DOE/PC/93.256--

ELECTRIC POWER RESEARCH INSTITUTE

ENVIRONMENTAL CONTROL TECHNOLOGY CENTER

REPORT TO THE STEERING COMMITTEE

July 1996

Approved Final Technical Report

US/DOE Patent Clearance is not Required
Prior to the Publication of this Document

RECEIVED

NOV 26 1996

OSTI

RECEIVED
USDOE/PETC
96 OCT -2 AM 9:51
ACQUISITION & ASSISTANCE DIV.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

For further information on:

Facility Operations and Miscellaneous ECTC inquires;

contact - Gary Andes (716) 795-3397

Wet FGD/Toxics Testing, Spray Drying/Dry FGD/Duct Injection technologies;

contact - Richard Rhudy (415) 855-2421

CAUTIONS TO USE OF THIS REPORT

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.

Neither EPRI, members of EPRI, Radian International, Parsons Power, nor any person acting on behalf of any of them: (a) makes any warranty, express or implied, with respect to the use of any information, apparatus, method, or process disclosed in this report or that any such use may not infringe privately owned rights; or (b) assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	v
SECTION I. FACILITY STATUS	1
General.....	1
Carbon Injection System	1
B&W CHX System.....	2
Air Purification, Inc. (Third-party testing)	2
Miscellaneous Systems.....	3
Financial Report.....	4
SECTION II. PILOT AND MINI-PILOT TEST ACTIVITY.....	7
APPENDIX A Test Schedules	23
APPENDIX B Process Summary Reports.....	27
APPENDIX C Analytical Summary Results.....	38
ECTC COSPONSORS DISTRIBUTION	59

LIST OF TABLES

Table

i.	Monthly Operating Costs By Task.....	4
1.	July Process Operating Conditions Summary	13
2.	HAP Test Conditions and Results.....	17

LIST OF FIGURES

Figure

i.	1996 Operation & Maintenance Costs.....	5
1.	Simplified Flow Diagram for ECTC Hg ⁰ Oxidation testing	20
2.	Effect of 10 lbs. Catalyst CT-9 (carbon-based) on Mercury Oxidation and Removal.....	20
3.	Effect of Catalyst CT-9 (Carbon-based) loading on Mercury Oxidation.....	21
4.	Effect of Accumulated Fine Kintigh Fly Ash on Mercury Oxidation and Removal	21
5.	Effect of Lignite (Pirkey) Fly Ash on Mercury Oxidation and Removal.....	22
6.	Mercury Capture Efficiency of Two NOxSORB® Impingers Upstream of Method 29T	22

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

General Operations

Operations and maintenance continued this month at the Electric Power Research Institute's Environmental Control Technology Center. Testing for the Hazardous Air Pollutant (HAP) test block was conducted using the Carbon Injection System (the 4.0 MW Spray Dryer Absorber System and the Pulse Jet Fabric Filter). Testing also continued across the B&W/CHX Heat Exchanger project. The 1.0 MW Cold-Side Selective Catalytic Reduction (SCR) unit and the 4.0 MW Pilot Wet Scrubber remained idle this month in a cold-standby mode. Inspections of these idled systems were conducted this month.

Pilot Testing Highlights

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

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

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

Testing in July continued to focus on catalytic oxidation of elemental mercury¹. Tests included the evaluation of three potential catalyst materials: catalysts CT-9 (a carbon-based catalyst), FAB-2A (a fine bituminous fly ash from Kintigh), and FAL-3 (a lignite fly ash #3).

¹Testing of catalyst materials has not been performed long enough to distinguish whether the material reacts with Hg^0 or catalyzes the oxidation of Hg^0 . For purposes of this report, the test material is assumed to catalyze Hg^0 oxidation.

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, 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 discussing work fatigue, hand protection, and personal work space protection were reviewed by the staff this month. 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 1518 as of 7/31/96. Also, the monthly safety meeting with the NYSEG Kintigh Station staff was rescheduled for early August due to scheduling conflicts this month.

CARBON INJECTION SYSTEM

The equivalent and actual availabilities for the ECTC Carbon Injection System (SDA/PJFF test configuration) this month were both 98% during this period. The system did not operate during the following periods:

- July 30-31 for 16 hours due to a facility outage to conduct repairs to the B&W CHX system.

The equivalent and actual availabilities for the Pulse-Jet Fabric Filter (PJFF) unit this month were both 95% during this period. The PJFF system did not operate during the following periods:

- July 30-31 for 34 hours due to replace 14 damaged filter bags, to reseal several tubesheet blanking plates, and to inspect/calibrate the pulse air system.

The Hazardous Air Pollutants (HAP) test block with the SDA/PJFF configuration continued this month with tests HAP-40; HAP-40R; HAP-41A; HAP-41B; HAP-41C; HAP-41D; HAP-41E; HAP-41F; HAP-42; HAP-42R; HAP-43A; HAP-43B; HAP-43C; HAP-44; HAP-45; HAP-45A; HAP-45B; HAP-45C; HAP-45D and HAP-46. These mercury removal investigations were conducted this month as elemental mercury was injected at different locations throughout the ECTC flue gas ductwork. Gas sampling during this testing 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.

To investigate the possibility of using an elemental mercury absorption solution in a scrubber, two extra impingers were added to the front of the Method 29T train at the PJFF inlet during tests HAP-41D and HAP-41E. In HAP-41D, a 30% NOxSORB® solution was tested in these impingers; in test HAP-41E, a 5% NOxSORB® solution was tested. By comparing the Tris and KMnO₄ mercury concentrations from these NOxSORB® impinger trains to baseline concentrations collected without NOxSORB® impingers, an estimate of the elemental and oxidized mercury removal efficiencies across the NOxSORB® impingers could be determined.

The operational parameters for the SDA/PJFF testing during this period included: gas flows of 8,000 scfm; inlet SO₂ concentrations as received from the NYSEG Kintigh Station flue gas inlet, and a PJFF outlet temperature of 300°F. There was no separate maintenance work required on the Carbon Injection System during this performance period.

B&W/CHX HEAT EXCHANGER PROJECT

Operations and testing across the Condensing Heat Exchanger (CHX) project for the DOE/PRDA program with B&W and CHX corp. continued this month. A B&W representative visited the ECTC during the second week of July to inspect the CHX system and take several measurements across the unit. Also, B&W requested that Parsons construct a system this month to blend particulate rich "dirty gas" into the clean raw gas (CRG) ductwork currently supplying the unit. The goal of this modification is to supply a flue gas to the unit which has a particulate mass loading value of 0.2 lb./MMBTU.

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

- A bypass duct was fabricated and installed to facilitate the proper blending of DRG to the CRG before supplying flue gas to the CHX unit.
- A restriction in a section of the DRG duct supplying flue gas to the CHX unit was removed. This allowed for proper blending of DRG to CRG.
- Repairs were made to damper 26 (DMP-26) and the manual isolation damper used in the system.

AIR PURIFICATION, INC. (ROTORFILTER™ PROJECT)

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 prepared the necessary technical approach 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™, 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 first shipment of system equipment for this testing arrived at the ECTC this month. Preparations are underway to establish various services necessary for system installation and operation. The placement of system equipment at the site location has also been initiated.

MISCELLANEOUS

A continuous on-line mercury analyzer from Radian Austin was received at the Center this month. As the system was installed and tested, problems were discovered with the unit (damage caused during shipping). This forced the return of the unit for further evaluation and repairs at the Radian Austin laboratory.

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

- Repairs were completed across the Pilot absorber system this month. This work involved reinforcing (with additional FRP) several sections of a spoolpiece that contains the upper spray header, and the absorber wall opposite the inlet of the absorber.
- 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 new valves for this system were received this month and will be scheduled for during the next available 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.
- Modifications to the sampling shed at the PJFF outlet location are being conducted to prepare for further testing of the on-line mercury analyzer system as it is returned from the Radian Austin laboratory.

FINANCIAL REPORT

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

	July	Year to Date	Contract Total
Task 100	\$ 74,961	\$ 351,031	\$ 14,006,973
Task 200	\$ 17,638	\$ 89,638	\$ 8,060,937
Task 300	\$ 5,388	\$ 21,625	\$ 1,160,498
Task 400	\$ ---	\$ 2,830	\$ 53,031
TOTAL	\$ 97,987	\$ 465,124	\$ 23,281,439

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

Figure i.
1996 Operation & Maintenance Costs

SECTION II PILOT AND MINI-PILOT TEST ACTIVITY

PILOT

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

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

Testing in July continued to focus on catalytic oxidation of elemental mercury¹. These tests included the evaluation of three potential catalyst materials: catalysts CT-9 (a carbon-based catalyst), FAB-2A (a fine bituminous fly ash from Kintigh), and FAL-3 (a lignite fly ash #3). This report includes test results from July 1 to July 29, 1996.

Summary of Operations

A detailed summary of operations for July is presented in Table 1. A simplified flow diagram of the ESP/SDA/PJFF gas path used during July's PJFF testing is shown in Figure 1. Almost all of the particulate was removed in the ESP before the flue gas was drawn through the SDA/PJFF and discharged to the Treated Gas Return (TGR) ductwork. During the July tests, elemental mercury was injected at the SDA outlet, and gas samples were collected at the SDA inlet (pre-spike) and PJFF inlet (post-spike). The particulate was removed in the ESP before the flue gas was drawn through the SDA/PJFF and discharged to the TGR. During the July 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 at the PJFF outlet (post-catalyst) using

Testing of catalyst materials has not been performed long enough to distinguish whether the material reacts with Hg^0 or catalyzes the oxidation of Hg^0 . For purposes of this report, the test material is assumed to catalyze Hg^0 oxidation.

Method 29T. The use of these injection and sampling locations minimizes the gas residence time in the ductwork with this configuration.

Three different catalysts were tested for extended periods of time in the PJFF to determine their ability to oxidize elemental mercury. Catalysts were tested by "slug-feeding" various catalyst solids into the duct upstream of the PJFF to coat the PJFF bags with catalyst material. Fiberglass bags coated with polytetrafluoroethylene (PTFE) were used throughout July. (These bags have proven to be more chemically resistant than the acrylic bags used in May). After coating each catalyst onto the PJFF bags, the PJFF was not cleaned until testing of the catalyst was complete; therefore, small amounts of fly ash escaping the ESP accumulated on the bags during each test.

As the testing with each catalyst was complete, the catalyst material was cleaned off the PJFF bags by passing "dirty" flue gas (i.e., no particulate removed by the ESP) through the PJFF for one to two days with pulse cleaning initiated at 6 inches of H₂O pressure drop across the bags. Elemental mercury oxidation across the PJFF was then determined at baseline conditions (i.e., no catalyst) by thoroughly cleaning the accumulated fly ash off the PJFF bags. This cleaning was accomplished by passing "clean" flue gas (i.e., almost all of the particulate removed by the ESP) through the PJFF with 5-minute cleaning cycles every hour. Pulse-cleaning of the PJFF was stopped immediately before the next catalyst material was added to the PJFF. Baseline measurements were made six times in July.

Testing was interrupted on July 29 when several failures/leaks in the PJFF bags were discovered. The PJFF was taken off-line, and 9 bags were replaced on July 30. A subsequent visolite test revealed 5 more damaged bags that were replaced on July 31. These bag failures appeared to be caused by physical stresses, possibly by excessive pulse-cleaning over the last few months. Several blanking plates were also resealed during this period.

Summary of Results

Results obtained from July 1 to July 29 are discussed below. Test conditions and results during this time are presented in Table 2. Complete analytical data tables and process data summary reports for all of the tests completed in July 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 KMnO₄ impingers) can be attributed to three different mechanisms. In each of these mechanisms, elemental mercury is believed to first adsorb onto the solid surface before undergoing any chemical change. In the first mechanism, adsorbed elemental mercury is oxidized and then released back into the outlet gas stream. Evidence of this mechanism is indicated by an increase in oxidized mercury across the PJFF (as measured by the mercury concentration difference in the inlet and outlet Tris impingers). In the second mechanism, the elemental mercury is oxidized, but the oxidized form remains adsorbed to the PJFF solids. In the third mechanism,

adsorbed elemental mercury remains on the PJFF solids without changing chemical form.

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

Effect of Accumulated Kintigh Bituminous Fine Fly Ash

Tests HAP-43A through HAP-43C evaluated the effect of accumulated Kintigh fine fly ash (FAB-2A) on oxidation. Figure 2 illustrates the percent reduction in elemental mercury 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 with Kintigh fly ash on the bags. Catalyst CT-9 was tested prior to these tests. Therefore, CT-9 was cleaned off the bags, and baseline measurements were repeated on two consecutive days before adding the fly ash (HAP-42). The data on Day 0 were collected within 2 hours after the PJFF was cleaned and fine fly ash passing through the ESP was allowed to deposit on the PJFF bags. At the end of Day 1, the ESP was detuned for an hour to allow the pressure drop across the PJFF to increase by one inch H_2O , indicating an increase in the fly ash loading on the bags.

As shown in Figure 2, the baseline elemental mercury oxidation was about 35% before allowing fine fly ash to accumulate on the bags. Based on all baseline tests conducted in July, elemental mercury oxidation is 35-45% with "clean" bags. This level of oxidation is attributed to the relatively long gas residence time between the inlet and outlet PJFF sampling points and to small amounts of fly ash on the bags. Previous ECTC results have shown that even in "clean" flue gas with very little fly ash, elemental mercury oxidation increases as the gas residence time increases. In addition to the effect of residence time, small amounts of fly ash remain imbedded in the bags despite efforts to thoroughly "clean" them; this embedded fly ash may affect oxidation.

After allowing fine fly ash to accumulate on the bags, elemental mercury oxidation increased to about 55%. Total mercury removal was slightly higher than 10% during each test, indicating that some of the elemental mercury may have been adsorbed. Oxidation did not change significantly from Day 1 to Day 2 after increasing the fly ash loading by detuning the ESP. This result is inconsistent with the expected effect of loading on oxidation. However, the data in Figure 2 indicate that fly ash does have some effect on oxidation. Since fly ash accumulation occurs while testing each catalyst, about 55% oxidation should be attributed to fly ash accumulation while testing each catalyst.

Effect of CT-9 Carbon Catalyst

Tests HAP-41A through HAP-41F evaluated elemental mercury oxidation across catalyst CT-9 (carbon-based) by adding 10 pounds of CT-9 to the PJFF bags. This catalyst was previously tested in June by adding 20 pounds to the PJFF bags. After adding the catalyst and collecting gas samples the first day, no more samples were collected until the catalyst had been on the bags for six days due to the Fourth of July holiday. Baseline measurements were collected before adding CT-9 (tests HAP-40 and HAP-40R).

Figure 3 illustrates the percent reduction in elemental mercury 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 with 10 pounds of CT-9 on the bags. Baseline data were collected for two consecutive days prior to catalyst deposition with the PJFF bags thoroughly cleaned. The data on Day 0 was collected within 16 hours after depositing the catalyst on the PJFF bags.

As shown in Figure 3, elemental mercury oxidation increased from a baseline value of about 35% to 90% after the catalyst was added to the PJFF bags. Over the next nine days, with the exception of day 5, oxidation remained at about 75%. Total mercury removal during this time averaged less than 10%, indicating that very little adsorption occurred. Samples collected on Day 5 resulted in only 24% oxidation and 47% adsorption of the elemental mercury. These results can not be explained but are certainly inconsistent with the other days.

As discussed above, the accumulation of fly ash on the PJFF bags increases the baseline oxidation value from about 35% to 55%. Therefore, during the catalyst CT-9 tests, the steady-state mercury oxidation increased from the baseline value (with fine ash accumulation) of 55% to 75%. This additional 20% oxidation efficiency implies that catalyst CT-9 oxidized 44% of the elemental mercury not oxidized by the fly ash. In terms of total elemental mercury removal, catalyst CT-9 increased removal from about 68% (removal with fine fly ash only, see Figure 2) to 87%. In this case, catalyst CT-9 removed 60% of the elemental mercury not removed by the fly ash.

The addition of CT-9 clearly improves elemental mercury oxidation and removal across the PJFF. However, because of the continuous presence of fly ash on the bags, which can also oxidize mercury, isolating the effect of CT-9 is difficult. Based on results collected in July, if no fly ash were present on the bags, CT-9 would be expected to oxidize/remove about 50% of the elemental mercury for an extended period of time.

Figure 4 compares elemental mercury oxidation across the PJFF with both 10 and 20 pounds of catalyst CT-9 on the bags (these data have not been corrected for the effect of fly ash accumulation). Mercury oxidation is not significantly different at the two different catalyst loadings. With either 10 or 20 pounds of catalyst on the bags, elemental mercury oxidation reached a steady-state value of 70% to 80%. In addition, the total reduction in elemental mercury across the PJFF was not

significantly different (87% with 10 pounds and 92% with 20 pounds, respectively). As observed after increasing the fly ash loading, these results are not consistent with the expected trend of greater oxidation and/or removal at higher catalyst loadings.

At both catalyst loadings, the first gas samples were taken after the catalyst was exposed to flue gas for 16 to 18 hours. Catalyst CT-9 is known to adsorb mercury; therefore, some time is required for the catalyst to become "saturated" with mercury in the flue gas. With 10 pounds of catalyst on the bags, the first measurement of oxidation (Day 0) was essentially equal to subsequent measurements. However, at the 20 pound loading, the first measurement resulted in only 45% oxidation compared to 70-80% during the remaining days. These results suggest that the 10 pounds of catalyst CT-9 were saturated with mercury within about 16 hours since the first measurement of oxidation was equal to subsequent measurements. When testing 20 pounds of catalyst, the steady-state oxidation value was not obtained until the second day of testing since 20 pounds of catalyst would take about twice as long to become saturated with mercury.

Effect of Lignite Fly Ash #3

Tests HAP-45A through HAP-45D evaluated the effect of lignite fly ash #3 (FAL-3) on oxidation. Figure 5 illustrates the percent reduction in elemental mercury 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 with 40 pounds of FAL-3 on the bags. Kintigh ash was cleaned off the bags, and baseline measurements were repeated one day before adding the new fly ash (HAP-44). The data on Day 0 were collected within 2 hours after the PJFF was cleaned and 40 pounds of the new fly ash were deposited on the PJFF bags.

As shown in Figure 5, elemental mercury oxidation increased from a baseline value of approximately 45% to 65% after FAL-3 was added. Over three days of testing, elemental mercury oxidation remained at about 65%. Again, total mercury removal was generally less than 10%, indicating very little adsorption occurred. Based on the Kintigh ash test, at least 55% oxidation can be associated with the fine fly ash accumulation. Since the baseline oxidation varied by 10% (from 45% at the beginning of this test compared to a previous value of 35%), the 65% oxidation obtained with FAL-3 is not statistically different than the 55% oxidation obtained with the fine fly ash alone. Therefore, the effect of FAL-3 on oxidation appears to be minimal.

Fly ash FAL-3 was tested previously in the Radian Austin laboratory. The lab tests indicated that this fly ash oxidized about 15% of the elemental mercury. This level of oxidation would increase the baseline value of 55% to about 62%. This increase in oxidation is clearly within the baseline variability observed. Therefore, FAL-3 may be oxidizing some elemental mercury, but this low level can not be measured. The lab results also indicated that FAL-3 removed about 40% of the elemental mercury. This relatively high level of removal was not observed during the July test.

Effect of NOxSORB® Solution in Impinger Train

Results from other test facilities indicate that NOxSORB® solution can potentially remove elemental mercury from a flue gas stream. These results are encouraging since this solution could potentially be added to a wet-scrubber to increase elemental mercury removal. To investigate this possibility, two extra impingers were added to the front of the Method 29T train at the PJFF inlet during tests HAP-41D and HAP-41E. In HAP-41D, a 30% NOxSORB® solution was tested; in test HAP-41E, a 5% NOxSORB® solution was tested. By comparing the Tris and KMnO₄ mercury concentrations from these NOxSORB® trains to baseline concentrations collected without NOxSORB® impingers, an estimate of the elemental and oxidized mercury removal efficiencies across the NOxSORB® impingers could be determined.

Figure 6 illustrates the results from the NOxSORB® tests. Overall, the 30% NOxSORB® solution removed about 41% of the total mercury at the PJFF inlet. The oxidized and elemental mercury removal efficiencies were 67% and 33%, respectively, when using the 30% solution. The 5% NOxSORB® solution removed approximately 33% of the total mercury. The oxidized and elemental mercury removal efficiencies were 84% and 16%, respectively, when using the 5% solution. The ECTC results indicate that the concentrated NOxSORB® solution removed about 33% of the elemental mercury. This removal efficiency is a significant improvement over wet scrubbers which typically remove no elemental mercury. However, the NOxSORB® was tested at low pH (< 2) which is not typical of wet scrubbers.

Lab tests were also conducted with NOxSORB® solution in Austin. NOxSORB® was added to a Tris solution, resulting in a solution with pH 8. High pH tests were conducted with both 30% and 4% NOxSORB® solutions, with and without NOx, and at different temperatures. Under these conditions, no elemental mercury was removed. One test was conducted using 4% NOxSORB® with the pH less than 4.5, and about 10% elemental mercury removal was achieved. These lab data suggest that NOxSORB® will not remove significant amounts of elemental mercury at scrubber conditions.

Future Tests

The TER test block will continue in August with the PTFE/fiberglass bags in the PJFF. The effect of different catalysts on the oxidation of elemental mercury will be the focus of August testing. An outage is scheduled for August 12 to install the Rotorfilter^a system for an upcoming test block. The Rotorfilter test block is scheduled to begin on August 19 and will run for approximately 4 weeks.

Table 1. July Process Operating Conditions Summary

Date	Test ID#	Gas Sampling Summary	Process Summary
Mon., 7/1	HAP-40 Baseline 8000 scfm 300° F PJFF outlet. 30.49 µg/Nm ³ Hg ⁰ spike.	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 3.14 " H ₂ O at 08:00 hourly average. PJFF was pulse-cleaned for 10 min on the hour starting at 14:00 (after testing).
Tues., 7/2	HAP-40R Baseline 8000 scfm 300°F PJFF outlet. 30.49 µg/Nm ³ Hg ⁰ spike.	Gas sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). After gas sampling, 10 lbs. of carbon were deposited onto the PJFF bags.	PJFF ΔP was 2.94 " H ₂ O at 08:00 hourly average. Maintenance done on fabric filter opacity monitor. The PJFF ΔP increased from 3.0 " H ₂ O to 5.3 " H ₂ O when the carbon was deposited.
Wed., 7/3	HAP-41A CT-9 8000 scfm 300°F PJFF outlet. 25.75 µg/Nm ³ Hg ⁰ spike.	Day 1 of gas sampling with carbon. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). The mercury spike at 25.75 µg/Nm ³ reflects the re-calculated value after calibrating the vessel rotameter.	PJFF ΔP was 5.8 " H ₂ O at 08:00 hourly average.
Thurs. - Sun. 7/4 - 7/7		PJFF run with no pulsing. Carbon on the bags being conditioned over the long weekend.	
Mon., 7/8	HAP-41B CT-9 8000 scfm 300°F PJFF outlet. 25.75 µg/Nm ³ Hg ⁰ spike.	Day 6 since carbon deposited onto the PJFF bags. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	Mercury field analyzer arrived on site. PJFF ΔP had dropped from a high of 6.2 " H ₂ O to 6.04 " H ₂ O at the 08:00 hourly reading. NYSEG continues to increase and decrease unit load from 180 MW
Tues., 7/9	HAP-41C CT-9 8000 scfm 300°F PJFF outlet. 28.98 µg/Nm ³ Hg ⁰ spike.	Day 7 since carbon deposited. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst). The SDA inlet sampling location is now on the upper platform. The mercury field unit will use the previous sampling port. The spiked mercury amount was increased to return to a spike of approx. 30 µg/Nm ³ . The change was due to a new rotameter calibration curve generated for the mercury vessel stream.	Mercury field unit set up at the SDA inlet location. PJFF ΔP was 6.04 " H ₂ O at 08:00 hourly.

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

Date	Test ID#	Gas Sampling Summary	Process Summary
Wed., 7/10	HAP-41D CT-9 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Day 8 since carbon deposited. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.03 " H_2O at 08:00 hourly.
Thurs., 7/11	HAP-41E CT-9 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Day 9 since carbon deposited. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	PJFF ΔP was 6.05 " H_2O at 08:00 hourly.
Fri., 7/12	HAP-41F CT-9 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Day 10 since carbon deposited. Sampling at the SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	New I/O board and new diaphragm for Teflon-coated heated head pump. PJFF ΔP was 6.14 " H_2O at 08:00 hourly.
Sat - Sun. 7/13 - 7/14			Operating with dirty raw gas to the PJFF until Sun. at 18:00 when switched to clean raw gas. ΔP initiate at 6.0 " H_2O with dirty raw gas. 5 min. pulsing on the hour with clean raw gas. Work ongoing at the PJFF outlet shed.
Mon., 7/15	HAP-42 Baseline 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Changed prespike sampling location to the CRG duct to allow work on the pilot wet scrubber, other locations remain the same: PJFF inlet (post spike), and PJFF outlet (post catalyst).	Ancor on site making repairs to the WS causing move to clean raw gas duct for prespike location. Mercury field unit computer controls shipped back to Austin for continued work. PJFF ΔP was 4.14 " H_2O at 08:00 hourly. Started pulsing 10 min. on the hour after sampling.
Tues., 7/16	HAP-42R Baseline 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the CRG duct (prespike), PJFF inlet (post spike), and PJFF outlet.	PJFF ΔP was 3.69 " H_2O at 08:00 hourly. Ancor finishing repairs to WS.
Wed., 7/17	HAP-43A Accumulated Fine Fly Ash 8000 scfm 300°F outlet 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Switched sampling back to the SDA inlet location (prespike). Sampling at SDA inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was 4.64 " H_2O at 8:00. At 2:00 AM the main compressor tripped resulting in low instrument air pressure that caused the PJFF bypass damper to open. The PJFF was back on-line by 2:55 with no loss of ΔP due to the outage (PJFF ΔP was 4.4 " H_2O before and after).

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

Thurs., 7/18	HAP-43B Accumulated Fine Fly Ash 8000 scfm 300°F outlet 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was 5.15" H_2O at 8:00 rising to 5.23 by noon. After gas sampling, the ESP was detuned to allow more fly ash to accumulate on the PJFF. The ΔP was allowed to increase to 6.6" H_2O before the ESP was returned to its original settings.
Fri., 7/19	HAP-43C Accumulated Fine Fly Ash 8000 scfm 300°F outlet 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was 6.68" H_2O at 8:00 rising to 6.72 by noon. At 15:00, the dirty raw gas was routed to the PJFF and the cleaning cycle was set to pulse clean at 6" H_2O stopping at 5.9" H_2O .
Sat., 7/20			Continued to run dirty raw gas through the PJFF with regular cleaning.
Sun., 7/21			At 2:00 AM, the dirty raw gas flow to the PJFF was stopped and clean raw gas was restarted. The cleaning cycle was set for 10 minutes every hour.
Mon., 7/22	HAP-44 Baseline 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet.	The cleaning cycle was stopped at 7:00 before gas sampling for baseline conditions. The PJFF ΔP was 3.58" H_2O at 8:00. Before each gas sample, the PJFF was pulse-cleaned for 5 minutes. After gas sampling, the cleaning cycle was returned to 10 minutes each hour.
Tues., 7/23	HAP-45A FAL-3 Fly Ash 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The cleaning cycle was stopped at 5:00. In 10 lb. increments, 40 lbs. of FAL-3 fly ash was added to the PJFF at 5:00 bringing the PJFF ΔP up to 5.38" H_2O . Gas sampling was started at all three locations at 7:30. The probe for the SDA inlet shorted twice. After a new probe was rewired, the probe box shorted. Sampling at the two PJFF locations was started around 13:00 while working on the SDA inlet probe box.
Wed., 7/24	HAP-45B FAL-3 Fly Ash 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was 5.8" H_2O at 8:00.

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

Thurs., 7/25	HAP-45C FAL-3 Fly Ash 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was at 6.22 " H_2O at 8:00.
Fri., 7/26	HAP-45D FAL-3 Fly Ash 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The PJFF ΔP was at 6.50 " H_2O at 8:00. At 15:00, the dirty raw gas was routed to the PJFF and the cleaning cycle was set to start at 6 " H_2O and stop at 5.8 " H_2O .
Sat., 7/27			Dirty raw gas with regular cleaning.
Sun., 7/28			At 9:00 PM, 7/27, the dirty raw gas flow to the PJFF was stopped and clean raw gas was restarted. The cleaning cycle was set for 5 minutes every hour.
Mon., 7/29	HAP-46 Baseline 8000 scfm 300°F PJFF outlet. 28.98 $\mu\text{g}/\text{Nm}^3 \text{Hg}^0$ spike.	Sampling at the SDA Inlet (prespike), PJFF inlet (post spike), and PJFF outlet (post catalyst).	The cleaning cycle was stopped at 11:00 before sampling for the baseline. The PJFF ΔP was 3.43 " H_2O at 11:00. Before each gas sample, the PJFF was cleaned (pulsed) for 5 minutes. After gas sampling, the cleaning cycle was returned to 5 minutes each hour.
Tues., 7/30			Cleaning cycle was stopped at 11:00. In 20 lb. increments, 40 lb. of FAB-2A fly ash was added to the PJFF at 11:15. While the ash was added, the PJFF outlet opacity increased by 2% for the entire period when ash was added. The PJFF ΔP increased only slightly from 3.2 to 3.8 " H_2O . The second 20 lbs. brought the ΔP up to 4.2 " H_2O with the same increase in outlet opacity. The unit was taken off gas and allowed to cool before visolite was added to the inlet. At least 3 bags had failed and approximately 8 blanking plates from the initial inspection.
Wed., 7/31			Unit off-line. When the PJFF was inspected with the black light, 9 bags and about 15 blanking plates showed signs of leakage. The bags were replaced and the plates were recaulked. A gas sampling train with the iodated carbon on the filter was set up and run over night to condition the carbon. At this point, no mercury spiking was taking place.

Table 2. HAP Test Conditions and Results

Test	Spike	Post-Catalyst Sample Location	Spike Res. Time	SDA Gas Flow	PJFF ΔP	PJFF Conditions Temp.	Catalyst Mass	Flue Gas Mercury Concentrations (μg/Nm³)								Reduction in KMnO₄ % Hg(0)	Increase in Tris % Hg(0)	Overall % Hg(0)	Overall % Hg(0)	% Rem. of Total
								SDA Inlet (Prespike)		PJFF Inlet (Postspike)		PJFF Outlet (Post Catalyst)		Hg(0)						
								Tris	KMnO₄	Tris	KMnO₄	Tris	KMnO₄	Spike						
ID#	Test Description	Location	Location	(sec.)	(scfm)	("H₂O)	(°F)	(lb)	Tris	KMnO₄	Tris	KMnO₄	Tris	KMnO₄	Spike	Oxidized	Oxidized	Oxidized	Adsorbed	Hg
HAP-40	Baseline with PTFE/fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	3.0	299	0	5.9	1.1	11.6	26.6	19.8	15.6	31.2	41	31	36	0	7
HAP-40R	Repeat of Baseline Test	SDA Outlet	PJFF Outlet	12	8000	3.0	299	0	9.1	1.2	13.5	33.5	24.5	19.8	36.7	41	33	37	0	6
HAP-41A	Catalyst CT-9 on PJFF bags (20#). Day 1	SDA Outlet	PJFF Outlet	12	8000	6.2	300	20	9.7	1.1	16.8	30.4	43.2	2.2	36.4	93	87	90	0	4
HAP-41B	Catalyst CT-9 on PJFF bags. Day 6	SDA Outlet	PJFF Outlet	12	8000	6.1	300	20	6.1	5.6	6.4	43.2	16.6	12.8	37.9	70	24	24	47	41
HAP-41C	Catalyst CT-9 on PJFF bags. Day 7	SDA Outlet	PJFF Outlet	12	8000	6.1	300	20	7.6	0.9	13.6	39.9	44.5	5.0	45.0	87	77	82	0	7
HAP-41D	Catalyst CT-9 on PJFF bags. Day 8	Inlet	CRG Duct	12	8000	6.0	299	20	6.8	1.1	11.4	35.4	36.2	4.7	38.9	87	70	70	17	13
HAP-41E	Catalyst CT-9 on PJFF bags. Day 9	ESP Fan Inlet	CRG Duct	12	8000	6.1	301	20	6.3	0.9	11.9	34.6	36.7	4.9	39.3	86	72	72	14	11

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

Test ID#	Test Description	Location	Spike Location	Post-Spike Time (sec.)	Res. Gas Flow (scfm)	PJFF Catalyst			Flue Gas Mercury Concentrations (µg/Nm³)						Hg(0) Spike	Reduction in KMnO₄ % Hg(0) Oxidized	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	% Rem. of Total Hg			
						Catalyst Sample	Res. Time	Gas Flow	PJFF ΔP ("H₂O)	Conditions Temp. (°F)	Mass (lb)	SDA Inlet (Prespike)		PJFF Inlet (Postspike)							PJFF Outlet (Post Catatlyst)		
												Tris	KMnO₄	Tris							KMnO₄	Tris	KMnO₄
HAP-41F	Catalyst CT-9 on PJFF bags. Day 10	SDA Outlet	PJFF Outlet	12	8000	6.1	302	20	6.3	0.8	10.9	31.6	34.8	5.0	35.4	84	76	80	0	6			
HAP-42	Baseline with PTFE/ fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	4.1	299	0	6.0	1.0	9.7	30.7	20.9	13.8	33.4	55	36	36	19	14			
HAP-42R	Repeat of Baseline test.	SDA Outlet	PJFF Outlet	12	8000	3.7	300	0	5.6	0.9	11.4	35.1	23.7	17.8	40.0	49	35	35	14	11			
HAP-43A	Accumulated fine fly ash (FAB-2A) on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	4.7	301	NM	7.5	1.1	12.6	31.7	27.5	11.8	35.7	63	47	47	16	11			
HAP-43B	Accumulated fine fly ash (FAB-2A) on PJFF bags. Day 2	SDA Outlet	PJFF Outlet	12	8000	5.2	301	NM		1.1	12.6	32.8	30.1	11.6	36.9	65	53	59	0	8			

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

Test ID#	Test Description	Spike Location	Post-Catalyst Sample Location	Spike Res. Time (sec.)	SDA Gas Flow (scfm)	PJFF Catalyst			Flue Gas Mercury Concentrations (µg/Nm³)						Hg(0) Spike	Reduction in KMnO₄ % Hg(0) Oxidized	Increase in Tris % Hg(0) Oxidized	Overall % Hg(0) Oxidized	Overall % Hg(0) Adsorbed	% Rem. of Total Hg
						PJFF ΔP ("H₂O)	Conditions Temp. (°F)	Mass (lb)	SDA Inlet (Prespike)		PJFF Inlet (Postspike)		PJFF Outlet (Post Catalyst)							
									Tris	KMnO₄	Tris	KMnO₄	Tris	KMnO₄						
HAP-43C	Accumulated fine fly ash (FAB-2A) on PJFF bags. Day 3	SDA Outlet	PJFF Outlet	12	8000	6.7	298	NM	5.4	0.8	9.4	26.2	24.5	6.6	29.4	75	58	58	17	13
HAP-44	Baseline with PTFE/ fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	3.6	303	0	5.5	0.9	10.0	31.9	23.3	15.4	35.5	52	42	47	0	8
HAP-45A	40# lignite ash (FAL-3) on PJFF bags. Day 1	SDA Outlet	PJFF Outlet	12	8000	5.4	302	40	9.1	1.0	12.0	30.0	29.8	9.8	31.9	67	59	63	0	6
HAP-45B	40# lignite fly ash (FAL-3) on PJFF bags. Day 2	SDA Outlet	PJFF Outlet	12	8000	5.8	300	40	6.3	0.8	11.8	38.5	35.1	10.2	43.2	74	61	67	0	10
HAP-45D	40# lignite fly ash (FAL-3) on PJFF bags. Day 4	SDA Outlet	PJFF Outlet	12	8000	6.5	299	40	6.2	0.9	10.2	29.5	30.8	7.3	32.6	75	70	73	0	4
HAP-46	Baseline with PTFE/ fiberglass PJFF bags	SDA Outlet	PJFF Outlet	12	8000	3.5	302	0	7.1	1.1	12.2	37.9	27.6	17.1	41.9	55	41	41	14	11

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

Figure 2. Effect of 10 lbs. Catalyst CT-9 (Carbon-based) on Mercury Oxidation and Removal.

Figure 3. Effect of Catalyst CT-9 (Carbon-based) Loading on Mercury Oxidation.

Figure 4. Effect of Accumulated Fine Kintigh Fly Ash on Mercury Oxidation and Removal.

APPENDIX A
TEST SCHEDULES

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

July 1996 (Updated August 6, 1996)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	¹ Haz Air Pollutants HAP-40 Baseline 8000 scfm, 300F PJFF Hg Spiking	² Haz Air Pollutants HAP-40R Repeat Baseline 8000 scfm, 300F PJFF Hg Spiking	³ Haz Air Pollutants HAP-41A 10 lbs of Carbon 8000 scfm, 300F PJFF Hg Spiking	⁴ Haz Air Pollutants HAP-41A	⁵ Haz Air Pollutants HAP-41A	⁶ Haz Air Pollutants HAP-41A
⁷ Haz Air Pollutants HAP-41A	⁸ Haz Air Pollutants HAP-41B 10 lbs of Carbon 8000 scfm, 300F PJFF Day 6	⁹ Haz Air Pollutants HAP-41C 10 lbs of Carbon 8000 scfm, 300F PJFF Day 7	¹⁰ Haz Air Pollutants HAP-41D 10 lbs of Carbon 8000 scfm, 300F PJFF Day 8	¹¹ Haz Air Pollutants HAP-41E 10 lbs of Carbon 8000 scfm, 300F PJFF Day 9	¹² Haz Air Pollutants HAP-41F 10 lbs of Carbon 8000 scfm, 300F PJFF Day 10	¹³ Haz Air Pollutants Cleaning Cycle DRG 6" ON/5.9" OFF
¹⁴ Haz Air Pollutants Cleaning Cycle CRG 5 min./hr	¹⁵ Haz Air Pollutants HAP-42 Baseline 8000 scfm, 300F PJFF Hg Spiking	¹⁶ Haz Air Pollutants HAP-42R Baseline 8000 scfm, 300F PJFF Hg Spiking	¹⁷ Haz Air Pollutants HAP-43A Fine Fly Ash 8000 scfm, 300F PJFF Day 1	¹⁸ Haz Air Pollutants HAP-43B Fine Fly Ash 8000 scfm, 300F PJFF Day 2	¹⁹ Haz Air Pollutants HAP-43C Fine Fly Ash 8000 scfm, 300F PJFF Day 3	²⁰ Haz Air Pollutants Cleaning Cycle DRG 6" ON/5.8" OFF
²¹ Haz Air Pollutants Cleaning Cycle CRG 10 min./hr	²² Haz Air Pollutants HAP-44 Baseline 8000 scfm, 300F PJFF Hg Spiking	²³ Haz Air Pollutants HAP-45A Pirkey Fly Ash 8000 scfm, 300F PJFF Day 1	²⁴ Haz Air Pollutants HAP-45B Pirkey Fly Ash 8000 scfm, 300F PJFF Day 2	²⁵ Haz Air Pollutants HAP-45C Pirkey Fly Ash 8000 scfm, 300F PJFF Day 3	²⁶ Haz Air Pollutants HAP-45D Pirkey Fly Ash 8000 scfm, 300F PJFF Day 4	²⁷ Haz Air Pollutants Cleaning Cycle DRG 6" ON/5.8" OFF
²⁸ Haz Air Pollutants Cleaning Cycle CRG 5 min./hr	²⁹ Haz Air Pollutants HAP-46 Baseline 8000 scfm, 300F PJFF Hg Spiking	³⁰ Haz Air Pollutants Unit Down 9 Bags Changed 15 Plates Recaulked	³¹ Haz Air Pollutants Unit Down 5 Bags Changed			

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

August 1996 (Updated August 6, 1996)

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

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									
			UNIT DOWN									

1 9 9 6

PILOT

MINI-PILOT

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 Toxics Removal Testing	EPRI SOx/NOx Process Testing	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)									

1 9 9 7 (Tentative Schedule)

PILOT with DOE PRDA Phase II

MINI-PILOT with DOE PRDA Phase I

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CLS Phase I		EPRI Environmental Control Testing-Toxics Removal				DOE/PRDA Phase II - Mercury and HAPs Control by Modifications to Wet FGD Processes					DOE/PRDA Phase II - Clear Liquor Scrubbing	
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-40 Process Summary Report
07/01/96 06:00:00 to 07/01/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	7999	1	5
Facility Inlet SO2 Conc. (ppm)	986	1155	748	161	5
Facility Outlet SO2 Conc	900	984	771	86	5
SDA Inlet SO2 Conc. (ppm)	1004	1050	964	31	5
SDA Outlet SO2 Conc. (ppm)	1045	1090	1013	26	5
TGR/PJFF Outlet SO2 Conc. (ppm)	982	1027	951	26	5
SDA Inlet O2 Conc. (%)	10.52	11.92	9.38	0.99	5
SDA Outlet O2 Conc. (%)	10.71	12.03	9.62	0.94	5
TGR O2 Conc. (%)	11.72	13.69	10.17	1.37	5
SDA Inlet Temp. (F)	338	338	338	0	5
SDA Outlet Temp. (F)	326	326	325	0	5
ESP Outlet Temp. (F)	291	298	288	4	5
PJFF Inlet Temp. (F)	309	309	308	0	5
PJFF Outlet Temp. (F)	299	300	298	1	5
PJFF Air/Cloth Ratio	8.02	8.03	8.00	0.01	5
PJFF Cleaning Pulses/Hour	63	63	63	0	5
PJFF ΔP (in H2O)	2.98	3.01	2.94	0.03	5
NYSEG Load (MW)	290	449	185	102	5

HAP-40R Process Summary Report
07/02/96 07:00:00 to 07/02/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7999	1	5
Facility Inlet SO2 Conc. (ppm)	1105	1551	746	270	5
Facility Outlet SO2 Conc	989	1318	774	181	5
SDA Inlet SO2 Conc. (ppm)	1085	1373	976	146	5
SDA Outlet SO2 Conc. (ppm)	1124	1408	1028	143	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1060	1340	962	141	5
SDA Inlet O2 Conc. (%)	9.62	11.93	6.92	1.61	5
SDA Outlet O2 Conc. (%)	9.88	12.03	7.43	1.48	5
TGR O2 Conc. (%)	10.50	13.69	6.83	2.20	5
SDA Inlet Temp. (F)	338	338	338	0	5
SDA Outlet Temp. (F)	326	326	325	0	5
ESP Outlet Temp. (F)	293	298	288	4	5
PJFF Inlet Temp. (F)	309	310	308	1	5
PJFF Outlet Temp. (F)	299	301	298	1	5
PJFF Air/Cloth Ratio	8.38	8.40	8.36	0.02	5
PJFF Cleaning Pulses/Hour	39	39	39	0	5
PJFF ΔP (in H2O)	3.00	3.06	2.94	0.04	5
NYSEG Load (MW)	376	615	187	148	5

HAP-41A Process Summary Report
07/03/96 07:00:00 to 07/03/96 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)	1020	1183	875	109	4
Facility Outlet SO2 Conc	921	1003	861	52	4
SDA Inlet SO2 Conc. (ppm)	1025	1054	1000	19	4
SDA Outlet SO2 Conc. (ppm)	1075	1099	1049	18	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1004	1031	975	20	4
SDA Inlet O2 Conc. (%)	9.36	10.60	7.98	0.94	4
SDA Outlet O2 Conc. (%)	9.65	10.87	8.39	0.88	4
TGR O2 Conc. (%)	10.14	11.83	8.28	1.27	4
SDA Inlet Temp. (F)	344	344	343	0	4
SDA Outlet Temp. (F)	330	330	330	0	4
ESP Outlet Temp. (F)	285	292	281	4	4
PJFF Inlet Temp. (F)	311	312	311	0	4
PJFF Outlet Temp. (F)	300	301	299	1	4
PJFF Air/Cloth Ratio	7.65	7.67	7.65	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.15	6.16	6.14	0.01	4
NYSEG Load (MW)	376	581	210	136	4

HAP-41B Process Summary Report
07/08/96 07:00:00 to 07/08/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7999	1	4
Facility Inlet SO2 Conc. (ppm)	1047	1400	727	239	4
Facility Outlet SO2 Conc	912	931	864	28	4
SDA Inlet SO2 Conc. (ppm)	1007	1039	989	19	4
SDA Outlet SO2 Conc. (ppm)	1060	1097	1039	22	4
TGR/PJFF Outlet SO2 Conc. (ppm)	993	1026	970	21	4
SDA Inlet O2 Conc. (%)	10.93	12.07	10.13	0.74	4
SDA Outlet O2 Conc. (%)	11.20	12.33	10.37	0.74	4
TGR O2 Conc. (%)	12.31	13.91	11.20	1.02	4
SDA Inlet Temp. (F)	340	340	340	0	4
SDA Outlet Temp. (F)	327	327	327	0	4
ESP Outlet Temp. (F)	290	291	289	1	4
PJFF Inlet Temp. (F)	310	310	310	0	4
PJFF Outlet Temp. (F)	300	300	300	0	4
PJFF Air/Cloth Ratio	8.52	8.53	8.52	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.05	6.05	6.04	0.01	4
NYSEG Load (MW)	244	277	193	33	4

HAP-41C Process Summary Report
07/09/96 08:00:00 to 07/09/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	7999	1	4
Facility Inlet SO2 Conc. (ppm)	933	1022	728	120	4
Facility Outlet SO2 Conc	931	947	920	10	4
SDA Inlet SO2 Conc. (ppm)	1009	1039	989	19	4
SDA Outlet SO2 Conc. (ppm)	1060	1097	1039	22	4
TGR/PJFF Outlet SO2 Conc. (ppm)	992	1026	970	21	4
SDA Inlet O2 Conc. (%)	10.38	11.05	9.86	0.45	4
SDA Outlet O2 Conc. (%)	10.65	11.35	10.12	0.47	4
TGR O2 Conc. (%)	11.54	12.43	10.84	0.59	4
SDA Inlet Temp. (F)	340	340	340	0	4
SDA Outlet Temp. (F)	327	327	327	0	4
ESP Outlet Temp. (F)	290	291	289	1	4
PJFF Inlet Temp. (F)	310	310	310	0	4
PJFF Outlet Temp. (F)	300	300	299	0	4
PJFF Air/Cloth Ratio	7.85	7.85	7.85	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.05	6.05	6.04	0.01	4
NYSEG Load (MW)	270	295	241	20	4

HAP-41D Process Summary Report
07/10/96 08:00:00 to 07/10/96 14:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	7999	1	6
Facility Inlet SO2 Conc. (ppm)	1349	1449	1106	112	6
Facility Outlet SO2 Conc	1179	1216	1151	22	6
SDA Inlet SO2 Conc. (ppm)	1233	1284	1193	29	6
SDA Outlet SO2 Conc. (ppm)	1274	1314	1240	25	6
TGR/PJFF Outlet SO2 Conc. (ppm)	1201	1243	1169	24	6
SDA Inlet O2 Conc. (%)	9.13	9.62	8.77	0.30	6
SDA Outlet O2 Conc. (%)	9.45	9.91	9.10	0.29	6
TGR O2 Conc. (%)	9.78	10.46	9.23	0.44	6
SDA Inlet Temp. (F)	340	340	340	0	6
SDA Outlet Temp. (F)	327	327	327	0	6
ESP Outlet Temp. (F)	290	293	287	2	6
PJFF Inlet Temp. (F)	309	310	309	0	6
PJFF Outlet Temp. (F)	299	300	299	0	6
PJFF Air/Cloth Ratio	7.24	7.25	7.23	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in H2O)	6.04	6.05	6.03	0.00	6
NYSEG Load (MW)	323	441	271	58	6

HAP-41E Process Summary Report
07/11/96 08:00:00 to 07/11/96 14:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	7999	8002	7994	3	6
Facility Inlet SO2 Conc. (ppm)	1460	1538	1342	63	6
Facility Outlet SO2 Conc	1211	1288	1096	61	6
SDA Inlet SO2 Conc. (ppm)	1306	1357	1260	32	6
SDA Outlet SO2 Conc. (ppm)	1310	1356	1273	29	6
TGR/PJFF Outlet SO2 Conc. (ppm)	1265	1318	1221	31	6
SDA Inlet O2 Conc. (%)	9.41	9.60	9.04	0.24	6
SDA Outlet O2 Conc. (%)	9.69	9.86	9.33	0.21	6
TGR O2 Conc. (%)	10.17	10.39	9.65	0.31	6
SDA Inlet Temp. (F)	340	340	340	0	6
SDA Outlet Temp. (F)	327	328	327	0	6
ESP Outlet Temp. (F)	296	298	294	1	6
PJFF Inlet Temp. (F)	310	311	310	0	6
PJFF Outlet Temp. (F)	301	301	300	0	6
PJFF Air/Cloth Ratio	7.33	7.33	7.32	0.01	6
PJFF Cleaning Pulses/Hour	0	0	0	0	6
PJFF ΔP (in H2O)	6.08	6.10	6.07	0.01	6
NYSEG Load (MW)	305	324	275	19	6

HAP-41F Process Summary Report
07/12/96 08:00:00 to 07/12/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8001	8000	0	4
Facility Inlet SO2 Conc. (ppm)	1403	1441	1345	37	4
Facility Outlet SO2 Conc	1171	1209	1118	34	4
SDA Inlet SO2 Conc. (ppm)	1256	1283	1216	26	4
SDA Outlet SO2 Conc. (ppm)	1239	1272	1176	37	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1193	1224	1134	35	4
SDA Inlet O2 Conc. (%)	9.00	9.67	8.50	0.44	4
SDA Outlet O2 Conc. (%)	9.33	10.00	8.94	0.41	4
TGR O2 Conc. (%)	9.63	10.60	9.03	0.60	4
SDA Inlet Temp. (F)	340	340	340	0	4
SDA Outlet Temp. (F)	327	328	327	0	4
ESP Outlet Temp. (F)	297	299	295	2	4
PJFF Inlet Temp. (F)	311	311	311	0	4
PJFF Outlet Temp. (F)	302	302	301	0	4
PJFF Air/Cloth Ratio	7.39	7.40	7.38	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.13	6.15	6.13	0.01	4
NYSEG Load (MW)	351	422	233	75	4

HAP-42 Process Summary Report
07/15/96 08:00:00 to 07/15/96 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)	1333	1411	1214	75	4
Facility Outlet SO2 Conc	1298	1381	1159	88	4
SDA Inlet SO2 Conc. (ppm)	1383	1468	1237	91	4
SDA Outlet SO2 Conc. (ppm)	1416	1500	1276	88	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1349	1434	1209	89	4
SDA Inlet O2 Conc. (%)	7.99	9.06	7.37	0.65	4
SDA Outlet O2 Conc. (%)	8.45	9.34	7.93	0.55	4
TGR O2 Conc. (%)	8.28	9.67	7.42	0.86	4
SDA Inlet Temp. (F)	338	339	338	0	4
SDA Outlet Temp. (F)	326	327	326	0	4
ESP Outlet Temp. (F)	293	296	290	2	4
PJFF Inlet Temp. (F)	309	310	309	0	4
PJFF Outlet Temp. (F)	299	299	298	0	4
PJFF Air/Cloth Ratio	7.13	7.13	7.12	0.00	4
PJFF Cleaning Pulses/Hour	39	39	39	0	4
PJFF Delta P (in H2O)	4.05	4.11	4.00	0.04	4
NYSEG Load (MW)	584	673	487	87	4

HAP-42R Process Summary Report
07/16/96 08:00:00 to 07/16/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7999	1	4
Facility Inlet SO2 Conc. (ppm)	1422	1556	1329	88	4
Facility Outlet SO2 Conc	1218	1306	1124	66	4
SDA Inlet SO2 Conc. (ppm)	1251	1352	1127	82	4
SDA Outlet SO2 Conc. (ppm)	1281	1387	1160	83	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1219	1321	1098	82	4
SDA Inlet O2 Conc. (%)	9.21	10.23	8.37	0.67	4
SDA Outlet O2 Conc. (%)	9.52	10.48	8.76	0.63	4
TGR O2 Conc. (%)	9.83	11.27	8.67	0.95	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	289	294	284	4	4
PJFF Inlet Temp. (F)	309	310	309	0	4
PJFF Outlet Temp. (F)	300	301	299	1	4
PJFF Air/Cloth Ratio	7.50	7.51	7.49	0.01	4
PJFF Cleaning Pulses/Hour	24	24	24	0	4
PJFF ΔP (in H2O)	3.68	3.77	3.63	0.05	4
NYSEG Load (MW)	404	478	283	78	4

HAP-43A Process Summary Report
07/17/96 08:00:00 to 07/17/96 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)	1463	1589	1341	93	4
Facility Outlet SO2 Conc	1149	1238	1080	61	4
SDA Inlet SO2 Conc. (ppm)	1201	1297	1122	66	4
SDA Outlet SO2 Conc. (ppm)	1234	1324	1164	62	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1168	1258	1096	63	4
SDA Inlet O2 Conc. (%)	8.37	9.11	7.74	0.51	4
SDA Outlet O2 Conc. (%)	8.44	9.00	7.91	0.42	4
TGR O2 Conc. (%)	9.05	10.06	8.20	0.71	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	293	293	292	0	4
PJFF Inlet Temp. (F)	311	311	310	0	4
PJFF Outlet Temp. (F)	301	302	301	0	4
PJFF Air/Cloth Ratio	7.35	7.36	7.34	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	4.71	4.74	4.67	0.03	4
NYSEG Load (MW)	605	702	454	101	4

HAP-43B Process Summary Report
07/18/96 08:00:00 to 07/18/96 13:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	7996	2	5
Facility Inlet SO2 Conc. (ppm)	1495	1755	1051	279	5
Facility Outlet SO2 Conc	1199	1399	898	204	5
SDA Inlet SO2 Conc. (ppm)	1246	1429	1000	182	5
SDA Outlet SO2 Conc. (ppm)	1271	1450	1035	177	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1203	1374	972	173	5
SDA Inlet O2 Conc. (%)	8.08	9.74	7.16	0.99	5
SDA Outlet O2 Conc. (%)	8.17	9.60	7.37	0.86	5
TGR O2 Conc. (%)	8.73	10.98	7.52	1.36	5
SDA Inlet Temp. (F)	338	338	338	0	5
SDA Outlet Temp. (F)	326	326	326	0	5
ESP Outlet Temp. (F)	295	298	293	2	5
PJFF Inlet Temp. (F)	311	311	310	0	5
PJFF Outlet Temp. (F)	301	302	301	0	5
PJFF Air/Cloth Ratio	7.60	7.61	7.59	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	5.21	5.24	5.17	0.02	5
NYSEG Load (MW)	620	689	456	90	5

HAP-43C Process Summary Report
07/19/96 07:00:00 to 07/19/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7998	2	4
Facility Inlet SO2 Conc. (ppm)	1645	1749	1430	126	4
Facility Outlet SO2 Conc	1296	1389	1184	74	4
SDA Inlet SO2 Conc. (ppm)	1335	1418	1121	123	4
SDA Outlet SO2 Conc. (ppm)	1382	1470	1159	129	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1298	1375	1111	108	4
SDA Inlet O2 Conc. (%)	8.20	9.87	7.53	0.97	4
SDA Outlet O2 Conc. (%)	8.32	9.68	7.76	0.79	4
TGR O2 Conc. (%)	8.76	10.80	7.92	1.18	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	326	326	325	0	4
ESP Outlet Temp. (F)	293	296	291	2	4
PJFF Inlet Temp. (F)	309	309	308	1	4
PJFF Outlet Temp. (F)	298	298	296	1	4
PJFF Air/Cloth Ratio	7.35	7.36	7.33	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.70	6.72	6.68	0.02	4
NYSEG Load (MW)	636	701	475	93	4

HAP-44 Process Summary Report
07/22/96 07:00:00 to 07/22/96 11:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	8000	1	4
Facility Inlet SO2 Conc. (ppm)	1435	1552	1334	98	4
Facility Outlet SO2 Conc	1171	1249	1090	68	4
SDA Inlet SO2 Conc. (ppm)	1250	1371	1158	88	4
SDA Outlet SO2 Conc. (ppm)	1290	1410	1192	89	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1211	1322	1121	81	4
SDA Inlet O2 Conc. (%)	9.13	10.07	7.90	0.87	4
SDA Outlet O2 Conc. (%)	9.16	9.97	8.14	0.73	4
TGR O2 Conc. (%)	10.19	11.49	8.51	1.18	4
SDA Inlet Temp. (F)	343	344	343	0	4
SDA Outlet Temp. (F)	331	331	330	0	4
ESP Outlet Temp. (F)	293	295	290	2	4
PJFF Inlet Temp. (F)	313	314	313	0	4
PJFF Outlet Temp. (F)	303	304	303	0	4
PJFF Air/Cloth Ratio	7.67	7.68	7.66	0.01	4
PJFF Cleaning Pulses/Hour	43	43	43	0	4
PJFF ΔP (in H2O)	3.61	3.65	3.58	0.03	4
NYSEG Load (MW)	514	626	358	102	4

HAP-45A Process Summary Report
07/23/96 08:00:00 to 07/23/96 15:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8002	7998	1	7
Facility Inlet SO2 Conc. (ppm)	1559	1628	1354	88	7
Facility Outlet SO2 Conc	1228	1298	980	105	7
SDA Inlet SO2 Conc. (ppm)	1318	1382	1108	90	7
SDA Outlet SO2 Conc. (ppm)	1358	1418	1153	88	7
TGR/PJFF Outlet SO2 Conc. (ppm)	1280	1342	1078	87	7
SDA Inlet O2 Conc. (%)	8.02	10.04	7.27	0.90	7
SDA Outlet O2 Conc. (%)	8.20	9.90	7.56	0.76	7
TGR O2 Conc. (%)	8.60	11.45	7.55	1.26	7
SDA Inlet Temp. (F)	341	341	341	0	7
SDA Outlet Temp. (F)	328	329	328	0	7
ESP Outlet Temp. (F)	291	296	283	4	7
PJFF Inlet Temp. (F)	311	311	311	0	7
PJFF Outlet Temp. (F)	302	302	301	0	7
PJFF Air/Cloth Ratio	7.79	7.79	7.77	0.01	7
PJFF Cleaning Pulses/Hour	0	0	0	0	7
PJFF ΔP (in H2O)	5.42	5.50	5.35	0.05	7
NYSEG Load (MW)	631	701	373	112	7

HAP-45B Process Summary Report
07/24/96 08:00:00 to 07/24/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	4
Facility Inlet SO2 Conc. (ppm)	1305	1443	1243	81	4
Facility Outlet SO2 Conc	1074	1151	1039	45	4
SDA Inlet SO2 Conc. (ppm)	1128	1206	1091	46	4
SDA Outlet SO2 Conc. (ppm)	1195	1273	1160	46	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1100	1174	1060	44	4
SDA Inlet O2 Conc. (%)	9.96	10.33	9.26	0.42	4
SDA Outlet O2 Conc. (%)	9.91	10.26	9.32	0.36	4
TGR O2 Conc. (%)	11.32	11.87	10.29	0.61	4
SDA Inlet Temp. (F)	341	341	341	0	4
SDA Outlet Temp. (F)	328	328	328	0	4
ESP Outlet Temp. (F)	293	294	291	1	4
PJFF Inlet Temp. (F)	311	311	310	0	4
PJFF Outlet Temp. (F)	300	301	299	1	4
PJFF Air/Cloth Ratio	7.82	7.83	7.81	0.01	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	5.84	5.86	5.81	0.02	4
NYSEG Load (MW)	454	558	385	65	4

HAP-45C Process Summary Report
07/25/96 08:00:00 to 07/25/96 12:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8001	8002	8000	0	4
Facility Inlet SO2 Conc. (ppm)	1576	1694	1465	107	4
Facility Outlet SO2 Conc	1300	1392	1209	90	4
SDA Inlet SO2 Conc. (ppm)	1364	1459	1233	98	4
SDA Outlet SO2 Conc. (ppm)	1381	1498	1295	73	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1336	1417	1252	81	4
SDA Inlet O2 Conc. (%)	7.60	8.63	6.57	0.89	4
SDA Outlet O2 Conc. (%)	8.11	8.42	7.83	0.24	4
TGR O2 Conc. (%)	8.02	9.16	6.79	1.10	4
SDA Inlet Temp. (F)	339	339	339	0	4
SDA Outlet Temp. (F)	327	327	327	0	4
ESP Outlet Temp. (F)	300	301	298	1	4
PJFF Inlet Temp. (F)	310	310	310	0	4
PJFF Outlet Temp. (F)	300	300	300	0	4
PJFF Air/Cloth Ratio	7.18	7.18	7.18	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.23	6.25	6.21	0.02	4
NYSEG Load (MW)	591	635	526	46	4

HAP-45D Process Summary Report
07/26/96 04:00:00 to 07/26/96 08:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8001	8000	0	4
Facility Inlet SO2 Conc. (ppm)	1302	1364	1259	39	4
Facility Outlet SO2 Conc	1085	1135	1053	30	4
SDA Inlet SO2 Conc. (ppm)	1123	1174	1088	31	4
SDA Outlet SO2 Conc. (ppm)	1155	1206	1121	31	4
TGR/PJFF Outlet SO2 Conc. (ppm)	1100	1152	1068	31	4
SDA Inlet O2 Conc. (%)	9.66	10.08	9.15	0.34	4
SDA Outlet O2 Conc. (%)	9.74	10.10	9.29	0.29	4
TGR O2 Conc. (%)	10.90	11.48	10.16	0.48	4
SDA Inlet Temp. (F)	338	338	338	0	4
SDA Outlet Temp. (F)	326	326	326	0	4
ESP Outlet Temp. (F)	290	292	287	2	4
PJFF Inlet Temp. (F)	309	309	309	0	4
PJFF Outlet Temp. (F)	299	299	299	0	4
PJFF Air/Cloth Ratio	7.61	7.61	7.61	0.00	4
PJFF Cleaning Pulses/Hour	0	0	0	0	4
PJFF ΔP (in H2O)	6.49	6.50	6.48	0.01	4
NYSEG Load (MW)	346	435	298	53	4

HAP-46 Process Summary Report
07/29/96 10:00:00 to 07/29/96 15:00:00

Process Variable	Average	Max	Min	Std.Dev.	Points
Flue Gas Flow Rate (scfm)	8000	8003	7999	2	5
Facility Inlet SO2 Conc. (ppm)	1277	1340	1183	66	5
Facility Outlet SO2 Conc	1097	1146	1001	60	5
SDA Inlet SO2 Conc. (ppm)	1112	1160	1036	55	5
SDA Outlet SO2 Conc. (ppm)	1117	1163	1042	53	5
TGR/PJFF Outlet SO2 Conc. (ppm)	1087	1132	1015	53	5
SDA Inlet O2 Conc. (%)	9.08	9.71	8.58	0.43	5
SDA Outlet O2 Conc. (%)	9.28	9.79	8.85	0.34	5
TGR O2 Conc. (%)	10.03	10.94	9.26	0.62	5
SDA Inlet Temp. (F)	340	340	340	0	5
SDA Outlet Temp. (F)	328	328	327	0	5
ESP Outlet Temp. (F)	298	301	294	2	5
PJFF Inlet Temp. (F)	311	312	311	0	5
PJFF Outlet Temp. (F)	302	302	301	0	5
PJFF Air/Cloth Ratio	7.32	7.33	7.32	0.00	5
PJFF Cleaning Pulses/Hour	29	29	29	0	5
PJFF ΔP (in H2O)	3.52	3.63	3.41	0.07	5
NYSEG Load (MW)	468	513	397	40	5

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)
<i>Bsl, 8000scfm</i>															
HAP-40	Mon-7/1	07:45	U1399	33.85	9.06	7.85	-	1.77	590.9	-	468.4	5.19	-	0.93	6.12
HAP-40	Mon-7/1	08:30	U1402	32.95	8.03	7.29	-	1.86	560.1	-	436.7	4.69	-	0.93	5.63
HAP-40	Mon-7/1	09:15	U1405	33.41	6.82	6.61	-	1.63	595.5	-	472.7	4.46	-	0.87	5.34
Averages												4.78		0.91	5.69
<i>Bsl, 8000scfm</i>															
HAP-40R	Tue-7/2	07:45	U1410	33.56	10.39	9.46	-	1.55	585.5	-	467.4	6.25	-	0.82	7.07
HAP-40R	Tue-7/2	08:30	U1413	32.42	9.48	9.77	-	1.59	580.6	-	448.8	6.63	-	0.83	7.46
HAP-40R	Tue-7/2	09:15	U1416	33.10	9.55	9.74	-	1.54	564.0	-	476.7	6.29	-	0.84	7.13
Averages												6.39		0.83	7.22
<i>Catalyst CT-9, Day 1</i>															
HAP-41A	Wed-7/3	07:45	U1419	33.72	9.53	10.64	-	1.43	591.5	-	512.1	7.07	-	0.82	7.89
HAP-41A	Wed-7/3	08:30	U1422	33.84	9.18	11.22	-	1.60	555.9	-	440.9	6.98	-	0.79	7.77
HAP-41A	Wed-7/3	09:15	U1425	32.16	9.65	9.95	-	1.36	583.1	-	498.8	6.83	-	0.80	7.63
Averages												6.96		0.80	7.77
<i>Catalyst CT-9, Day 6</i>															
HAP-41B	Mon-7/8	07:45	U1428	35.34	10.63	8.54	-	9.71	591.4	-	448.3	5.42	-	4.67	10.08
HAP-41B	Mon-7/8	08:30	U1431	33.59	10.09	4.36	-	6.57	573.4	-	481.3	2.82	-	3.56	6.38
HAP-41B	Mon-7/8	09:15	U1434	33.71	10.14	6.06	-	5.43	594.0	-	501.0	4.05	-	3.06	7.10
Averages												4.09		3.76	7.86
<i>Catalyst CT-9, Day 7</i>															
HAP-41C	Tue-7/9	07:45	U1437	36.96	10.47	8.58	-	1.40	592.2	-	495.2	5.20	-	0.71	5.91
HAP-41C	Tue-7/9	08:30	U1440	34.00	10.22	7.71	-	1.06	582.0	-	462.2	5.00	-	0.55	5.55
HAP-41C	Tue-7/9	09:15	U1443	33.34	9.70	7.82	-	1.13	586.8	-	462.7	5.21	-	0.59	5.81
Averages												5.14		0.62	5.76
<i>Catalyst CT-9, Day 8</i>															
HAP-41D	Wed-7/10	07:45	U1446	35.10	9.35	7.48	-	1.33	603.4	-	470.8	4.87	-	0.68	5.55
HAP-41D	Wed-7/10	08:30	U1449	33.97	9.00	7.51	-	1.30	596.1	-	458.1	4.99	-	0.66	5.66
HAP-41D	Wed-7/10	09:15	U1452	31.37	9.26	7.19	-	1.64	591.6	-	496.3	5.14	-	0.98	6.12
Averages												5.00		0.77	5.78
<i>NoxSorb</i>															
HAP-41D	Wed-7/10	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-41D	Wed-7/10	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Catalyst CT-9, Day 9</i>															
HAP-41E	Thu-7/11	07:45	U1457	35.51	9.52	7.48	-	1.17	568.9	-	499.3	4.54	-	0.62	5.16
HAP-41E	Thu-7/11	08:30	U1460	34.49	9.32	7.41	-	1.13	572.0	-	485.0	4.66	-	0.60	5.26
HAP-41E	Thu-7/11	09:15	U1463	34.07	9.29	6.90	-	1.21	588.1	-	495.3	4.51	-	0.67	5.18
Averages					9.38							4.57		0.63	5.20
<i>NoxSorb</i>															

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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 In Gas [Hg] (µg/Nm³)	H2O2 In Gas [Hg] (µg/Nm³)	KMnO4 In Gas [Hg] (µg/Nm³)	Total In Gas [Hg] (µg/Nm³)
HAP-41E	Thu-7/11	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-41E	Thu-7/11	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Catalyst CT-9, Day 10</i>															
HAP-41F	Fri-7/12	07:45	U1468	34.77	9.82	7.13	-	1.17	589.9	-	493.0	4.58	-	0.63	5.21
HAP-41F	Fri-7/12	08:30	U1471	35.92	8.53	7.55	-	1.26	619.0	-	512.2	4.93	-	0.68	5.61
HAP-41F	Fri-7/12	09:15	U1474	34.07	8.47	7.41	-	1.18	579.7	-	458.1	4.78	-	0.60	5.38
Averages												4.76		0.64	5.40
<i>Baseline</i>															
HAP-42	Mon-7/15	07:45	U1477	32.15	9.20	7.16	-	1.62	559.3	-	496.6	4.72	-	0.95	5.66
HAP-42	Mon-7/15	08:30	U1480	37.32	8.52	8.09	-	1.42	569.9	-	488.5	4.68	-	0.70	5.38
HAP-42	Mon-7/15	09:15	U1483	37.12	7.01	8.40	-	1.56	573.9	-	484.6	4.92	-	0.77	5.69
Averages												4.77		0.81	5.58
<i>Baseline</i>															
HAP-42R	Tue-7/16	07:45	U1486	34.69	10.01	6.17	-	1.08	579.6	-	477.9	3.91	-	0.56	4.47
HAP-42R	Tue-7/16	08:30	U1489	34.19	9.71	6.52	-	1.12	565.2	-	463.9	4.08	-	0.58	4.66
HAP-42R	Tue-7/16	09:15	U1492	33.76	8.47	6.61	-	1.77	551.6	-	466.5	4.09	-	0.93	5.02
Averages												4.03		0.69	4.72

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
Accumulated Fine Fly Ash															
HAP-43A	Wed-7/17	07:45	U1495	33.46	9.09	8.71	-	1.44	572.6	-	513.8	5.65	-	0.84	6.48
HAP-43A	Wed-7/17	08:30	U1498	30.11	8.14	8.93	-	1.47	551.0	-	484.7	6.19	-	0.90	7.09
HAP-43A	Wed-7/17	09:15	U1501	36.00	8.00	9.43	-	1.58	583.4	-	489.3	5.79	-	0.81	6.60
Averages												5.88	-	0.85	6.72
Accumulated Fine Fly Ash															
HAP-43B	Thu-7/18	07:45	U1504	34.45	9.49	9.34	-	1.73	592.6	-	473.7	6.08	-	0.90	6.99
HAP-43B	Thu-7/18	08:30	U1507	33.44	7.42	9.37	-	1.60	583.5	-	492.2	6.20	-	0.89	7.08
HAP-43B	Thu-7/18	09:15	U1510	33.40	7.29	8.34	-	1.67	578.1	-	482.9	5.47	-	0.91	6.38
Averages												5.92	-	0.90	6.82
Accumulated Fine Fly Ash															
HAP-43C	Fri-7/19	07:45	U1513	31.01	7.66	6.28	-	1.27	581.1	-	460.9	4.46	-	0.71	5.17
HAP-43C	Fri-7/19	08:30	U1516	28.91	7.52	5.96	-	1.11	584.0	-	471.5	4.56	-	0.68	5.24
HAP-43C	Fri-7/19	09:15	U1519	30.74	7.61	6.43	-	1.30	580.6	-	454.3	4.60	-	0.73	5.33
Averages												4.54	-	0.71	5.25
Baseline															
HAP-44	Mon-7/22	07:45	U1522	36.88	9.57	6.53	-	1.37	564.7	-	472.8	3.78	-	0.66	4.45
HAP-44	Mon-7/22	08:30	U1525	34.11	8.13	7.21	-	1.39	565.8	-	495.0	4.53	-	0.76	5.29
HAP-44	Mon-7/22	09:15	U1528	33.17	7.97	7.01	-	1.52	568.6	-	453.9	4.55	-	0.79	5.34
Averages												4.29	-	0.74	5.03
FAL-3 Fly Ash (Day 1)															
HAP-45A	Tue-7/23	07:45	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-45A	Tue-7/23	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-45A	Tue-7/23	09:15	U1537	34.90	7.68	12.31	-	1.70	565.4	-	457.1	7.56	-	0.84	8.40
Averages												7.56	-	0.84	8.40
FAL-3 Fly Ash (Day 2)															
HAP-45B	Wed-7/24	07:45	U1540	35.32	10.22	6.84	-	1.16	576.9	-	459.9	4.23	-	0.57	4.80
HAP-45B	Wed-7/24	08:30	U1543	33.93	9.99	7.10	-	1.18	562.7	-	441.2	4.46	-	0.58	5.04
HAP-45B	Wed-7/24	09:15	U1546	34.45	10.40	6.42	-	1.06	562.7	-	478.4	3.97	-	0.56	4.53
Averages												4.22	-	0.57	4.79
FAL-3 Fly Ash (Day 3)															
HAP-45C	Thu-7/25	07:45	U1549	32.16	7.12	8.11	-	1.65	575.4	-	450.2	5.49	-	0.87	6.37
HAP-45C	Thu-7/25	08:30	U1552	34.57	6.86	8.61	-	1.38	587.1	-	485.7	5.54	-	0.73	6.27
HAP-45C	Thu-7/25	09:15	U1555	34.58	8.69	8.75	-	1.50	557.6	-	441.5	5.35	-	0.73	6.07
Averages												5.46	-	0.78	6.24
FAL-3 Fly Ash (Day 4)															
HAP-45D	Fri-7/26	07:45	U1558	35.36	9.02	7.97	-	1.42	556.8	-	435.3	4.75	-	0.66	5.41
HAP-45D	Fri-7/26	08:30	U1561	34.22	8.88	7.78	-	1.36	555.1	-	469.4	4.78	-	0.71	5.49

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
HAP-45D	Fri-7/26	09:15	U1564	33.70	7.56	7.89	-	1.29	549.4	-	465.7	4.87	-	0.68	5.55
Averages												4.80		0.68	5.48
Baseline															
HAP-46	Mon-7/29	07:45	U1567	33.76	9.25	7.73	-	1.49	594.2	-	502.7	5.15	-	0.84	5.99
HAP-46	Mon-7/29	08:30	U1570	30.58	9.65	7.19	-	1.36	587.5	-	445.1	5.23	-	0.75	5.98
HAP-46	Mon-7/29	09:15	U1573	32.87	8.33	8.25	-	1.60	566.3	-	491.2	5.39	-	0.91	6.29
Averages												5.26		0.83	6.09

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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

Test ID	Date	Start Time	ID	Gas Volume (dscf)	O ₂ (%)	Tris Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	KMnO ₄ Sample [Hg] (ng/ml)	Tris Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	KMnO ₄ Sample Mass (g)	Tris [Hg] In Gas (µg/Nm ³)	H ₂ O ₂ [Hg] In Gas (µg/Nm ³)	KMnO ₄ [Hg] In Gas (µg/Nm ³)	Total [Hg] In Gas (µg/Nm ³)
<i>Bsl, 8000scfm</i>															
HAP-40	Mon-7/1	07:45	U1400	37.63	9.07	15.08	-	44.14	602.4	-	512.2	9.15	-	22.76	31.91
HAP-40	Mon-7/1	08:30	U1403	36.31	8.26	15.84	-	41.44	587.2	-	455.9	9.70	-	19.71	29.42
HAP-40	Mon-7/1	09:15	U1406	34.39	6.90 a	13.99	-	41.90	592.1	-	468.3	9.13	-	21.62	30.74
Averages												9.32		21.36	30.69
<i>Bsl, 8000scfm</i>															
HAP-40R	Tue-7/2	07:45	U1411	36.68	10.75	15.99	-	48.62	579.7	-	454.6	9.57	-	22.82	32.40
HAP-40R	Tue-7/2	08:30	U1414	33.34	9.67	14.75	-	46.59	569.6	-	441.6	9.55	-	23.38	32.93
HAP-40R	Tue-7/2	09:15	U1417	32.37	9.74	13.03	-	40.96	562.3	-	467.1	8.57	-	22.39	30.97
Averages												9.23		22.87	32.10
<i>Catalyst CT-9, Day 1</i>															
HAP-41A	Wed-7/3	07:45	U1420	34.81	9.64	18.55	-	43.01	594.6	-	461.9	12.00	-	21.62	33.62
HAP-41A	Wed-7/3	08:30	U1423	36.52	9.49	20.45	-	46.85	572.2	-	444.4	12.14	-	21.60	33.73
HAP-41A	Wed-7/3	09:15	U1426	32.09	9.83	16.62	-	39.04	594.1	-	465.1	11.66	-	21.44	33.09
Averages												11.93		21.55	33.48
<i>Catalyst CT-9, Day 6</i>															
HAP-41B	Mon-7/8	07:45	U1429	46.31	10.92	8.92	-	67.79	579.3	-	475.8	4.23	-	26.38	30.61
HAP-41B	Mon-7/8	08:30	U1432	32.12	10.27	5.79	-	44.67	553.2	-	545.5	3.78	-	28.74	32.51
HAP-41B	Mon-7/8	09:15	U1435	32.06	10.23a	6.79	-	51.00	582.0	-	501.0	4.67	-	30.19	34.86
Averages												4.23		28.44	32.66
<i>Catalyst CT-9, Day 7</i>															
HAP-41C	Tue-7/9	07:45	U1438	33.96	10.75	13.81	-	53.77	591.3	-	434.6	9.11	-	26.07	35.17
HAP-41C	Tue-7/9	08:30	U1441	33.55	10.29	13.50	-	52.80	585.3	-	442.7	8.92	-	26.39	35.31
HAP-41C	Tue-7/9	09:15	U1444	31.92	10.29	13.22	-	50.14	560.1	-	445.0	8.79	-	26.48	35.26
Averages												8.94		26.31	35.25
<i>Catalyst CT-9, Day 8</i>															
HAP-41D	Wed-7/10	07:45	U1447	35.59	9.56	10.11	-	59.11	454.7	-	391.7	4.90	-	24.65	29.54
HAP-41D	Wed-7/10	08:30	U1450	38.30	9.33	15.00	-	59.98	583.5	-	433.7	8.65	-	25.73	34.38
HAP-41D	Wed-7/10	09:15	U1453	32.16	9.69	11.51	-	47.54	571.3	-	448.9	7.75	-	25.14	32.89
Averages												8.20		25.43	33.64
<i>NoxSorb</i>															
HAP-41D	Wed-7/10	08:30	U1466	30.93	9.59	3.89	-	28.51	548.1	-	479.1	2.61	-	16.73	19.34
HAP-41D	Wed-7/10	09:15	U1467	29.27	9.20	4.46	-	30.82	525.3	-	438.5	3.03	-	17.49	20.52
<i>Catalyst CT-9, Day 9</i>															
HAP-41E	Thu-7/11	07:45	U1458	36.42	9.77	14.71	-	48.93	579.5	-	475.4	8.87	-	24.20	33.06
HAP-41E	Thu-7/11	08:30	U1461	37.12	9.49	14.56	-	47.72	569.9	-	510.9	8.47	-	24.88	33.35
HAP-41E	Thu-7/11	09:15	U1464	33.41	9.71	12.06	-	42.64	579.5	-	508.7	7.93	-	24.60	32.52
Averages												8.42		24.56	32.98
<i>NoxSorb</i>															

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
HAP-41E	Thu-7/11	08:30	U1466	26.13	9.98	1.62	-	29.58	575.6	-	485.4	1.35	-	20.82	22.17
HAP-41E	Thu-7/11	09:15	U1467	28.98	9.44	1.80	-	30.68	567.0	-	514.7	1.33	-	20.64	21.98
<i>Catalyst CT-9, Day 10</i>															
HAP-41F	Fri-7/12	07:45	U1469	39.54	10.01	14.15	-	45.44	607.9	-	513.2	8.24	-	22.35	30.59
HAP-41F	Fri-7/12	08:30	U1472	39.89	8.92	14.41	-	52.98	570.6	-	467.1	7.81	-	23.50	31.31
HAP-41F	Fri-7/12	09:15	U1475	48.61	8.96	17.40	-	65.21	579.5	-	461.1	7.86	-	23.43	31.29
Averages												7.97		23.09	31.06
<i>Baseline</i>															
HAP-42	Mon-7/15	07:45	U1478	43.96	9.52	15.58	-	55.43	590.2	-	484.2	7.92	-	23.13	31.05
HAP-42	Mon-7/15	08:30	U1481	35.25	8.62 a	11.44	-	45.94	564.7	-	481.2	6.94	-	23.75	30.70
HAP-42	Mon-7/15	09:15	U1484	35.55	7.02 a	12.44	-	51.63	593.5	-	464.9	7.87	-	25.58	33.45
Averages												7.58		24.15	31.73
<i>Baseline</i>															
HAP-42R	Tue-7/16	07:45	U1487	35.84	10.17	13.50	-	49.37	562.2	-	470.2	8.02	-	24.54	32.56
HAP-42R	Tue-7/16	08:30	U1490	38.27	9.85	15.07	-	54.86	579.9	-	464.8	8.65	-	25.24	33.89
HAP-42R	Tue-7/16	09:15	U1493	32.80	8.87	11.30	-	44.40	577.1	-	484.6	7.53	-	24.85	32.38
Averages												8.07		24.88	32.95

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prefim. values from pilot log sheet.

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)
Accumulated Fine Fly Ash															
HAP-43A	Wed-7/17	07:45	U1496	32.58	9.60 a	15.14	-	44.27	554.4	-	457.4	9.76	-	23.54	33.30
HAP-43A	Wed-7/17	08:30	U1499	36.86	8.45 a	16.10	-	49.24	584.5	-	484.0	9.67	-	24.49	34.17
HAP-43A	Wed-7/17	09:15	U1502	33.83	8.46	14.47	-	43.88	572.6	-	491.0	9.28	-	24.13	33.41
Averages												9.57		24.06	33.63
Accumulated Fine Fly Ash															
HAP-43B	Thu-7/18	07:45	U1505	33.89	10.30 a	15.68	-	48.30	574.9	-	459.5	10.08	-	24.81	34.89
HAP-43B	Thu-7/18	08:30	U1508	36.84	8.75 a	15.42	-	46.97	602.1	-	502.7	9.55	-	24.28	33.83
HAP-43B	Thu-7/18	09:15	U1511	31.19	7.43	12.67	-	44.73	566.1	-	463.8	8.71	-	25.20	33.91
Averages												9.44		24.76	34.21
Accumulated Fine Fly Ash															
HAP-43C	Fri-7/19	07:45	U1514	37.64	7.66	12.62	-	44.07	597.2	-	466.7	7.59	-	20.70	28.29
HAP-43C	Fri-7/19	08:30	U1517	35.17	7.81	12.99	-	45.71	564.9	-	452.0	7.90	-	22.26	30.16
HAP-43C	Fri-7/19	09:15	U1520	35.07	7.82	11.70	-	43.48	616.6	-	467.7	7.79	-	21.97	29.76
Averages												7.76		21.64	29.40
Baseline															
HAP-44	Mon-7/22	07:45	U1523	36.54	10.38 a	12.18	-	44.54	569.2	-	512.9	7.19	-	23.69	30.88
HAP-44	Mon-7/22	08:30	U1526	34.33	8.55	12.33	-	46.55	553.4	-	476.5	7.53	-	24.48	32.01
HAP-44	Mon-7/22	09:15	U1529	32.27	8.02	11.49	-	41.40	567.0	-	475.7	7.65	-	23.12	30.77
Averages												7.46		23.76	31.22
FAL-3 Fly Ash (Day 1)															
HAP-45A	Tue-7/23	07:45	U1532	36.73	9.48	14.76	-	47.06	594.4	-	483.8	9.05	-	23.48	32.53
HAP-45A	Tue-7/23	08:30	U1535	44.09	7.56	18.50	-	60.44	597.0	-	459.3	9.49	-	23.85	33.34
HAP-45A	Tue-7/23	09:15	U1538	30.80	7.89	14.43	-	41.20	561.6	-	471.1	9.97	-	23.88	33.84
Averages												9.50		23.74	33.24
FAL-3 Fly Ash (Day 2)															
HAP-45B	Wed-7/24	07:45	U1541	33.69	11.00	11.97	-	44.96	577.7	-	473.8	7.78	-	23.96	31.73
HAP-45B	Wed-7/24	08:30	U1544	38.23	10.65	13.87	-	52.62	550.5	-	469.3	7.57	-	24.47	32.04
HAP-45B	Wed-7/24	09:15	U1547	33.12	11.14	11.03	-	44.87	546.7	-	473.3	6.90	-	24.29	31.19
Averages												7.41		24.24	31.65
FAL-3 Fly Ash (Day 3)															
HAP-45C	Thu-7/25	07:45	U1550	37.41	7.49 a	16.25	-	50.93	573.3	-	467.8	9.44	-	24.13	33.56
HAP-45C	Thu-7/25	08:30	U1553	37.96	6.92 a	15.55	-	51.40	557.6	-	471.9	8.65	-	24.21	32.86
HAP-45C	Thu-7/25	09:15	U1556	37.05	8.81 a	14.30	-	49.34	567.0	-	474.8	8.29	-	23.96	32.25
Averages												8.79		24.10	32.89
FAL-3 Fly Ash (Day 4)															
HAP-45D	Fri-7/26	07:45	U1559	38.75	9.17	14.74	-	51.70	568.1	-	451.8	8.19	-	22.83	31.02
HAP-45D	Fri-7/26	08:30	U1562	37.94	9.07	14.50	-	50.86	562.4	-	470.1	8.14	-	23.88	32.02

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
HAP-45D	Fri-7/26	09:15	U1565	33.77	8.29	10.81	-	38.61	569.1	-	469.3	6.90	-	20.33	27.23
Averages												7.74		22.34	30.09
Baseline															
HAP-46	Mon-7/29	07:45	U1568	40.05	9.69	16.19	-	57.89	587.1	-	492.7	8.99	-	26.98	35.97
HAP-46	Mon-7/29	08:30	U1571	37.47	10.29 a	15.72	-	55.28	559.6	-	491.4	8.89	-	27.46	36.36
HAP-46	Mon-7/29	09:15	U1574	37.67	8.56	14.24	-	57.19	576.7	-	465.5	8.26	-	26.77	35.03
Averages												8.71		27.07	35.79

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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, 8000scfm															
HAP-40	Mon-7/1	07:45	U1401	37.06	9.64	25.44	-	22.16	586.6	-	518.6	15.26	-	11.75	27.00
HAP-40	Mon-7/1	08:30	U1404	35.11	8.45	25.05	-	24.30	572.5	-	477.4	15.47	-	12.52	27.99
HAP-40	Mon-7/1	09:15	U1407	32.00	6.97	23.40	-	22.38	580.1	-	477.2	16.07	-	12.64	28.72
Averages												15.60		12.30	27.90
Bsl, 8000scfm															
HAP-40R	Tue-7/2	07:45	U1412	35.25	12.15	26.09	-	24.14	551.0	-	463.1	15.45	-	12.01	27.46
HAP-40R	Tue-7/2	08:30	U1415	33.17	10.52	24.04	-	23.57	557.3	-	476.9	15.31	-	12.84	28.14
HAP-40R	Tue-7/2	09:15	U1418	34.87	10.12	24.41	-	28.19	566.1	-	404.8	15.01	-	12.40	27.41
Averages												15.26		12.42	27.67
Catalyst CT-9, Day 1															
HAP-41A	Wed-7/3	07:45	U1421	32.44	10.39	42.86	-	3.37	578.8	-	448.7	28.97	-	1.77	30.74
HAP-41A	Wed-7/3	08:30	U1424	35.09	9.90	43.24	-	2.36	599.8	-	463.5	28.00	-	1.18	29.18
HAP-41A	Wed-7/3	09:15	U1427	33.60	10.56	45.36	-	2.62	583.1	-	480.5	29.82	-	1.42	31.24
Averages												28.93		1.46	30.39
Catalyst CT-9, Day 6															
HAP-41B	Mon-7/8	07:45	U1430	31.40	12.17	15.21	-	18.58	562.4	-	472.4	10.32	-	10.59	20.91
HAP-41B	Mon-7/8	08:30	U1433	29.13	11.24	10.87	-	8.93	554.1	-	469.8	7.83	-	5.45	13.28
HAP-41B	Mon-7/8	09:15	U1436	31.19	10.32	17.20	-	12.38	579.5	-	454.9	12.10	-	6.84	18.95
Averages												10.08		7.63	17.71
Catalyst CT-9, Day 7															
HAP-41C	Tue-7/9	07:45	U1439	34.81	11.44	42.20	-	6.62	580.9	-	466.6	26.68	-	3.36	30.04
HAP-41C	Tue-7/9	08:30	U1442	33.92	11.33	45.18	-	5.94	565.3	-	430.5	28.53	-	2.86	31.38
HAP-41C	Tue-7/9	09:15	U1445	30.77	10.58	37.42	-	4.99	587.5	-	498.1	27.06	-	3.06	30.12
Averages												27.42		3.09	30.51
Catalyst CT-9, Day 8															
HAP-41D	Wed-7/10	07:45	U1448	35.61	10.22	38.85	-	6.85	594.9	-	468.2	24.58	-	3.41	28.00
HAP-41D	Wed-7/10	08:30	U1451	36.93	9.71	42.10	-	6.61	594.7	-	462.3	25.68	-	3.13	28.82
HAP-41D	Wed-7/10	09:15	U1454	32.15	9.84	36.90	-	6.10	574.1	-	456.5	24.96	-	3.28	28.24
Averages												25.08		3.27	28.35
NoxSorb															
HAP-41D	Wed-7/10	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-41D	Wed-7/10	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-
Catalyst CT-9, Day 9															
HAP-41E	Thu-7/11	07:45	U1459	35.08	10.42	43.33	-	6.31	533.3	-	496.3	24.96	-	3.38	28.34
HAP-41E	Thu-7/11	08:30	U1462	35.75	10.08	42.06	-	6.00	577.6	-	508.0	25.74	-	3.23	28.97
HAP-41E	Thu-7/11	09:15	U1465	32.00	9.82	36.70	-	5.93	555.3	-	471.4	24.12	-	3.31	27.43
Averages												24.94		3.31	28.25
NoxSorb															

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
HAP-41E	Thu-7/11	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-
HAP-41E	Thu-7/11	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Catalyst CT-9, Day 10</i>															
HAP-41F	Fri-7/12	07:45	U1470	37.11	10.90	40.48	-	7.06	599.1	-	486.7	24.75	-	3.51	28.26
HAP-41F	Fri-7/12	08:30	U1473	39.41	9.17	40.77	-	7.00	605.2	-	507.5	23.72	-	3.41	27.13
HAP-41F	Fri-7/12	09:15	U1476	36.24	8.97	40.56	-	7.39	588.2	-	457.1	24.94	-	3.53	28.46
Averages												24.47		3.48	27.95
<i>Baseline</i>															
HAP-42	Mon-7/15	07:45	U1479	39.72	9.80	28.49	-	23.17	589.9	-	468.0	16.03	-	10.34	26.37
HAP-42	Mon-7/15	08:30	U1482	33.34	8.71	25.99	-	19.67	571.8	-	475.4	16.89	-	10.62	27.51
HAP-42	Mon-7/15	09:15	U1485	35.39	7.03	24.27	-	23.21	595.6	-	452.1	15.47	-	11.23	26.70
Averages												16.13		10.73	26.86
<i>Baseline</i>															
HAP-42R	Tue-7/16	07:45	U1488	33.01	11.20	22.34	-	21.91	593.8	-	455.8	15.23	-	11.46	26.69
HAP-42R	Tue-7/16	08:30	U1491	36.24	10.92	26.23	-	23.79	591.6	-	469.2	16.22	-	11.67	27.89
HAP-42R	Tue-7/16	09:15	U1494	32.74	8.88	23.75	-	22.51	563.5	-	468.1	15.48	-	12.19	27.67
Averages												15.64		11.77	27.42

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)
Accumulated Fine Fly Ash															
HAP-43A	Wed-7/17	07:45	U1497	36.94	10.10	34.01	-	18.25	568.2	-	468.4	19.82	-	8.77	28.59
HAP-43A	Wed-7/17	08:30	U1500	32.92	8.75	31.19	-	14.64	588.1	-	486.3	21.11	-	8.19	29.30
HAP-43A	Wed-7/17	09:15	U1503	32.57	8.65	29.53	-	16.72	579.3	-	467.4	19.90	-	9.09	28.99
Averages												20.27		8.68	28.96
Accumulated Fine Fly Ash															
HAP-43B	Thu-7/18	07:45	U1506	31.65	11.10	30.57	-	12.85	580.9	-	527.0	21.25	-	8.10	29.35
HAP-43B	Thu-7/18	08:30	U1509	36.37	10.08	34.79	-	15.23	604.8	-	497.8	21.92	-	7.90	29.81
HAP-43B	Thu-7/18	09:15	U1512	32.69	7.64	28.73	-	15.95	601.6	-	461.7	20.03	-	8.53	28.56
Averages												21.06		8.18	29.24
Accumulated Fine Fly Ash															
HAP-43C	Fri-7/19	07:45	U1515	34.88	8.03	30.34	-	9.29	594.2	-	485.0	19.58	-	4.89	24.47
HAP-43C	Fri-7/19	08:30	U1518	33.97	7.85	32.60	-	13.05	563.9	-	458.7	20.50	-	6.68	27.18
HAP-43C	Fri-7/19	09:15	U1521	34.38	8.06	29.43	-	8.46	609.9	-	482.0	19.78	-	4.49	24.27
Averages												19.95		5.35	25.31
Baseline															
HAP-44	Mon-7/22	07:45	U1524	33.41	11.18	23.70	-	17.53	590.5	-	531.9	15.87	-	10.57	26.44
HAP-44	Mon-7/22	08:30	U1527	34.80	10.00	25.65	-	19.46	587.5	-	482.4	16.40	-	10.22	26.62
HAP-44	Mon-7/22	09:15	U1530	34.43	8.05	26.30	-	20.98	566.7	-	492.0	16.40	-	11.36	27.76
Averages												16.23		10.72	26.94
FAL-3 Fly Ash (Day 1)															
HAP-45A	Tue-7/23	07:45	U1533	34.20	11.04	34.98	-	13.74	566.7	-	476.0	21.96	-	7.25	29.21
HAP-45A	Tue-7/23	08:30	U1536	33.98	7.53	34.83	-	13.58	571.7	-	470.3	22.20	-	7.12	29.32
HAP-45A	Tue-7/23	09:15	U1539	34.20	7.94	36.14	-	15.12	566.8	-	457.3	22.69	-	7.66	30.35
Averages												22.29		7.34	29.63
FAL-3 Fly Ash (Day 2)															
HAP-45B	Wed-7/24	07:45	U1542	34.70	11.79	34.05	-	12.37	537.0	-	471.6	19.96	-	6.37	26.33
HAP-45B	Wed-7/24	08:30	U1545	35.64	11.30	36.29	-	11.17	556.6	-	500.8	21.47	-	5.95	27.41
HAP-45B	Wed-7/24	09:15	U1548	30.82	11.89	29.35	-	10.03	557.4	-	456.1	20.11	-	5.62	25.73
Averages												20.51		5.98	26.49
FAL-3 Fly Ash (Day 3)															
HAP-45C	Thu-7/25	07:45	U1551	34.59	7.86	33.02	-	10.98	600.6	-	501.2	21.72	-	6.03	27.74
HAP-45C	Thu-7/25	08:30	U1554	39.30	6.98	40.06	-	12.21	593.5	-	491.5	22.92	-	5.78	28.70
HAP-45C	Thu-7/25	09:15	U1557	34.13	8.93	34.54	-	9.79	581.3	-	534.1	22.29	-	5.80	28.09
Averages												22.31		5.87	28.18
FAL-3 Fly Ash (Day 4)															
HAP-45D	Fri-7/26	07:45	U1560	36.82	10.16	36.49	-	10.93	568.0	-	452.0	21.33	-	5.08	26.41
HAP-45D	Fri-7/26	08:30	U1563	36.52	9.86	36.21	-	8.99	598.1	-	517.3	22.47	-	4.82	27.29

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

**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)
HAP-45D	Fri-7/26	09:15	U1566	36.44	8.63	38.85	-	12.36	548.6	-	441.5	22.16	-	5.67	27.83
Averages												21.98		5.19	27.18
<i>Baseline</i>															
HAP-46	Mon-7/29	07:45	U1569	36.36	10.24	31.48	-	22.95	567.2	-	490.0	18.61	-	11.72	30.32
HAP-46	Mon-7/29	08:30	U1572	34.93	10.93	31.32	-	23.24	569.2	-	441.8	19.34	-	11.14	30.47
HAP-46	Mon-7/29	09:15	U1575	36.08	8.92	29.70	-	23.36	591.1	-	495.4	18.43	-	12.15	30.59
Averages												18.79		11.67	30.46

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)	Hg Rem'l (%)	
Bsl, 8000scfm																							
HAP-40	Mon-7/1	07:45	7.0	12.3	21.5	5.3	-75.2	-	-	-	-	-	1.2	30.5	16.5	29.3	45.8	8.2	42.8	38.0	34.6	11.1	
HAP-40	Mon-7/1	08:30	5.8	12.2	19.7	6.4	-61.9	-	-	-	-	-	1.2	24.8	16.0	23.6	35.5	6.9	36.9	35.7	30.0	3.4	
HAP-40	Mon-7/1	09:15	5.0	10.4	18.3	5.3	-77.1	-	-	-	-	-	1.0	24.5	14.4	23.5	41.2	6.0	34.9	32.8	28.9	6.1	
Averages			5.9	11.6	19.8	5.7	-71.4						1.1	26.6	15.6	25.5	40.8	7.1	38.2	35.5	31.1	6.9	
Bsl, 8000scfm																							
HAP-40R	Tue-7/2	07:45	9.4	14.9	27.9	5.5	-86.9	-	-	-	-	-	1.2	35.6	21.7	34.4	39.0	10.7	50.6	49.6	39.9	1.8	
HAP-40R	Tue-7/2	08:30	9.2	13.5	23.4	4.3	-73.3	-	-	-	-	-	1.2	33.0	19.6	31.9	40.6	10.4	46.5	43.0	36.1	7.6	
HAP-40R	Tue-7/2	09:15	8.8	12.2	22.1	3.4	-81.3	-	-	-	-	-	1.2	31.8	18.2	30.6	42.7	10.0	44.0	40.3	34.0	8.4	
Averages			9.1	13.5	24.5	4.4	-80.5						1.2	33.5	19.8	32.3	40.8	10.3	47.0	44.3	36.7	5.9	
Catalyst CT-9, Day 1																							
HAP-41A	Wed-7/3	07:45	9.9	16.9	43.7	7.0	-158.3	-	-	-	-	-	1.1	30.5	2.7	29.3	91.3	11.0	47.4	46.4	36.4	2.1	
HAP-41A	Wed-7/3	08:30	9.5	16.9	40.3	7.4	-139.1	-	-	-	-	-	1.1	30.0	1.7	29.0	94.3	10.5	46.9	42.0	36.4	10.3	
HAP-41A	Wed-7/3	09:15	9.6	16.7	45.7	7.1	-173.5	-	-	-	-	-	1.1	30.7	2.2	29.6	92.9	10.8	47.4	47.9	36.7	-0.9	
Averages			9.7	16.8	43.2	7.2	-157.0						1.1	30.4	2.2	29.3	92.8	10.8	47.2	45.4	36.5	3.9	
Catalyst CT-9, Day 6																							
HAP-41B	Mon-7/8	07:45	8.4	6.7	18.7	-1.6	-178.6	-	-	-	-	-	7.2	41.9	19.2	34.7	54.2	15.6	48.6	37.9	33.0	22.0	
HAP-41B	Mon-7/8	08:30	4.1	5.6	12.8	1.5	-128.0	-	-	-	-	-	5.2	42.8	8.9	37.6	79.1	9.4	48.5	21.8	39.1	55.1	
HAP-41B	Mon-7/8	09:15	6.0	6.9	18.1	1.0	-161.3	-	-	-	-	-	4.5	44.8	10.2	40.3	77.1	10.5	51.8	28.4	41.3	45.2	
Averages			6.1	6.4	16.6	0.3	-156.0						5.6	43.2	12.8	37.5	70.2	11.8	49.6	29.3	37.8	40.8	
Catalyst CT-9, Day 7																							
HAP-41C	Tue-7/9	07:45	7.9	14.2	44.7	6.3	-214.1	-	-	-	-	-	1.1	40.7	5.6	39.6	86.2	9.0	54.9	50.3	45.9	8.4	
HAP-41C	Tue-7/9	08:30	7.4	13.3	47.2	5.9	-254.2	-	-	-	-	-	0.8	39.4	4.7	38.6	88.0	8.2	52.8	51.9	44.5	1.6	
HAP-41C	Tue-7/9	09:15	7.4	13.1	41.6	5.7	-216.5	-	-	-	-	-	0.8	39.6	4.7	38.7	88.1	8.2	52.7	46.2	44.5	12.2	
Averages			7.6	13.6	44.5	6.0	-228.3						0.9	39.9	5.0	39.0	87.4	8.5	53.4	49.5	45.0	7.4	
Catalyst CT-9, Day 8																							
HAP-41D	Wed-7/10	07:45	6.7	6.8	36.5	0.2	-433.0	-	-	-	-	-	0.9	34.5	5.1	33.5	85.3	7.6	41.3	41.6	33.7	-0.6	
HAP-41D	Wed-7/10	08:30	6.7	11.9	36.4	5.2	-206.7	-	-	-	-	-	0.9	35.3	4.4	34.4	87.4	7.5	47.1	40.8	39.6	13.4	
HAP-41D	Wed-7/10	09:15	7.0	11.0	35.8	4.0	-226.6	-	-	-	-	-	1.3	35.6	4.7	34.2	86.8	8.3	46.5	40.5	38.2	13.0	
Averages			6.8	11.4	36.2	4.6	-216.6						1.1	35.4	4.7	34.3	87.1	7.8	46.8	41.0	38.9	13.2	
NoxSorb																							
HAP-41D	Wed-7/10	08:30	-	3.7	-	-	69.2	-	-	-	-	-	-	23.5	-	-	33.8	-	27.1	-	-	42.1	
HAP-41D	Wed-7/10	09:15	-	4.1	-	-	65.4	-	-	-	-	-	-	23.7	-	-	33.0	-	27.8	-	-	40.6	
Catalyst CT-9, Day 9																							
HAP-41E	Thu-7/11	07:45	6.3	12.6	37.7	6.3	-198.7	-	-	-	-	-	0.9	34.5	5.1	33.6	85.2	7.2	47.1	42.9	39.9	9.0	
HAP-41E	Thu-7/11	08:30	6.4	11.8	37.7	5.4	-220.4	-	-	-	-	-	0.8	34.6	4.7	33.8	86.3	7.2	46.4	42.5	39.2	8.4	
HAP-41E	Thu-7/11	09:15	6.2	11.2	34.5	5.1	-207.4	-	-	-	-	-	0.9	34.9	4.7	33.9	86.4	7.1	46.1	39.3	39.0	14.8	
Averages			6.3	11.9	36.7	5.6	-208.8						0.9	34.6	4.9	33.8	86.0	7.2	46.5	41.5	39.4	10.8	
NoxSorb																							

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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	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/Nm³)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(%)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(%)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(%)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(µg/Nm³)	(%)
HAP-41E	Thu-7/11	08:30	-	2.0	-	-	83.5	-	-	-	-	-	-	30.2	-	-	12.7	-	32.2	-	-	30.8
HAP-41E	Thu-7/11	09:15	-	1.8	-	-	84.5	-	-	-	-	-	-	28.6	-	-	17.5	-	30.4	-	-	34.6
Catalyst CT-9, Day 10																						
HAP-41F	Fri-7/12	07:45	6.6	12.0	39.2	5.4	-226.9	-	-	-	-	-	0.9	32.5	5.6	31.6	82.9	7.5	44.5	44.8	37.1	-0.5
HAP-41F	Fri-7/12	08:30	6.3	10.3	32.1	4.0	-210.1	-	-	-	-	-	0.9	31.1	4.6	30.3	85.2	7.2	41.5	36.7	34.3	11.5
HAP-41F	Fri-7/12	09:15	6.1	10.4	33.2	4.3	-217.6	-	-	-	-	-	0.8	31.1	4.7	30.4	84.9	6.9	41.6	37.9	34.7	9.0
Averages			6.3	10.9	34.8	4.6	-218.2						0.8	31.6	5.0	30.8	84.3	7.2	42.5	39.8	35.4	6.6
Baseline																						
HAP-42	Mon-7/15	07:45	6.4	11.0	22.9	4.6	-107.4	-	-	-	-	-	1.3	32.2	14.8	30.9	54.2	7.7	43.3	37.7	35.6	13.0
HAP-42	Mon-7/15	08:30	6.0	9.0	22.0	3.0	-145.1	-	-	-	-	-	0.9	30.7	13.8	29.8	54.9	6.9	39.7	35.8	32.8	9.7
HAP-42	Mon-7/15	09:15	5.6	9.0	17.7	3.4	-96.8	-	-	-	-	-	0.9	29.3	12.9	28.4	56.1	6.5	38.3	30.6	31.8	20.1
Averages			6.0	9.7	20.9	3.7	-116.4						1.0	30.7	13.8	29.7	55.1	7.0	40.4	34.7	33.4	14.2
Baseline																						
HAP-42R	Tue-7/16	07:45	5.7	11.9	24.9	6.2	-109.7	-	-	-	-	-	0.8	36.3	18.7	35.4	48.4	6.5	48.1	43.6	41.6	9.4
HAP-42R	Tue-7/16	08:30	5.8	12.4	25.7	6.6	-107.4	-	-	-	-	-	0.8	36.2	18.5	35.4	48.9	6.6	48.6	44.3	42.0	9.0
HAP-42R	Tue-7/16	09:15	5.2	9.9	20.4	4.7	-105.7	-	-	-	-	-	1.2	32.8	16.1	31.6	50.9	6.4	42.7	36.5	36.3	14.5
Averages			5.6	11.4	23.7	5.8	-107.6						0.9	35.1	17.8	34.1	49.4	6.5	46.5	41.5	40.0	11.0

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/G1 = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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)	Hg Rem'l (%)
Accumulated Fine Fly Ash																						
HAP-43A	Wed-7/17	07:45	7.6	13.7	29.1	6.1	-112.4	-	-	-	-	-	1.1	33.0	12.9	31.9	61.0	8.7	46.7	42.0	38.0	10.2
HAP-43A	Wed-7/17	08:30	7.7	12.3	27.6	4.6	-123.7	-	-	-	-	-	1.1	31.2	10.7	30.1	65.7	8.8	43.5	38.3	34.7	12.1
HAP-43A	Wed-7/17	09:15	7.1	11.8	25.8	4.7	-117.6	-	-	-	-	-	1.0	30.8	11.8	29.8	61.8	8.1	42.6	37.5	34.5	11.9
Averages			7.5	12.6	27.5	5.1	-117.9						1.1	31.7	11.8	30.6	62.8	8.6	44.3	39.3	35.7	11.4
Accumulated Fine Fly Ash																						
HAP-43B	Thu-7/18	07:45	8.5	15.1	34.3	6.6	-128.0	-	-	-	-	-	1.3	37.1	13.1	35.8	64.7	9.7	52.1	47.4	42.4	9.0
HAP-43B	Thu-7/18	08:30	7.3	12.5	32.1	5.2	-157.5	-	-	-	-	-	1.0	31.7	11.6	30.7	63.5	8.3	44.2	43.7	35.8	1.1
HAP-43B	Thu-7/18	09:15	6.4	10.3	24.0	3.9	-133.6	-	-	-	-	-	1.1	29.7	10.2	28.6	65.6	7.4	40.0	34.2	32.5	14.5
Averages			7.4	12.6	30.1	5.2	-139.7						1.1	32.8	11.6	31.7	64.6	8.5	45.4	41.8	36.9	8.2
Accumulated Fine Fly Ash																						
HAP-43C	Fri-7/19	07:45	5.3	9.1	24.1	3.8	-165.4	-	-	-	-	-	0.9	24.8	6.0	24.0	75.7	6.2	33.9	30.2	27.7	11.0
HAP-43C	Fri-7/19	08:30	5.4	9.6	24.9	4.2	-160.2	-	-	-	-	-	0.8	27.0	8.1	26.2	69.9	6.2	36.6	33.1	30.4	9.6
HAP-43C	Fri-7/19	09:15	5.5	9.5	24.4	4.0	-158.3	-	-	-	-	-	0.9	26.7	5.6	25.8	79.2	6.4	36.1	30.0	29.8	17.0
Averages			5.4	9.4	24.5	4.0	-161.3						0.8	26.2	6.6	25.3	74.9	6.3	35.6	31.1	29.3	12.5
Baseline																						
HAP-44	Mon-7/22	07:45	5.3	10.8	25.9	5.5	-138.9	-	-	-	-	-	0.9	35.7	17.2	34.7	51.7	6.2	46.5	43.1	40.3	7.3
HAP-44	Mon-7/22	08:30	5.6	9.7	23.9	4.0	-146.6	-	-	-	-	-	0.9	31.5	14.9	30.5	52.7	6.6	41.1	38.7	34.5	5.8
HAP-44	Mon-7/22	09:15	5.6	9.4	20.3	3.8	-114.9	-	-	-	-	-	1.0	28.5	14.0	27.5	50.8	6.6	37.9	34.3	31.4	9.6
Averages			5.5	10.0	23.3	4.5	-133.5						0.9	31.9	15.4	30.9	51.7	6.5	41.9	38.7	35.4	7.6
FAL-3 Fly Ash (Day 1)																						
HAP-45A	Tue-7/23	07:45	-	12.6	35.3	-	-	-	-	-	-	-	-	32.6	11.6	-	64.3	-	45.2	46.9	-	-3.9
HAP-45A	Tue-7/23	08:30	-	11.3	26.4	-	-	-	-	-	-	-	-	28.4	8.5	-	70.2	-	39.7	34.8	-	12.2
HAP-45A	Tue-7/23	09:15	9.1	12.2	27.8	3.1	-128.5	-	-	-	-	-	1.0	29.1	9.4	28.1	67.8	10.1	41.3	37.2	31.2	10.0
Averages			9.1	12.0	29.8	3.1	-128.5						1.0	30.0	9.8	28.1	67.4	10.1	42.1	39.6	31.2	6.1
FAL-3 Fly Ash (Day 2)																						
HAP-45B	Wed-7/24	07:45	6.3	12.4	34.7	6.2	-178.6	-	-	-	-	-	0.8	38.3	11.1	37.5	71.1	7.1	50.8	45.7	43.7	9.9
HAP-45B	Wed-7/24	08:30	6.5	11.7	35.4	5.2	-202.8	-	-	-	-	-	0.8	37.8	9.8	37.0	74.1	7.3	49.5	45.2	42.2	8.7
HAP-45B	Wed-7/24	09:15	6.0	11.2	35.3	5.2	-215.3	-	-	-	-	-	0.8	39.4	9.9	38.6	75.0	6.8	50.6	45.2	43.8	10.8
Averages			6.3	11.8	35.1	5.5	-198.9						0.8	38.5	10.2	37.7	73.4	7.1	50.3	45.4	43.2	9.8
FAL-3 Fly Ash (Day 3)																						
HAP-45C	Thu-7/25	07:45	6.3	11.2	26.4	4.8	-136.7	-	-	-	-	-	1.0	28.6	7.3	27.6	74.3	7.3	39.8	33.8	32.4	15.0
HAP-45C	Thu-7/25	08:30	6.3	9.8	26.2	3.6	-166.0	-	-	-	-	-	0.8	27.5	6.6	26.7	76.0	7.1	37.3	32.8	30.2	12.3
HAP-45C	Thu-7/25	09:15	6.9	10.9	29.6	3.9	-171.6	-	-	-	-	-	0.9	31.4	7.7	30.5	75.5	7.9	42.3	37.2	34.4	12.0
Averages			6.5	10.6	27.4	4.1	-158.1						0.9	29.2	7.2	28.3	75.3	7.4	39.8	34.6	32.4	13.1
FAL-3 Fly Ash (Day 4)																						
HAP-45D	Fri-7/26	07:45	6.3	11.1	31.5	4.7	-184.3	-	-	-	-	-	0.9	30.9	7.5	30.0	75.7	7.2	42.0	39.0	34.7	7.1
HAP-45D	Fri-7/26	08:30	6.3	10.9	32.3	4.6	-195.5	-	-	-	-	-	0.9	32.0	6.9	31.1	78.4	7.2	42.9	39.2	35.7	8.7

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and P1/F Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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 (µg/Nm ³)	Post-Spike Inlet (µg/Nm ³)	Outlet [Hg] (µg/Nm ³)	Hg Spiked (µg/Nm ³)	Hg Rem'l (%)	Pre-Spike Inlet (µg/Nm ³)	Post-Spike Inlet (µg/Nm ³)	Outlet [Hg] (µg/Nm ³)	Hg Spiked (µg/Nm ³)	Hg Rem'l (%)	Pre-Spike Inlet (µg/Nm ³)	Post-Spike Inlet (µg/Nm ³)	Outlet [Hg] (µg/Nm ³)	Hg Spiked (µg/Nm ³)	Hg Rem'l (%)	Pre-Spike Inlet (µg/Nm ³)	Post-Spike Inlet (µg/Nm ³)	Outlet [Hg] (µg/Nm ³)	Total Hg Spiked (µg/Nm ³)	Hg Rem'l (%)
HAP-45D	Fri-7/26	09:15	5.8	8.7	28.7	2.9	-229.9	-	-	-	-	-	0.8	25.6	7.3	24.8	71.3	6.6	34.3	36.0	27.7	-5.0
Averages			6.2	10.2	30.8	4.1	-203.3						0.9	29.5	7.3	28.6	75.1	7.0	39.7	38.1	32.7	3.6
<i>Baseline</i>																						
HAP-46	Mon-7/29	07:45	7.0	12.7	27.7	5.7	-117.4	-	-	-	-	-	1.1	38.2	17.4	37.0	54.4	8.2	50.9	45.1	42.7	11.4
HAP-46	Mon-7/29	08:30	7.4	13.3	30.7	5.9	-131.2	-	-	-	-	-	1.1	41.0	17.7	40.0	56.9	8.4	54.3	48.4	45.9	10.9
HAP-46	Mon-7/29	09:15	6.8	10.6	24.4	3.8	-129.8	-	-	-	-	-	1.1	34.4	16.1	33.3	53.3	7.9	45.1	40.5	37.1	10.1
Averages			7.1	12.2	27.6	5.1	-126.1						1.1	37.9	17.1	36.8	54.8	8.2	50.1	44.7	41.9	10.8

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PIJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

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, 8000scfm										
HAP-40	Mon-7/1	07:45	25.79	25.75	100.2	45.8	30.2	38.0	0.0	11.1
HAP-40	Mon-7/1	08:30	23.89	25.75	92.8	35.5	30.5	33.0	0.0	3.4
HAP-40	Mon-7/1	09:15	25.43	25.75	98.8	41.2	32.5	36.9	0.0	6.1
Averages			25.04		97.2	41.2	31.0	36.1	0.0	7.1
Bsl, 8000scfm										
HAP-40R	Tue-7/2	07:45	25.57	25.75	99.3	39.0	36.4	37.7	0.0	1.8
HAP-40R	Tue-7/2	08:30	25.59	25.75	99.4	40.6	29.9	35.3	0.0	7.6
HAP-40R	Tue-7/2	09:15	23.95	25.75	93.0	42.7	31.1	36.9	0.0	8.4
Averages			25.04		97.2	40.7	32.6	36.7	0.0	5.8
Catalyst CT-9, Day 1										
HAP-41A	Wed-7/3	07:45	25.80	25.75	100.2	91.3	87.9	89.6	0.0	2.1
HAP-41A	Wed-7/3	08:30	26.16	25.75	101.6	94.3	78.2	86.3	0.0	10.3
HAP-41A	Wed-7/3	09:15	25.59	25.75	99.4	92.9	94.3	93.6	0.0	-0.9
Averages			25.85		100.4	92.8	86.9	89.9	0.0	3.8
Catalyst CT-9, Day 6										
HAP-41B	Mon-7/8	07:45	20.81	25.75	80.8	54.2	28.6	28.6	25.6	22.0
HAP-41B	Mon-7/8	08:30	26.24	25.75	101.9	79.1	16.8	16.8	62.3	55.1
HAP-41B	Mon-7/8	09:15	27.81	25.75	108.0	77.1	25.0	25.0	52.2	45.2
Averages			24.95		96.9	70.4	23.5	23.5	46.9	40.9
Catalyst CT-9, Day 7										
HAP-41C	Tue-7/9	07:45	29.42	28.98	101.5	86.2	74.8	80.5	0.0	8.4
HAP-41C	Tue-7/9	08:30	29.80	28.98	102.8	88.0	85.9	87.0	0.0	1.6
HAP-41C	Tue-7/9	09:15	29.76	28.98	102.7	88.1	71.9	80.0	0.0	12.2
Averages			29.66		102.3	87.4	77.5	82.5	0.0	7.4
Catalyst CT-9, Day 8										
HAP-41D	Wed-7/10	07:45	24.09	28.98	83.1	85.3	86.0	86.0	-0.7	-0.6
HAP-41D	Wed-7/10	08:30	28.88	28.98	99.7	87.4	69.5	69.5	17.9	13.4
HAP-41D	Wed-7/10	09:15	26.99	28.98	93.1	86.8	69.8	69.8	17.0	13.0
Averages			26.65		92.0	86.6	70.1	70.1	16.6	12.5
NoxSorb										
HAP-41D	Wed-7/10	08:30	-11.77	28.98	-40.6	-	-	-	-	-
HAP-41D	Wed-7/10	09:15	-11.07	28.98	-38.2	-	-	-	-	-
Catalyst CT-9, Day 9										
HAP-41E	Thu-7/11	07:45	28.02	28.98	96.7	85.2	72.8	72.8	12.3	9.0
HAP-41E	Thu-7/11	08:30	28.17	28.98	97.2	86.3	75.0	75.0	11.3	8.4
HAP-41E	Thu-7/11	09:15	27.53	28.98	95.0	86.4	66.8	66.8	19.6	14.8
Averages			27.91		96.3	86.0	71.5	71.5	14.4	10.7
NoxSorb										

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PJFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

Spike Recovery

Oxidation/Removal

Test ID	Date	Start Time	Spike Recovery			Oxidation/Removal				
			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 (%)
HAP-41E	Thu-7/11	08:30	-7.17	28.98	-24.8	-	-	-	-	-
HAP-41E	Thu-7/11	09:15	-8.94	28.98	-30.9	-	-	-	-	-
Catalyst CT-9, Day 10										
HAP-41F	Fri-7/12	07:45	25.46	28.98	87.9	82.9	83.7	83.3	0.0	-0.5
HAP-41F	Fri-7/12	08:30	25.88	28.98	89.3	85.2	69.8	77.5	0.0	11.5
HAP-41F	Fri-7/12	09:15	26.12	28.98	90.1	84.9	73.0	78.9	0.0	9.0
Averages			25.82		89.1	84.3	75.6	80.0	0.0	6.5
Baseline										
HAP-42	Mon-7/15	07:45	25.54	28.98	88.1	54.2	36.8	36.8	17.4	13.0
HAP-42	Mon-7/15	08:30	25.35	28.98	87.5	54.9	42.4	42.4	12.5	9.7
HAP-42	Mon-7/15	09:15	27.76	28.98	95.8	56.1	29.8	29.8	26.3	20.1
Averages			26.22		90.5	55.0	36.4	36.4	18.6	14.1
Baseline										
HAP-42R	Tue-7/16	07:45	28.16	28.98	97.2	48.4	35.9	35.9	12.5	9.4
HAP-42R	Tue-7/16	08:30	29.29	28.98	101.1	48.9	36.8	36.8	12.1	9.0
HAP-42R	Tue-7/16	09:15	27.52	28.98	95.0	50.9	32.0	32.0	18.9	14.5
Averages			28.32		97.7	49.3	35.0	35.0	14.3	10.8

*Shaded areas indicate sampling problems. a)calculated average of the SDA In and PIFF Out CEM values. PTFE/GI = PTFE membrane on fiberglass. b)prelim. values from pilot log sheet.

ECTC COSPONSORS DISTRIBUTION

Ms. Debra DiMeo (10)
Empire State Electric Energy Res. Corp.
1515 Broadway
New York, NY 10036
Ph: (212) 302-1212
Fax: (212) 302-1377

Mr. Michael Perlsweig
U.S. Department of Energy
FE-22/GTN
Washington, DC 20545
Ph: (202) 353-4399
Fax: (202) 353-4399

Mr. John E. Smigelski (10)
New York State Electric & Gas
Corporate Drive, Kirkwood Ind. Park
P. O. Box 5224
Binghamton, NY 13902-5224
Ph: (607) 762-8688
Fax: (607) 762-8457

Ms. JoAnn C. Zysk (7)
U.S. Department of Energy
Pittsburgh Energy Technology Center
P. O. Box 10940, MS 900-33
Pittsburgh, PA 15236
Ph: (412) 892-6200
Fax: (412) 892-6216

Dr. Gerald Janik
New York State Electric & Gas
Corporate Drive, Kirkwood Ind. Park
P. O. Box 5224
Binghamton, NY 13902-5224
Ph: (607) 762-4318
Fax: (607) 762-8457

Mr. Takeo Hirai
Electric Power Development Co., Ltd.
15-1, Ginza 6-Chome, Chuo-ku
Tokyo, 104 JAPAN
Ph: (81) 3-3546-9404
Fax: (81) 3-3546-9482

EPRI DISTRIBUTION

G. Andes
W. Chow

R. Glover
M. Miller

R. Rhudy
G. Offen

G. Preston