8003	8000	1	4
Facility Inlet SO2 Conc. (ppm)	1267	1442	1054	143	4
Facility Outlet SO2 Conc	1065	1206	903	110	4
SDA Inlet SO2 Conc. (ppm)	1139	1288	999	107	4
SDA Outlet SO2 Conc. (ppm)	1145	1292	1012	104	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1112	1251	981	100	4
SDA Inlet O2 Conc. (%)	8.52	9.72	6.98	1.02	4
SDA Outlet O2 Conc. (%)	8.78	9.86	7.40	0.91	4
TGR O2 Conc. (%)	8.95	10.55	7.01	1.31	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	325	325	325	0	4
ESP Outlet Temp. (F)	291	296	283	5	4
PJFF Inlet Temp. (F)	309	309	308	0	4
PJFF Outlet Temp. (F)	300	300	299	0	4
PJFF Air/Cloth Ratio	7.28	7.29	7.28	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.87	6.88	6.86	0.01	4
NYSEG Load (MW)	460	599	337	101	4

HAP-39K Process Summary Report
06/28/96 11:00:00 to 06/28/96 15:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	8000	0	4
Facility Inlet SO2 Conc. (ppm)	1493	1515	1470	16	4
Facility Outlet SO2 Conc	1249	1270	1228	16	4
SDA Inlet SO2 Conc. (ppm)	1335	1359	1314	16	4
SDA Outlet SO2 Conc. (ppm)	1333	1357	1306	19	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1299	1323	1272	19	4
SDA Inlet O2 Conc. (%)	7.04	7.37	6.74	0.24	4
SDA Outlet O2 Conc. (%)	7.49	7.81	7.24	0.21	4
TGR O2 Conc. (%)	7.03	7.46	6.72	0.29	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	325	325	325	0	4
ESP Outlet Temp. (F)	296	297	296	0	4
PJFF Inlet Temp. (F)	308	308	308	0	4
PJFF Outlet Temp. (F)	299	299	299	0	4
PJFF Air/Cloth Ratio	6.74	6.74	6.73	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF Delta P (in H2O)	6.85	6.86	6.83	0.01	4
NYSEG Load (MW)	614	641	591	21	4

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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
Bsl, PTFE/GI, 4000scfm, 300F															
HAP-34	Tue-6/4	09:46	U1235	37.71	8.99	8.75	-	1.64	564.8	-	495.9	4.96	-	0.82	5.78
HAP-34	Tue-6/4	10:43	U1238	42.20	8.98	10.16	-	1.01	554.4	-	429.1	5.06	-	0.39	5.44
HAP-34	Tue-6/4	11:35	U1241	40.43	8.70	10.52	-	0.94	572.3	-	471.0	5.64	-	0.42	6.06
Averages												5.22	-	0.54	5.76
Fine Fly Ash, 4000scfm, 290F															
HAP-35	Wed-6/5	07:55	U1244	35.26	9.50	8.78	-	0.72	596.8	-	493.4	5.63	-	0.38	6.01
HAP-35	Wed-6/5	09:58	U1247	31.37	9.81	8.98	-	0.66	568.8	-	503.9	6.17	-	0.40	6.57
HAP-35	Wed-6/5	09:40	U1250	40.53	9.83	11.96	-	1.01	586.5	-	517.2	6.56	-	0.49	7.05
Averages												6.12	-	0.42	6.54
Fine Fly Ash, 4000scfm, 300F															
HAP-35R	Thu-6/6	08:40	U1253	34.71	10.04	8.50	-	0.85	564.9	-	481.2	5.24	-	0.45	5.69
HAP-35R	Thu-6/6	10:10	U1256	44.03	9.21	11.29	-	1.26	570.4	-	501.9	5.54	-	0.55	6.08
HAP-35R	Thu-6/6	11:05	U1259	41.30	8.63	9.88	-	1.01	589.6	-	505.5	5.34	-	0.47	5.81
Averages												5.37	-	0.49	5.86
Bsl, PTFE/GI, 8000scfm, 300F															
HAP-36	Fri-6/7	08:30	U1262	33.75	7.23	7.36	-	1.67	593.4	-	477.1	4.90	-	0.89	5.79
HAP-36	Fri-6/7	09:18	U1265	33.36	7.35	7.30	-	2.94	551.4	-	414.2	4.57	-	1.38	5.95
HAP-36	Fri-6/7	10:00	U1268	29.26	7.23	7.25	-	2.24	455.7	-	455.7	4.28	-	1.32	5.60
Averages												4.58	-	1.20	5.78
Fine Fly Ash, 8000scfm, 300F															
HAP-36A	Mon-6/10	08:54	U1271	26.24	7.58	6.23	-	1.07	561.4	-	470.4	5.05	-	0.73	5.78
HAP-36A	Mon-6/10	09:37	U1274	28.05	8.00	6.58	-	1.30	600.5	-	461.5	5.34	-	0.81	6.14
HAP-36A	Mon-6/10	10:20	U1277	31.87	7.84	6.60	-	1.35	576.3	-	436.3	4.52	-	0.70	5.22
Averages												4.97	-	0.74	5.71
New PTGE/GI on Filter @300°F															
HAP-37	Tue-6/11	08:20	U1280	31.64	9.47	9.37	-	26.30	562.6	-	485.1	Base CRG-1	Base CRG-1	Base CRG-1	Base CRG-1
HAP-37	Tue-6/11	09:42	U1282	28.73	8.28	8.43	-	22.80	574.9	-	511.0	6.31	-	15.28	21.58
HAP-37	Tue-6/11	10:54	U1284	32.92	8.03	9.81	-	28.76	573.4	-	467.8	6.39	-	15.36	21.75
HAP-37	Tue-6/11	12:09	U1286	32.54	7.75	8.86	-	23.54	610.3	-	539.2	6.47	-	15.48	21.95
Averages												6.29	-	14.78	21.07
												6.37	-	15.22	21.59
Conditioned PTGE/GI @300°F															
HAP-37A	Wed-6/12	08:36	U1288	31.56	8.38	11.99	-	28.86	511.4	-	460.3	Base CRG-1	Base CRG-1	Base CRG-1	Base CRG-1
HAP-37A	Wed-6/12	09:56	U1290	32.10	8.36	9.89	-	26.89	607.3	-	517.8	7.36	-	15.95	23.31
HAP-37A	Wed-6/12	11:11	U1292	31.22	8.06	10.50	-	23.60	559.2	-	561.5	7.09	-	16.43	23.52
HAP-37A	Wed-6/12	12:24	U1294	32.75	7.78	9.63	-	30.94	613.8	-	459.9	7.12	-	16.08	23.21
Averages												6.84	-	16.46	23.30
												7.10	-	16.23	23.33
Bsl, 8000scfm, 300F															
HAP-38	Fri-6/14	07:46	U1296	35.60	9.72	6.78	-	1.84	611.7	-	543.9	4.41	-	1.06	5.48
HAP-38	Fri-6/14	08:40	U1299	32.49	9.10	6.53	-	1.76	584.9	-	510.7	4.46	-	1.05	5.50
HAP-38	Fri-6/14	09:30	U1302	34.45	9.23	6.24	-	2.06	605.8	-	506.1	4.16	-	1.15	5.31
Averages												4.34	-	1.09	5.43

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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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
<i>CT-9, 8000scfm, Day 1</i>															
HAP-39A	Mon-6/17	08:50	U1305	36.61	9.74	9.33	-	1.35	575.4	-	450.1	5.55	-	0.63	6.18
HAP-39A	Mon-6/17	09:46	U1308	31.75	8.77	9.61	-	1.31	589.1	-	467.3	6.75	-	0.73	7.48
HAP-39A	Mon-6/17	10:36	U1311	32.33	7.90	8.85	-	1.38	588.4	-	503.0	6.10	-	0.81	6.91
Averages												6.14		0.72	6.86
<i>CT-9, 8000scfm, Day 2</i>															
HAP-39B	Tue-6/18	08:05	U1314	31.95	9.58	6.20	-	1.10	561.5	-	468.7	4.12	-	0.61	4.74
HAP-39B	Tue-6/18	08:52	U1317	34.23	9.96	6.25	-	1.26	597.6	-	484.2	4.14	-	0.67	4.81
HAP-39B	Tue-6/18	09:44	U1320	33.84	8.90	6.89	-	1.30	557.9	-	486.1	4.30	-	0.71	5.01
Averages												4.19		0.66	4.85
<i>CT-9, 8000scfm, Day 3</i>															
HAP-39C	Wed-6/19	08:26	U1323	41.13	8.18	9.98	-	2.01	571.0	-	461.5	5.25	-	0.85	6.10
HAP-39C	Wed-6/19	10:57	U1326	45.69	9.02	10.98	-	2.34	583.5	-	467.7	5.31	-	0.91	6.22
HAP-39C	Wed-6/19	12:58	U1329	28.15	9.17	6.46	-	1.17	565.2	-	466.7	4.91	-	0.73	5.65
Averages												5.16		0.83	5.99

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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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
<i>CT-9, Day 4, No Hg(0) Spk.</i>															
HAP-39DN	Thu-6/20	08:00	-	-	11.29	-	-	-	-	-	-	-	-	-	-
HAP-39DN	Thu-6/20	09:00	-	-	8.84	-	-	-	-	-	-	-	-	-	-
HAP-39DN	Thu-6/20	10:00	-	-	8.64	-	-	-	-	-	-	-	-	-	-
HAP-39DN	Thu-6/20	11:00	-	-	6.82	-	-	-	-	-	-	-	-	-	-
Averages															
<i>CT-9, 8000scfm, Day 5</i>															
HAP-39E	Fri-6/21	08:45	U1340	34.25	8.95	10.62	-	1.36	575.4	-	526.0	6.76	-	0.79	7.55
HAP-39E	Fri-6/21	09:45	U1343	35.15	8.66	9.95	-	1.44	594.3	-	462.0	6.37	-	0.72	7.09
HAP-39E	Fri-6/21	10:30	U1346	31.83	6.85	9.72	-	1.34	538.4	-	408.6	6.23	-	0.65	6.88
Averages												6.45		0.72	7.17
<i>CT-9, 8000scfm, Day 6</i>															
HAP-39F	Mon-6/24	08:30	U1349	-	-	-	-	-	-	-	-	-	-	-	-
HAP-39F	Mon-6/24	09:30	U1352	33.02	9.13	8.62	-	1.40	574.5	-	502.8	5.68	-	0.81	6.49
HAP-39F	Mon-6/24	10:15	U1355	41.43	8.67	12.34	-	2.21	573.4	-	532.9	6.47	-	1.08	7.55
Averages												6.08		0.94	7.02
<i>CT-9, 8000scfm, Day 7</i>															
HAP-39G	Tue-6/25	08:00	U1359	37.08	9.37	13.27	-	1.98	599.5	-	463.1	8.13	-	0.93	9.06
HAP-39G	Tue-6/25	09:00	U1362	35.88	8.60	13.91	-	2.51	580.2	-	455.9	8.52	-	1.21	9.73
HAP-39G	Tue-6/25	10:00	U1365	38.10	6.90	15.67	-	3.30	597.9	-	459.7	9.32	-	1.51	10.82
Averages												8.66		1.22	9.87
<i>CT-9, 8000scfm, Day 8</i>															
HAP-39H	Wed-6/26	09:00	U1368	38.87	8.96	7.57	-	1.24	584.7	-	572.0	4.31	-	0.69	5.01
HAP-39H	Wed-6/26	10:00	U1371	38.83	9.15	7.35	-	1.26	611.7	-	592.7	4.38	-	0.73	5.12
HAP-39H	Wed-6/26	11:00	U1374	32.97	9.22	6.65	-	1.21	569.8	-	540.0	4.35	-	0.75	5.11
Averages												4.35		0.73	5.08
<i>CT-9, 8000scfm, Day 9</i>															
HAP-39I	Thu-6/27	08:00	U1377	35.14	9.86	9.25	-	1.32	573.1	-	444.1	5.72	-	0.63	6.34
HAP-39I	Thu-6/27	09:15	U1380	36.30	9.39	9.38	-	1.19	599.3	-	493.2	5.87	-	0.61	6.48
HAP-39I	Thu-6/27	10:15	U1383	33.03	9.12	8.99	-	1.38	593.1	-	441.1	6.12	-	0.70	6.81
Averages												5.90		0.65	6.55
<i>CT-9, 8000scfm, Day 10</i>															
HAP-39J	Fri-6/28	07:45	U1386	31.10	9.16	8.92	-	1.48	578.5	-	478.1	6.29	-	0.86	7.14
HAP-39J	Fri-6/28	08:30	U1389	30.09	9.12	8.09	-	1.51	544.7	-	428.6	5.55	-	0.82	6.36
HAP-39J	Fri-6/28	09:15	U1392	31.81	8.45	8.68	-	1.62	566.9	-	429.9	5.86	-	0.83	6.69
Averages												5.90		0.83	6.73

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ECTC PRDA HAP's Testing
Mercury Gas Sampling Results
Post-Spiking Inlet Location
(PJFF 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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
Bsl, PTFE/GI, 4000scfm, 300F															
HAP-34	Tue-6/4	09:46	U1236	49.59	9.42	35.36	-	61.52	586.6	-	432.0	15.85	-	20.30	36.15
HAP-34	Tue-6/4	10:43	U1239	41.59	9.39	20.06	-	56.69	577.7	-	409.8	10.56	-	21.16	31.72
HAP-34	Tue-6/4	11:35	U1242	37.78	9.10	19.48	-	46.17	583.7	-	429.8	11.40	-	19.90	31.30
Averages												12.60		20.45	33.06
Fine Fly Ash, 4000scfm, 290F															
HAP-35	Wed-6/5	07:55	U1245	53.91	10.05	29.45	-	61.15	609.2	-	493.5	12.61	-	21.21	33.81
HAP-35	Wed-6/5	09:58	U1248	49.09	10.44	26.16	-	59.51	564.5	-	453.4	11.40	-	20.82	32.22
HAP-35	Wed-6/5	09:40	U1251	40.08	10.30	22.18	-	46.74	572.6	-	472.3	12.01	-	20.87	32.87
Averages												12.00		20.97	32.97
Fine Fly Ash, 4000scfm, 300F															
HAP-35R	Thu-6/6	08:40	U1254	38.78	10.74	20.24	-	37.91	562.2	-	480.9	11.12	-	17.81	28.93
HAP-35R	Thu-6/6	10:10	U1257	44.41	9.89	23.30	-	47.55	593.1	-	365.0	11.79	-	14.81	26.60
HAP-35R	Thu-6/6	11:05	U1260	43.81	9.26	21.78	-	45.85	577.7	-	482.4	10.88	-	19.13	30.00
Averages												11.26		17.25	28.51
Bsl, PTFE/GI, 8000scfm, 300F															
HAP-36	Fri-6/7	08:30	U1263	31.72	7.53	13.01	-	47.69	522.1	-	463.5	8.11	-	26.40	34.51
HAP-36	Fri-6/7	09:18	U1266	32.82	7.74	14.22	-	58.71	567.3	-	428.1	9.31	-	29.01	38.32
HAP-36	Fri-6/7	10:00	U1269	28.94	7.58	12.48	-	43.04	550.4	-	463.6	8.99	-	26.12	35.11
Averages												8.81		27.18	35.98
Fine Fly Ash, 8000scfm, 300F															
HAP-36A	Mon-6/10	08:54	U1272	30.24	7.84	11.87	-	50.35	572.2	-	442.3	8.51	-	27.90	36.41
HAP-36A	Mon-6/10	09:37	U1275	29.69	8.31	11.89	-	48.71	571.6	-	463.0	8.67	-	28.78	37.45
HAP-36A	Mon-6/10	10:20	U1278	30.05	8.11	10.54	-	47.92	585.1	-	465.7	7.77	-	28.13	35.90
Averages												8.32		28.27	36.59
New PTGE/GI on Filter @300°F												PTFE/GI	PTFE/GI	PTFE/GI	PTFE/GI
HAP-37	Tue-6/11	08:20	U1281	30.62	9.51	10.89	-	27.26	577.1	-	435.4	CRG-2	CRG-2	CRG-2	CRG-2
HAP-37	Tue-6/11	09:42	U1283	29.60	8.28	10.42	-	25.11	570.5	-	457.2	7.78	-	14.69	22.46
HAP-37	Tue-6/11	10:54	U1285	31.67	8.03	11.27	-	30.40	560.2	-	416.6	7.61	-	14.70	22.30
HAP-37	Tue-6/11	12:09	U1287	28.13	7.75	7.49	-	20.77	505.5	-	498.8	7.55	-	15.15	22.70
Averages												5.10	-	13.95	19.05
Conditioned PTGE/GI @300°F												PTFE/GI	PTFE/GI	PTFE/GI	PTFE/GI
HAP-37A	Wed-6/12	08:36	U1289	31.53	8.38	11.02	-	32.46	601.7	-	469.4	CRG-2	CRG-2	CRG-2	CRG-2
HAP-37A	Wed-6/12	09:56	U1291	32.27	8.36	11.69	-	32.65	583.9	-	468.5	7.97	-	18.31	26.27
HAP-37A	Wed-6/12	11:11	U1188	30.76	8.06	12.23	-	27.21	550.1	-	536.4	8.01	-	17.96	25.97
HAP-37A	Wed-6/12	12:24	U1190	32.82	7.78	11.50	-	34.46	606.7	-	460.9	8.28	-	17.97	26.26
Averages												8.05	-	18.33	26.39
Bsl, 8000scfm, 300F												8.08		18.14	26.22
HAP-38	Fri-6/14	07:46	U1297	32.20	9.87 a	31.39	-	212.83	606.3	-	482.2	22.39	-	120.73	143.12
HAP-38	Fri-6/14	08:40	U1300	36.16	9.15 a	30.21	-	192.35	577.4	-	517.6	18.27	-	104.31	122.59
HAP-38	Fri-6/14	09:30	U1303	17.41	9.36 a	18.12	-	109.37	560.4	-	474.8	22.10	-	113.03	135.12
Averages												20.92		112.69	133.61

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

Test ID	Date	Start Time	ID	Gas Volume (dscl)	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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
<i>CT-9, 8000scfm, Day 1</i>															
HAP-39A	Mon-6/17	08:50	U1306	48.17	10.21	65.17	-	213.99	613.4	-	483.1	31.44	-	81.30	112.73
HAP-39A	Mon-6/17	09:46	U1309	36.91	9.10	48.29	-	170.63	594.6	-	474.0	29.47	-	83.02	112.49
HAP-39A	Mon-6/17	10:36	U1312	34.35	8.26	46.12	-	134.18	576.3	-	513.8	29.32	-	76.04	105.35
Averages												30.07		80.12	110.19
<i>CT-9, 8000scfm, Day 2</i>															
HAP-39B	Tue-6/18	08:05	U1315	31.81	10.18 a	46.91	-	156.04	546.9	-	449.5	30.56	-	83.53	114.09
HAP-39B	Tue-6/18	08:52	U1318	39.26	9.87 a	47.78	-	197.66	559.5	-	453.5	25.79	-	86.48	112.28
HAP-39B	Tue-6/18	09:44	U1321	35.54	8.91 a	42.96	-	184.75	539.5	-	446.4	24.71	-	87.91	112.61
Averages												27.02		85.97	112.99
<i>CT-9, 8000scfm, Day 3</i>															
HAP-39C	Wed-6/19	08:26	U1324	39.67	8.15 a	31.99	-	174.02	579.6	-	448.0	17.71	-	74.46	92.17
HAP-39C	Wed-6/19	10:57	U1327	93.11	9.09 a	59.25	-	435.09	635.1	-	473.8	15.31	-	83.87	99.18
HAP-39C	Wed-6/19	12:58	U1330	40.64	9.33 a	21.73	-	168.50	851.7	-	519.4	17.25	-	81.57	98.82
Averages												16.76		79.97	96.72

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**ECTC PRDA HAP's Testing
Mercury Gas Sampling Results
Post-Spiking Inlet Location
(PJFF 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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
CT-9, Day 4, No Hg(0) Spk.															
HAP-39DN	Thu-6/20	08:00	U1332	37.83	11.67 a	6.57	-	0.91	568.7	-	468.4	6.65	-	0.43	7.08
HAP-39DN	Thu-6/20	09:00	U1334	34.39	8.86 a	9.08	-	1.14	586.5	-	477.8	5.73	-	0.60	6.33
HAP-39DN	Thu-6/20	10:00	U1336	40.57	8.78 a	9.00	-	0.73	598.1	-	478.5	4.90	-	0.33	5.23
HAP-39DN	Thu-6/20	11:00	U1338	35.95	7.07 a	8.31	-	0.75	582.4	-	466.0	4.34	-	0.37	4.71
Averages												5.76		0.45	6.21
CT-9, 8000scfm, Day 5															
HAP-39E	Fri-6/21	08:45	U1341	44.05	9.38	23.23	-	77.23	565.5	-	467.6	11.30	-	31.06	42.35
HAP-39E	Fri-6/21	09:45	U1344	39.03	8.71 a	19.51	-	71.59	577.8	-	472.6	10.94	-	32.84	43.79
HAP-39E	Fri-6/21	10:30	U1347	32.76	7.39	15.63	-	62.86	582.3	-	441.3	10.53	-	32.08	42.61
Averages												10.92		31.99	42.92
CT-9, 8000scfm, Day 6															
HAP-39F	Mon-6/24	08:30	U1350	38.02	10.00	16.78	-	48.70	600.1	-	570.3	10.03	-	27.67	37.71
HAP-39F	Mon-6/24	09:30	U1353	32.99	9.23 a	15.90	-	56.81	578.9	-	452.7	10.57	-	29.53	40.10
HAP-39F	Mon-6/24	10:15	U1356	33.70	8.79 a	16.09	-	50.50	558.5	-	531.0	10.10	-	30.14	40.24
Averages												10.23		29.11	39.35
CT-9, 8000scfm, Day 7															
HAP-39G	Tue-6/25	08:00	U1360	37.63	9.20 a	21.92	-	60.64	572.3	-	470.9	12.63	-	28.75	41.38
HAP-39G	Tue-6/25	09:00	U1363	36.50	8.03 a	21.23	-	64.46	587.0	-	438.4	12.93	-	29.33	42.26
HAP-39G	Tue-6/25	10:00	U1366	32.95	7.02 a	21.71	-	57.41	560.2	-	466.3	13.98	-	30.78	44.76
Averages												13.18		29.62	42.80
CT-9, 8000scfm, Day 8															
HAP-39H	Wed-6/26	09:00	U1369	33.71	8.97	15.73	-	47.94	557.3	-	454.2	9.85	-	24.47	34.32
HAP-39H	Wed-6/26	10:00	U1372	34.82	9.30	11.99	-	52.30	626.2	-	484.2	8.17	-	27.55	35.72
HAP-39H	Wed-6/26	11:00	U1375	34.00	9.45	12.62	-	46.77	572.1	-	503.1	8.05	-	26.22	34.27
Averages												8.69		26.08	34.77
CT-9, 8000scfm, Day 9															
HAP-39I	Thu-6/27	08:00	U1378	33.65	9.67	15.39	-	51.46	592.0	-	429.9	10.26	-	24.91	35.17
HAP-39I	Thu-6/27	09:15	U1381	39.12	9.78	17.83	-	64.19	574.1	-	441.8	9.91	-	27.46	37.37
HAP-39I	Thu-6/27	10:15	U1384	41.29	9.01	15.89	-	60.22	591.2	-	495.3	8.62	-	27.36	35.98
Averages												9.60		26.58	36.17
CT-9, 8000scfm, Day 10															
HAP-39J	Fri-6/28	07:45	U1387	36.38	9.22	13.89	-	44.67	627.0	-	498.3	9.06	-	23.18	32.24
HAP-39J	Fri-6/28	08:30	U1390	34.76	9.00	16.47	-	43.44	592.9	-	477.4	10.64	-	22.60	33.24
HAP-39J	Fri-6/28	09:15	U1393	36.18	8.15	16.05	-	54.37	587.1	-	423.5	9.86	-	24.11	33.97
Averages												9.86		23.29	33.15

*Shaded areas indicate sampling problems. H=Peroxide, TE3=Tris/EDTA(10mM), a=calculated as average of the SDA In and PJFF Out CEM values, PTFE/GI = PTFE membrane on fiberglass.

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

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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
Bsl, PTFE/GI, 4000scfm, 300F															
HAP-34	Tue-6/4	09:46	U1237	39.03	9.31	29.25	-	22.07	554.1	-	430.5	15.73	-	9.22	24.95
HAP-34	Tue-6/4	10:43	U1240	38.50	9.26	29.10	-	22.28	542.7	-	454.5	15.54	-	9.97	25.51
HAP-34	Tue-6/4	11:35	U1243	35.24	8.93	29.40	-	22.20	546.7	-	420.1	17.28	-	10.02	27.30
Averages												16.18		9.74	25.92
Fine Fly Ash, 4000scfm, 290F															
HAP-35	Wed-6/5	07:55	U1246	50.19	9.93	47.29	-	10.03	591.8	-	496.2	21.12	-	3.76	24.88
HAP-35	Wed-6/5	09:58	U1249	47.94	10.21	46.72	-	8.32	561.8	-	496.2	20.74	-	3.26	24.00
HAP-35	Wed-6/5	09:40	U1252	38.13	10.21	42.47	-	8.33	561.9	-	444.7	23.71	-	3.68	27.39
Averages												21.86		3.57	25.42
Fine Fly Ash, 4000scfm, 300F															
HAP-35R	Thu-6/6	08:40	U1255	36.61	10.56	32.85	-	12.81	567.1	-	498.2	19.28	-	6.60	25.89
HAP-35R	Thu-6/6	10:10	U1258	42.36	8.92	39.46	-	16.86	578.6	-	457.0	20.42	-	6.89	27.31
HAP-35R	Thu-6/6	11:05	U1261	42.24	9.17	36.82	-	17.87	585.4	-	448.1	19.33	-	7.18	26.52
Averages												19.68		6.89	26.57
Bsl, PTFE/GI, 8000scfm, 300F															
HAP-36	Fri-6/7	08:30	U1264	32.61	8.23	21.42	-	31.65	551.4	-	414.8	13.72	-	15.25	28.97
HAP-36	Fri-6/7	09:18	U1267	32.17	8.24	25.71	-	31.60	565.2	-	471.8	17.11	-	17.56	34.67
HAP-36	Fri-6/7	10:00	U1270	28.12	8.08	21.53	-	29.27	561.7	-	459.3	16.29	-	18.11	34.40
Averages												15.71		16.97	32.68
Fine Fly Ash, 8000scfm, 300F															
HAP-36A	Mon-6/10	08:54	U1273	31.42	8.49	28.10	-	24.87	589.3	-	435.5	19.96	-	13.06	33.02
HAP-36A	Mon-6/10	09:37	U1276	30.25	8.77	26.78	-	24.03	585.1	-	430.9	19.63	-	12.97	32.60
HAP-36A	Mon-6/10	10:20	U1279	29.16	8.64	20.42	-	20.53	582.5	-	457.6	15.45	-	12.21	27.66
Averages												18.35		12.74	31.09
New PTGE/GI on Filter @300°F															
HAP-37	Tue-6/11	08:20	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37	Tue-6/11	09:42	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37	Tue-6/11	10:54	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37	Tue-6/11	12:09	-	-	-	-	-	-	-	-	-	-	-	-	-
Averages															
Conditioned PTGE/GI @300°F															
HAP-37A	Wed-6/12	08:36	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37A	Wed-6/12	09:56	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37A	Wed-6/12	11:11	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-37A	Wed-6/12	12:24	-	-	-	-	-	-	-	-	-	-	-	-	-
Averages															
Bsl, 8000scfm, 300F															
HAP-38	Fri-6/14	07:46	U1298	33.97	10.02	74.64	-	126.05	602.6	-	492.6	50.16	-	69.25	119.42
HAP-38	Fri-6/14	08:40	U1301	38.90	9.19	83.72	-	140.47	585.4	-	512.4	47.72	-	70.09	117.81
HAP-38	Fri-6/14	09:30	U1304	31.41	9.50	69.61	-	123.46	568.5	-	475.8	47.72	-	70.84	118.56
Averages												48.54		70.06	118.60

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

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

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 (ug/Nm ³)	H2O2 [Hg] In Gas (ug/Nm ³)	KMnO4 [Hg] In Gas (ug/Nm ³)	Total [Hg] In Gas (ug/Nm ³)
CT-9, 8000scfm, Day 1															
HAP-39A	Mon-6/17	08:50	U1307	43.55	10.47	127.13	-	14.39	573.3	-	496.8	63.40	-	6.22	69.61
HAP-39A	Mon-6/17	09:46	U1310	38.53	9.23	108.63	-	14.04	619.0	-	445.9	66.11	-	6.16	72.27
HAP-39A	Mon-6/17	10:36	U1313	36.75	8.67	113.41	-	8.98	575.2	-	485.4	67.25	-	4.49	71.74
Averages												65.59		5.62	71.21
CT-9, 8000scfm, Day 2															
HAP-39B	Tue-6/18	08:05	U1316	30.23	10.79	131.92	-	10.00	561.7	-	451.2	92.85	-	5.65	98.51
HAP-39B	Tue-6/18	08:52	U1319	36.34	9.78	150.58	-	7.04	589.6	-	482.8	92.55	-	3.54	96.09
HAP-39B	Tue-6/18	09:44	U1322	33.84	8.92	148.17	-	8.75	555.1	-	463.2	92.06	-	4.54	96.60
Averages												92.49		4.58	97.07
CT-9, 8000scfm, Day 3															
HAP-39C	Wed-6/19	08:26	U1325	37.47	8.11	153.78	-	11.23	601.4	-	463.5	93.50	-	5.26	98.77
HAP-39C	Wed-6/19	10:57	U1328	100.16	9.16	168.77	-	222.65	594.3	-	478.8	37.94	-	40.32	78.26
HAP-39C	Wed-6/19	12:58	U1331	40.26	9.49	159.25	-	7.91	851.7	-	484.7	127.63	-	3.61	131.23
Averages												86.36		16.40	102.75

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

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

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/Nm³)	H2O2 [Hg] In Gas (µg/Nm³)	KMnO4 [Hg] In Gas (µg/Nm³)	Total [Hg] In Gas (µg/Nm³)
<i>CT-9, Day 4, No Hg(0) Spk.</i>															
HAP-39DN	Thu-6/20	08:00	U1333	32.35	12.06	5.46	-	0.38	562.7	-	485.1	3.60	-	0.22	3.81
HAP-39DN	Thu-6/20	09:00	U1335	31.81	8.88	6.83	-	0.82	582.9	-	462.1	4.74	-	0.45	5.19
HAP-39DN	Thu-6/20	10:00	U1337	38.23	8.93	7.82	-	0.19	604.2	-	485.6	4.68	-	0.09	4.77
HAP-39DN	Thu-6/20	11:00	U1339	39.71	7.33	8.75	-	1.10	599.3	-	506.9	5.00	-	0.53	5.53
Averages												4.34		0.25	4.59
<i>CT-9, 8000scfm, Day 5</i>															
HAP-39E	Fri-6/21	08:45	U1342	37.85	9.41	57.07	-	4.40	600.1	-	502.4	34.28	-	2.21	36.49
HAP-39E	Fri-6/21	09:45	U1345	36.16	8.76	60.50	-	2.78	570.1	-	435.7	36.14	-	1.27	37.40
HAP-39E	Fri-6/21	10:30	U1348	42.50	7.45	70.73	-	3.38	572.3	-	455.1	36.08	-	1.37	37.45
Averages												35.50		1.62	37.12
<i>CT-9, 8000scfm, Day 6</i>															
HAP-39F	Mon-6/24	08:30	U1351	39.01	10.22	54.35	-	6.14	556.7	-	460.4	29.38	-	2.75	32.13
HAP-39F	Mon-6/24	09:30	U1354	37.41	9.32	56.39	-	4.50	558.6	-	467.6	31.90	-	2.13	34.02
HAP-39F	Mon-6/24	10:15	U1357	40.45	8.91	66.30	-	5.12	579.7	-	495.7	36.00	-	2.38	38.38
Averages												32.43		2.42	34.84
<i>CT-9, 8000scfm, Day 7</i>															
HAP-39G	Tue-6/25	08:00	U1361	35.21	9.03	55.40	-	6.12	545.8	-	417.4	32.53	-	2.75	35.28
HAP-39G	Tue-6/25	09:00	U1364	36.02	7.45	61.77	-	4.37	553.6	-	446.6	35.96	-	2.05	38.01
HAP-39G	Tue-6/25	10:00	U1367	32.79	7.14	54.00	-	4.94	571.2	-	447.0	35.64	-	2.55	38.19
Averages												34.71		2.45	37.16
<i>CT-9, 8000scfm, Day 8</i>															
HAP-39H	Wed-6/26	09:00	U1370	37.61	9.61	44.92	-	5.60	588.4	-	446.0	26.62	-	2.52	29.14
HAP-39H	Wed-6/26	10:00	U1373	34.36	9.34	46.78	-	3.65	576.2	-	486.1	29.72	-	1.95	31.68
HAP-39H	Wed-6/26	11:00	U1376	34.98	10.11	35.79	-	5.51	584.7	-	490.9	22.66	-	2.93	25.59
Averages												26.34		2.47	28.80
<i>CT-9, 8000scfm, Day 9</i>															
HAP-39I	Thu-6/27	08:00	U1379	34.66	10.65	41.10	-	4.80	613.6	-	508.3	27.57	-	2.67	30.24
HAP-39I	Thu-6/27	09:15	U1382	36.12	10.26	47.95	-	5.65	569.0	-	423.4	28.62	-	2.51	31.13
HAP-39I	Thu-6/27	10:15	U1385	37.46	9.37	49.94	-	5.57	562.7	-	459.1	28.42	-	2.59	31.00
Averages												28.20		2.59	30.79
<i>CT-9, 8000scfm, Day 10</i>															
HAP-39J	Fri-6/28	07:45	U1388	37.10	9.74	45.77	-	5.82	588.0	-	418.4	27.48	-	2.48	29.96
HAP-39J	Fri-6/28	08:30	U1391	36.10	9.51	43.92	-	4.01	599.7	-	503.3	27.64	-	2.12	29.75
HAP-39J	Fri-6/28	09:15	U1394	35.50	8.39	45.01	-	4.92	570.4	-	438.5	27.39	-	2.30	29.69
Averages												27.50		2.30	29.80

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA (10mM). a=calculated as average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

ECTC Pilot Trace Elements Testing
Mercury Gas Sampling Results
Removal Summary
 (Normalized to 5% O₂)

			Tris/EDTA					H2O2					KMnO4					Total Vapor					
Test ID	Date	Start Time	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)	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)	Total Hg Rem'l (%)	
Bsl, PTFE/GI, 4000scfm, 300F																							
HAP-34	Tue-6/4	09:46	6.6	21.9	21.5	15.3	1.7	-	-	-	-	-	1.1	28.1	12.6	27.0	55.0	7.7	50.0	34.2	42.3	31.6	
HAP-34	Tue-6/4	10:43	6.7	14.5	21.2	7.8	-45.6	-	-	-	-	-	0.5	29.2	13.6	28.6	53.4	7.2	43.7	34.8	36.5	20.5	
HAP-34	Tue-6/4	11:35	7.3	15.3	22.9	8.0	-49.4	-	-	-	-	-	0.5	26.8	13.3	26.2	50.3	7.9	42.1	36.2	34.2	14.0	
Averages			6.9	17.3	21.9	10.4	-31.1						0.7	28.0	13.2	27.3	52.9	7.6	45.2	35.0	37.6	22.0	
Fine Fly Ash, 4000scfm, 290F																							
HAP-35	Wed-6/5	07:55	7.8	18.4	30.5	10.6	-65.7	-	-	-	-	-	0.5	31.0	5.4	30.5	82.5	8.4	49.4	36.0	41.0	27.2	
HAP-35	Wed-6/5	09:58	8.8	17.3	30.8	8.4	-78.1	-	-	-	-	-	0.6	31.5	4.8	31.0	84.7	9.4	48.8	35.6	39.4	27.1	
HAP-35	Wed-6/5	09:40	9.4	18.0	35.2	8.6	-95.8	-	-	-	-	-	0.7	31.2	5.5	30.5	82.5	10.1	49.2	40.6	39.1	17.4	
Averages			8.7	17.9	32.1	9.2	-79.9						0.6	31.2	5.2	30.6	83.2	9.3	49.1	37.4	39.8	23.9	
Fine Fly Ash, 4000scfm, 300F																							
HAP-35R	Thu-6/6	08:40	7.6	17.3	29.5	9.7	-70.4	-	-	-	-	-	0.7	27.8	10.1	27.1	63.6	8.3	45.1	39.7	36.8	12.1	
HAP-35R	Thu-6/6	10:10	7.5	17.0	27.0	9.5	-59.3	-	-	-	-	-	0.7	21.3	9.1	20.6	57.2	8.3	38.3	36.2	30.0	5.6	
HAP-35R	Thu-6/6	11:05	6.9	14.8	26.1	7.9	-76.4	-	-	-	-	-	0.6	26.1	9.7	25.5	62.7	7.5	40.9	35.9	33.4	12.3	
Averages			7.4	16.4	27.6	9.0	-68.7						0.7	25.1	9.7	24.4	61.2	8.0	41.4	37.2	33.4	10.0	
Bsl, PTFE/GI, 8000scfm, 300F																							
HAP-36	Fri-6/7	08:30	5.7	9.6	17.2	3.9	-78.4	-	-	-	-	-	1.0	31.4	19.1	30.3	39.1	6.7	41.0	36.3	34.3	11.4	
HAP-36	Fri-6/7	09:18	5.4	11.2	21.5	5.9	-91.0	-	-	-	-	-	1.6	35.0	22.0	33.4	37.1	7.0	46.2	43.5	39.3	6.0	
HAP-36	Fri-6/7	10:00	5.0	10.7	20.2	5.7	-88.2	-	-	-	-	-	1.5	31.1	22.4	29.6	28.0	6.5	41.9	42.6	35.4	-1.8	
Averages			5.3	10.5	19.6	5.2	-85.9						1.4	32.5	21.2	31.1	34.7	6.7	43.0	40.8	36.3	5.2	
Fine Fly Ash, 8000scfm, 300F																							
HAP-36A	Mon-6/10	08:54	6.0	10.3	25.5	4.3	-147.0	-	-	-	-	-	0.9	33.9	16.7	33.1	50.8	6.9	44.3	42.2	37.4	4.6	
HAP-36A	Mon-6/10	09:37	6.6	10.9	25.7	4.4	-135.0	-	-	-	-	-	1.0	36.3	17.0	35.3	53.2	7.6	47.2	42.7	39.6	9.7	
HAP-36A	Mon-6/10	10:20	5.5	9.6	20.0	4.1	-107.4	-	-	-	-	-	0.8	34.9	15.8	34.1	54.8	6.3	44.6	35.8	38.2	19.7	
Averages			6.0	10.3	23.7	4.3	-129.8						0.9	35.0	16.5	34.1	52.9	6.9	45.3	40.2	38.4	11.3	
New PTGE/GI on Filter @300°F																							
			Base	PTFE/GI									Base	PTFE/GI				Base	PTFE/GI				
			CRG-1	CRG-2									CRG-1	CRG-2				CRG-1	CRG-2				
HAP-37	Tue-6/11	08:20	8.8	10.8	-	-	-23.6	-	-	-	-	-	21.2	20.4	-	-	3.6	30.0	31.3	-	-	-4.4	
HAP-37	Tue-6/11	09:42	8.0	9.6	-	-	-19.1	-	-	-	-	-	19.3	18.5	-	-	4.3	27.4	28.1	-	-	-2.5	
HAP-37	Tue-6/11	10:54	8.0	9.3	-	-	-16.7	-	-	-	-	-	19.1	18.7	-	-	2.1	27.1	28.0	-	-	-3.4	
HAP-37	Tue-6/11	12:09	7.6	6.2	-	-	-19.0	-	-	-	-	-	17.8	16.8	-	-	5.6	25.4	23.0	-	-	9.6	
Averages			8.1	9.0			-10.1						19.4	18.6			3.9	27.5	27.6			-0.19	
Conditioned PTGE/GI @300°F																							
			Base	PTFE/GI									Base	PTFE/GI				Base	PTFE/GI				
			CRG-1	CRG-2									CRG-1	CRG-2				CRG-1	CRG-2				
HAP-37A	Wed-6/12	08:36	9.3	10.1	-	-	-8.2	-	-	-	-	-	20.2	23.2	-	-	-14.8	29.6	33.3	-	-	-12.7	
HAP-37A	Wed-6/12	09:56	9.0	10.1	-	-	-13.0	-	-	-	-	-	20.8	22.7	-	-	-9.3	29.8	32.9	-	-	-10.4	
HAP-37A	Wed-6/12	11:11	8.8	10.2	-	-	-16.3	-	-	-	-	-	19.9	22.2	-	-	-11.8	28.7	32.5	-	-	-13.1	
HAP-37A	Wed-6/12	12:24	8.3	9.7	-	-	-17.7	-	-	-	-	-	19.9	22.2	-	-	-11.4	28.2	31.9	-	-	-13.2	
Averages			8.9	10.1			-13.8						20.2	22.6			-11.8	29.1	32.7			-12.4	
Bsl, 8000scfm, 300F																							
HAP-38	Fri-6/14	07:46	6.3	32.2	73.1	25.9	-127.2	-	-	-	-	-	1.5	173.5	100.9	172.0	41.8	7.8	205.7	174.0	197.9	15.4	
HAP-38	Fri-6/14	08:40	6.0	24.7	64.7	18.7	-162.2	-	-	-	-	-	1.4	140.8	95.0	139.4	32.5	7.4	165.5	159.6	158.1	3.5	
HAP-38	Fri-6/14	09:30	5.7	30.4	66.4	24.7	-118.5	-	-	-	-	-	1.6	155.4	98.6	153.8	36.6	7.2	185.8	164.9	178.6	11.2	
Averages			6.0	29.1	68.1	23.1	-136.0						1.5	156.6	98.2	155.1	37.0	7.5	185.7	166.2	178.2	10.0	

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

ECTC Pilot Trace Elements Testing
Mercury Gas Sampling Results
Removal Summary
(Normalized to 5% O₂)

Test ID	Date	Start Time	Tris/EDTA					H ₂ O ₂					KMnO ₄					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]	Hg Spiked	Hg Rem'l	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Rem'l
			(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)
CT-9, 8000scfm, Day 1																						
HAP-39A	Mon-6/17	08:50	7.9	46.6	96.3	38.7	-106.5	-	-	-	-	-	0.9	120.6	9.4	119.7	92.2	8.8	167.2	105.7	158.4	36.8
HAP-39A	Mon-6/17	09:46	8.8	39.6	89.9	30.8	-126.9	-	-	-	-	-	1.0	111.6	8.4	110.6	92.5	9.8	151.2	98.3	141.4	35.0
HAP-39A	Mon-6/17	10:36	7.5	36.8	87.2	29.4	-136.9	-	-	-	-	-	1.0	95.5	5.8	94.5	93.9	8.4	132.4	93.1	123.9	29.7
Averages			8.1	41.0	91.1	33.0	-123.4						0.9	109.2	7.9	108.3	92.9	9.0	150.2	99.0	141.2	33.8
CT-9, 8000scfm, Day 2																						
HAP-39B	Tue-6/18	08:05	5.8	45.2	145.5	39.4	-221.8	-	-	-	-	-	0.9	123.6	8.9	122.7	92.8	6.6	168.8	154.3	162.1	8.6
HAP-39B	Tue-6/18	08:52	6.0	37.1	131.9	31.1	-255.8	-	-	-	-	-	1.0	124.3	5.1	123.3	95.9	7.0	161.4	137.0	154.4	15.1
HAP-39B	Tue-6/18	09:44	5.7	32.7	121.9	27.0	-272.9	-	-	-	-	-	0.9	116.4	6.0	115.4	94.8	6.6	149.1	128.0	142.4	14.2
Averages			5.8	38.3	133.1	32.5	-250.2						0.9	121.4	6.6	120.5	94.5	6.7	159.7	139.7	153.0	12.6
CT-9, 8000scfm, Day 3																						
HAP-39C	Wed-6/19	08:26	6.6	22.0	116.1	15.5	-426.6	-	-	-	-	-	1.1	92.7	6.5	91.6	93.0	7.6	114.7	122.6	107.1	-6.9
HAP-39C	Wed-6/19	10:57	7.1	20.6	51.2	13.5	-149.2	-	-	-	-	-	1.2	112.6	54.5	111.4	51.6	8.3	133.2	105.7	124.9	20.6
HAP-39C	Wed-6/19	12:58	6.6	23.6	177.5	17.0	-650.4	-	-	-	-	-	1.0	111.8	5.0	110.8	95.5	7.6	135.5	182.5	127.8	-34.7
Averages			6.8	22.1	114.9	15.3	-408.7						1.1	105.7	22.0	104.6	80.0	7.9	127.8	136.9	119.9	-7.0

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

ECTC Pilot Trace Elements Testing
Mercury Gas Sampling Results
Removal Summary
 (Normalized to 5% O₂)

Test ID	Date	Start Time	Tris/EDTA					H2O2					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]	Hg Spiked	Hg Rem'l	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Rem'l
			(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)
CT-9, Day 4, No Hg(0) Spk.																						
HAP-39DN	Thu-6/20	08:00	-	11.4	6.4	-	43.6	-	-	-	-	-	-	0.7	0.4	-	47.1	-	12.1	6.8	-	43.8
HAP-39DN	Thu-6/20	09:00	-	7.5	6.3	-	17.1	-	-	-	-	-	-	0.8	0.6	-	24.6	-	8.3	6.9	-	17.8
HAP-39DN	Thu-6/20	10:00	-	6.4	6.2	-	3.4	-	-	-	-	-	-	0.4	0.1	-	72.1	-	6.9	6.3	-	7.7
HAP-39DN	Thu-6/20	11:00	-	5.0	5.9	-	-17.4	-	-	-	-	-	-	0.4	0.6	-	-46.7	-	5.4	6.5	-	-19.7
Averages				8.5	6.3		21.3							0.7	0.4		47.9		9.1	6.7		23.1
CT-9, 8000scfm, Day 5																						
HAP-39E	Fri-6/21	08:45	9.0	15.6	47.3	6.6	-204.2	-	-	-	-	-	1.0	42.8	3.1	41.7	92.9	10.0	58.3	50.4	48.3	13.6
HAP-39E	Fri-6/21	09:45	8.3	14.2	47.2	6.0	-231.6	-	-	-	-	-	0.9	42.8	1.7	41.8	96.1	9.2	57.0	48.9	47.8	14.2
HAP-39E	Fri-6/21	10:30	7.0	12.4	42.6	5.3	-244.3	-	-	-	-	-	0.7	37.7	1.6	37.0	95.7	7.8	50.1	44.2	42.3	11.7
Averages			8.1	14.1	45.7	6.0	-226.7						0.9	41.1	2.1	40.2	94.9	9.0	55.1	47.8	46.1	13.2
CT-9, 8000scfm, Day 6																						
HAP-39F	Mon-6/24	08:30	-	14.6	43.6	-	-198.8	-	-	-	-	-	-	40.3	4.1	-	-	-	54.8	47.7	-	13.1
HAP-39F	Mon-6/24	09:30	7.7	14.4	43.7	6.7	-204.3	-	-	-	-	-	1.1	40.1	2.9	39.0	92.7	8.8	54.5	46.6	45.7	14.5
HAP-39F	Mon-6/24	10:15	8.4	13.2	47.6	4.8	-260.1	-	-	-	-	-	1.4	39.5	3.1	38.1	92.0	9.8	52.7	50.8	42.9	3.7
Averages			8.0	14.1	45.0	5.8	-221.0						1.2	40.0	3.4	38.6	92.4	9.3	54.0	48.4	44.3	10.4
CT-9, 8000scfm, Day 7																						
HAP-39G	Tue-6/25	08:00	11.2	17.1	43.5	5.9	-153.9	-	-	-	-	-	1.3	39.0	3.7	37.7	90.6	12.5	56.1	47.2	43.6	15.9
HAP-39G	Tue-6/25	09:00	11.0	15.9	42.5	5.0	-166.2	-	-	-	-	-	1.6	36.2	2.4	34.6	93.3	12.6	52.1	44.9	39.6	13.9
HAP-39G	Tue-6/25	10:00	10.6	16.0	41.1	5.4	-157.1	-	-	-	-	-	1.7	35.2	2.9	33.5	91.6	12.3	51.2	44.1	38.9	13.9
Averages			10.9	16.4	42.4	5.4	-159.1						1.5	36.8	3.0	35.3	91.8	12.4	53.1	45.4	40.7	14.6
CT-9, 8000scfm, Day 8																						
HAP-39H	Wed-6/26	09:00	5.7	13.1	37.4	7.4	-185.5	-	-	-	-	-	0.9	32.5	3.5	31.6	89.1	6.7	45.6	40.9	39.0	10.3
HAP-39H	Wed-6/26	10:00	5.9	11.2	40.8	5.2	-265.1	-	-	-	-	-	1.0	37.7	2.7	36.7	92.9	6.9	48.9	43.5	41.9	11.0
HAP-39H	Wed-6/26	11:00	5.9	11.1	33.3	5.2	-198.7	-	-	-	-	-	1.0	36.3	4.3	35.3	88.1	6.9	47.5	37.6	40.5	20.8
Averages			5.9	11.8	37.2	5.9	-216.4						1.0	35.5	3.5	34.5	90.1	6.8	47.3	40.7	40.5	14.0
CT-9, 8000scfm, Day 9																						
HAP-39I	Thu-6/27	08:00	8.2	14.5	42.6	6.3	-194.2	-	-	-	-	-	0.9	35.2	4.1	34.3	88.3	9.1	49.7	46.7	40.5	5.9
HAP-39I	Thu-6/27	09:15	8.1	14.1	42.6	6.0	-201.6	-	-	-	-	-	0.8	39.2	3.7	38.3	90.5	8.9	53.3	46.4	44.4	13.0
HAP-39I	Thu-6/27	10:15	8.2	11.5	39.1	3.3	-239.9	-	-	-	-	-	0.9	36.5	3.6	35.6	90.3	9.2	48.0	42.7	38.8	11.2
Averages			8.2	13.4	41.4	5.2	-211.9						0.9	37.0	3.8	36.1	89.7	9.1	50.3	45.3	41.3	10.0
CT-9, 8000scfm, Day 10																						
HAP-39J	Fri-6/28	07:45	8.5	12.3	39.1	3.8	-217.1	-	-	-	-	-	1.2	31.5	3.5	30.3	88.8	9.7	43.8	42.6	34.1	2.8
HAP-39J	Fri-6/28	08:30	7.5	14.2	38.5	6.7	-171.2	-	-	-	-	-	1.1	30.1	2.9	29.0	90.2	8.6	44.3	41.4	35.8	6.5
HAP-39J	Fri-6/28	09:15	7.5	12.3	34.8	4.8	-183.1	-	-	-	-	-	1.1	30.0	2.9	29.0	90.3	8.5	42.3	37.7	33.8	10.9
Averages			7.8	12.9	37.4	5.1	-190.5						1.1	30.5	3.1	29.4	89.8	8.9	43.5	40.6	34.6	6.7

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

			Spike Recovery			Oxidation/Removal				
Test ID	Date	Start Time	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	Removal of Total Mercury (%)
Bsl, PTFE/GI, 4000scfm, 300F										
HAP-34	Tue-6/4	09:46	30.58	33.07	92.5	55.02%	-1.30%	-1.30%	56.32%	31.63%
HAP-34	Tue-6/4	10:43	26.46	33.07	80.0	53.43%	22.74%	22.74%	30.70%	20.48%
HAP-34	Tue-6/4	11:35	25.44	33.07	76.9	50.34%	28.32%	28.32%	22.01%	13.99%
Averages			27.49		83.1	52.98%	16.49%	16.49%	36.49%	22.57%
Fine Fly Ash, 4000scfm, 290F										
HAP-35	Wed-6/5	07:55	28.09	33.07	85.0	82.48%	39.08%	39.08%	43.40%	27.22%
HAP-35	Wed-6/5	09:58	26.02	33.07	78.7	84.67%	42.75%	42.75%	41.91%	27.09%
HAP-35	Wed-6/5	09:40	26.12	33.07	79.0	82.51%	55.13%	55.13%	27.38%	17.38%
Averages			26.75		80.9	83.23%	45.66%	45.66%	37.57%	23.89%
Fine Fly Ash, 4000scfm, 300F										
HAP-35R	Thu-6/6	08:40	23.61	33.07	71.4	63.56%	43.96%	43.96%	19.60%	12.07%
HAP-35R	Thu-6/6	10:10	20.86	33.07	63.1	57.21%	47.22%	47.22%	10.00%	5.57%
HAP-35R	Thu-6/6	11:05	24.49	33.07	74.1	62.73%	43.44%	43.44%	19.29%	12.30%
Averages			22.99		69.5	61.47%	44.70%	44.70%	16.77%	10.14%
Bsl, PTFE/GI, 8000scfm, 300F										
HAP-36	Fri-6/7	08:30	28.84	30.49	94.6	39.06%	24.10%	31.58%	0.00%	11.44%
HAP-36	Fri-6/7	09:18	32.54	30.49	106.7	37.11%	29.20%	33.16%	0.00%	5.99%
HAP-36	Fri-6/7	10:00	29.65	30.49	97.3	27.97%	30.37%	29.17%	0.00%	-1.78%
Averages			30.35		99.5	34.82%	27.93%	31.38%	0.00%	5.20%
Fine Fly Ash, 8000scfm, 300F										
HAP-36A	Mon-6/10	08:54	30.74	30.49	100.8	50.77%	44.80%	44.80%	5.97%	4.57%
HAP-36A	Mon-6/10	09:37	31.45	30.49	103.1	53.22%	40.66%	40.66%	12.56%	9.65%
HAP-36A	Mon-6/10	10:20	30.79	30.49	101.0	54.76%	29.66%	29.66%	25.10%	19.67%
Averages			30.99		101.6	52.94%	38.34%	38.34%	14.60%	11.28%
						#REF!	#REF!	#REF!	#REF!	#REF!
New PTGE/GI on Filter @300°F										
HAP-37	Tue-6/11	08:20	-	-	-	3.57%	9.76%	6.67%	0.00%	-4.38%
HAP-37	Tue-6/11	09:42	-	-	-	4.33%	7.94%	6.14%	0.00%	-2.55%
HAP-37	Tue-6/11	10:54	-	-	-	2.13%	6.98%	4.55%	0.00%	-3.42%
HAP-37	Tue-6/11	12:09	-	-	-	5.57%	-8.09%	-1.26%	0.00%	9.58%
Averages						3.87%	4.51%	4.19%	0.00%	-0.45%
						#REF!	#REF!	#REF!	#REF!	#REF!
Conditioned PTGE/GI @300°F										
HAP-37A	Wed-6/12	08:36	-	-	-	-14.79%	3.80%	-5.49%	0.00%	-12.72%
HAP-37A	Wed-6/12	09:56	-	-	-	-9.31%	5.60%	-1.85%	0.00%	-10.41%
HAP-37A	Wed-6/12	11:11	-	-	-	-11.76%	7.20%	-2.28%	0.00%	-13.14%
HAP-37A	Wed-6/12	12:24	-	-	-	-11.40%	7.36%	-2.02%	0.00%	-13.25%
Averages						-11.80%	5.98%	-2.91%	0.00%	-12.36%
Bsl, 8000scfm, 300F										
HAP-38	Fri-6/14	07:46	137.72	30.49	451.7	41.84%	23.58%	23.58%	18.25%	15.40%
HAP-38	Fri-6/14	08:40	117.11	30.49	384.1	32.54%	28.41%	28.41%	4.13%	3.51%
HAP-38	Fri-6/14	09:30	129.88	30.49	426.0	36.58%	23.17%	23.17%	13.41%	11.22%
Averages			128.24		420.6	37.31%	24.89%	24.89%	12.42%	10.47%

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

			Spike Recovery			Oxidation/Removal				
Test ID	Date	Start Time	Actual Spiked ($\mu\text{g}/\text{Nm}^3$)	Spiked Theo Hg ($\mu\text{g}/\text{Nm}^3$)	Percent Spike Rec (%)	Reduction in KMnO4 % Hg(0) Oxidized	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	Removal of Total Mercury (%)
<i>CT-9, 8000scfm, Day 1</i>										
HAP-39A	Mon-6/17	08:50	106.81	30.49	350.3	92.17%	41.20%	41.20%	50.96%	36.75%
HAP-39A	Mon-6/17	09:46	105.20	30.49	345.0	92.50%	45.04%	45.04%	47.46%	35.02%
HAP-39A	Mon-6/17	10:36	98.63	30.49	323.5	93.90%	52.78%	52.78%	41.12%	29.68%
Averages			103.55		339.6	92.78%	45.89%	45.89%	46.90%	34.09%
<i>CT-9, 8000scfm, Day 2</i>										
HAP-39B	Tue-6/18	08:05	109.60	30.49	359.5	92.83%	81.14%	81.14%	11.70%	8.56%
HAP-39B	Tue-6/18	08:52	107.43	30.49	352.3	95.94%	76.30%	76.30%	19.64%	15.13%
HAP-39B	Tue-6/18	09:44	107.61	30.49	352.9	94.83%	76.71%	76.71%	18.13%	14.15%
Averages			108.21		354.9	94.53%	78.07%	78.07%	16.46%	12.51%
<i>CT-9, 8000scfm, Day 3</i>										
HAP-39C	Wed-6/19	08:26	86.05	30.49	282.2	92.95%	101.46%	97.21%	0.00%	-6.88%
HAP-39C	Wed-6/19	10:57	93.00	30.49	305.0	51.64%	27.24%	27.24%	24.40%	20.63%
HAP-39C	Wed-6/19	12:58	93.25	30.49	305.8	95.52%	137.53%	116.52%	0.00%	-34.68%
Averages			90.77		297.7	79.19%	87.82%	83.50%	0.00%	-7.14%

*Shaded areas indicate sampling problems. H=Peroxide. TE3=Tris/EDTA(10mM). a=calculated as average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass.

Spike Recovery				Oxidation/Removal						
Test ID	Date	Start Time	Actual Spiked ($\mu\text{g}/\text{Nm}^3$)	Spiked Theo Hg ($\mu\text{g}/\text{Nm}^3$)	Percent Spike Rec (%)	Reduction in KMnO4 % Hg(O) Oxidized	Increase in Tris % Hg(O) Oxidized	Overall % Hg(O) Oxidized	Overall % Hg(O) Adsorbed	Removal of Total Mercury (%)
CT-9, Day 4, No Hg(0) Spk.										
HAP-39DN	Thu-6/20	08:00	-	0.00	-	47.13%	-678.4%	-678.4%	725.56%	43.77%
HAP-39DN	Thu-6/20	09:00	-	0.00	-	24.58%	-162.6%	-162.6%	187.18%	17.77%
HAP-39DN	Thu-6/20	10:00	-	0.00	-	72.09%	-50.5%	10.8%	0.00%	7.68%
HAP-39DN	Thu-6/20	11:00	-	0.00	-	46.7%	204.86%	79.10%	0.00%	-19.67%
Averages						43.48%	-331.3%	-331.3%	374.81%	26.79%
CT-9, 8000scfm, Day 5										
HAP-39E	Fri-6/21	08:45	35.08	30.49	115.0	92.86%	74.28%	74.28%	18.58%	13.63%
HAP-39E	Fri-6/21	09:45	36.72	30.49	120.4	96.12%	77.16%	77.16%	18.96%	14.22%
HAP-39E	Fri-6/21	10:30	35.99	30.49	118.0	95.71%	80.16%	80.16%	15.54%	11.70%
Averages			35.93		117.8	94.86%	77.08%	77.08%	17.78%	13.25%
CT-9, 8000scfm, Day 6										
HAP-39F	Mon-6/24	08:30	-	30.49	-	89.87%	72.09%	72.09%	17.79%	13.05%
HAP-39F	Mon-6/24	09:30	33.66	30.49	110.4	92.73%	73.10%	73.10%	19.64%	14.46%
HAP-39F	Mon-6/24	10:15	32.76	30.49	107.5	92.04%	87.13%	87.13%	4.91%	3.68%
Averages			33.21		108.9	91.54%	77.38%	77.38%	14.16%	10.48%
CT-9, 8000scfm, Day 7										
HAP-39G	Tue-6/25	08:00	32.18	30.49	105.5	90.58%	67.63%	67.63%	22.95%	15.95%
HAP-39G	Tue-6/25	09:00	32.08	30.49	105.2	93.30%	73.31%	73.31%	19.99%	13.87%
HAP-39G	Tue-6/25	10:00	34.03	30.49	111.6	91.64%	71.35%	71.35%	20.29%	13.95%
Averages			32.76		107.5	91.81%	70.68%	70.68%	21.13%	14.63%
CT-9, 8000scfm, Day 8										
HAP-39H	Wed-6/26	09:00	29.32	30.49	96.1	89.14%	74.66%	74.66%	14.47%	10.32%
HAP-39H	Wed-6/26	10:00	30.67	30.49	100.6	92.88%	78.59%	78.59%	14.29%	11.02%
HAP-39H	Wed-6/26	11:00	29.26	30.49	96.0	88.15%	60.99%	60.99%	27.16%	20.78%
Averages			29.75		97.6	90.12%	71.39%	71.39%	18.73%	14.06%
CT-9, 8000scfm, Day 9										
HAP-39I	Thu-6/27	08:00	28.71	30.49	94.2	88.27%	79.98%	79.98%	8.29%	5.87%
HAP-39I	Thu-6/27	09:15	31.11	30.49	102.0	90.45%	72.78%	72.78%	17.68%	12.99%
HAP-39I	Thu-6/27	10:15	29.11	30.49	95.5	90.26%	75.57%	75.57%	14.69%	11.17%
Averages			29.64		97.2	89.70%	75.98%	75.98%	13.71%	10.07%
CT-9, 8000scfm, Day 10										
HAP-39I	Fri-6/28	07:45	25.13	30.49	82.4	88.79%	84.91%	86.85%	0.00%	2.79%
HAP-39I	Fri-6/28	08:30	26.82	30.49	88.0	90.21%	80.63%	83.42%	0.00%	6.52%
HAP-39I	Fri-6/28	09:15	27.12	30.49	88.9	90.27%	74.91%	82.59%	0.00%	10.90%
Averages			26.36		86.4	89.74%	80.23%	84.99%	0.00%	6.69%

*Shaded areas indicate sampling problems. H=ferrous. TE₃=Tris(EDTA)(0.0mM). a=calculated as average of the SDA In and PIFF Out CEM values. PTE/GI = PTFE membrane on fibreglass.

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