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ENVIRONMENTAL CONTROL TECHNOLOGY CENTER

REPORT TO THE STEERING COMMITTEE

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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

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LIST OF COMMON ABBREVIATIONS

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

EXECUTIVE SUMMARY

Operations and maintenance continued this month at the Electric Power Research Institute's Environmental Control Technology Center. Testing on the 4.0 MW Pilot Wet FGD unit continued this month with the Trace Element Removal (TER) test block as the Pilot was operated at baseline, forced oxidation, and inhibited oxidation conditions. As the NYSEG Kintigh Station conducted a test burn this month with Petroleum coke/coal fuel blends, a one-week trace element characterization test was performed across the Pilot unit testing this flue gas. Additionally, the mercury measurement (Method 29) studies continued this month as investigations into various activated carbons, metal amalgams, and impinger capture solutions were conducted.

As a result of new directions received from EPRI, August was the last scheduled month for testing on the 1.0 MW Cold-Side Selective Catalytic Reduction (SCR) unit at the ECTC. This month, the unit was isolated from the flue gas path and placed in a cold-standby mode for future test activities. Monthly inspections of all SCR system equipment placed in this cold-standby mode, as well as the fire safety systems in the SCR building, will be conducted by the ECTC maintenance department and will include manual rotation of the booster fan.

Pilot Testing Highlights

Trace Element Removal Tests

The Pilot Trace Elements Removal (TER) test block continued in September as part of EPRI's overall program to develop control technology options for trace element emissions. This experimental program investigates mercury removal and mercury speciation under different operating conditions. The 1995 six-month program is being performed on a 4.0 MW Wet FGD pilot unit at EPRI's Environmental Control Technology Center (ECTC).

Background

Wet FGD systems have the ability to remove solid-phase and vapor-phase trace elements present in flue gas streams. With only a limited amount of test data to quantify mercury removal efficiencies across full-scale FGD systems, additional research is needed to better understand the removal mechanisms that may aid in the development of processes to increase the mercury removal efficiencies. Several test programs investigating trace elements removal have been conducted.

The most important results from full-scale and pilot-scale testing for trace elements control by wet FGD systems are:

- Mercury is the primary vapor-phase trace element of interest to coal-fired power plants. Preliminary data show that the chemical form of the mercury can greatly affect the removal efficiency. Mercuric chloride is effectively removed by FGD systems, while elemental mercury is not.
- Mercury removal data collected at the ECTC and elsewhere are difficult to interpret because the currently available mercury speciation methods, especially when used at the FGD inlet location, do not yield successful speciation under all conditions.
- Solid-phase trace elements removal can be approximated by the bulk particulate removal efficiency for the FGD system as long as the mass of condensed sulfuric acid and scrubber carryover are considered.
- Measured bulk particulate removal efficiencies across full-scale FGD systems are generally greater than 50% and are usually greater than theoretical efficiencies. These higher-than-predicted removal efficiencies may be a result of an electrical charge on the inlet particles that causes an attraction to the slurry droplets, thereby improving particulate removal efficiency for the scrubber.

SECTION I FACILITY STATUS

GENERAL

The NYSEG Kintigh Station provided flue gas to the Center 96% of the time during this performance period. As the Kintigh Station test burn of Petroleum Coke/coal fuel blends (20% and 25%) continued this month, fluctuations in the Center's inlet SO₂ concentrations were experienced. This test burn is expected to continue until the Station's Fall '95 outage begins in October. This month, the ECTC was off-line from 9/16 through 9/18 due to a Station outage to repair tube leaks in the boiler.

Safety training for the month was conducted by the O&M Superintendent, Maintenance Supervisor and Shift Supervisors. Hearing Protection and Respirator Awareness were the topics of the month. During this training, the semi-annual inspection and fit testing of all O&M staff respirators was conducted per the current OSHA regulations. 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 1213 as of 9/30/95.

The monthly safety meeting with the NYSEG Kintigh Station was held on September 29 with the NYSEG and ECTC representatives to discuss shared states of responsibility, operations and future activities. The major topics of discussion included the Station's Fall '95 scheduled outage in October, the new OSHA Fall Protection standards and the site specific standard being created by the Station, and the future safety training activities and schedules.

PILOT WET FGD SYSTEM

The equivalent and actual availabilities for the ECTC 4.0 MW Pilot Wet FGD System testing this month were 98% and 94% respectively during this period.

- September 11 for 8 hours to removing pluggage from #3 spray nozzle, to repair a leak in the main recirculation header, and to repair a leak in the CRG bypass ductwork.
- September 16 - 18 for 28 hours due to a NYSEG tube leak outage.

The Trace Element Removal (TER) test block continued this month with the following tests: T22-N, T23, T23-N1, T23N3, T23-E2, T23-E4, T23-E6, T23-E7, T23-E8, T23-E9, T23-E10, T23-E11, T23-EY2, T23-EY3, T23-EY4, T23-EY5, T23-EY6, T23-EY7, T23-EY8, T23-EY9, T23-IY*, T23-EXY1, and T23-EXY2. These mercury removal tests were conducted under baseline, forced oxidation, and inhibited oxidation modes with the injection of elemental mercury and/or mercuric chloride (oxidized mercury). Also, various activated carbons, metal amalgams, and impinger capture

solutions were used during these tests. The operational parameters for the Pilot Wet Scrubber unit during this test block included: a gas flow of 8,250 scfm; 1600 ppm inlet SO₂; a recycle slurry flow 1300 gpm; 440 scfm of oxidation air; and an absorber inlet temperature of 315°F.

The following maintenance work was completed on the Pilot Wet Scrubber unit during this performance period:

- Recirculation Pump 6 was reset in place and energized.
- Minor problems with the Pilot inlet CEM system were repaired and resolved.

COLD-SIDE SELECTIVE CATALYTIC REDUCTION SYSTEM (SCR)

August was the last scheduled month for testing on the 1.0 MW Cold-Side Selective Catalytic Reduction (SCR) unit at the ECTC. This month, the unit was isolated from the flue gas path and placed in a cold-standby mode for future test activities. Monthly inspections of all SCR system equipment placed in this cold-standby mode, as well as the fire safety systems in the SCR building, will be conducted by the ECTC maintenance department and will include manual rotation of the booster fan. Additional isolation activities will be conducted by NYSEG contractors during the Station's Fall '95 scheduled outage.

The following activities were completed on the SCR unit this month to place it into a cold-standby mode:

- The SCR unit was purged on air to remove any residual ammonia.
- The reactor and heat exchanger were opened, cleaned, and sealed.
- All leased equipment and catalyst material was returned to the original manufacturer.
- All remaining SCR equipment was cleaned and de-energized, disconnected, and secured in place.

MISCELLANEOUS

The Paste Slaker and Ball Mill operations were normal this month during the preparation of Bellefonte lime and Beachville limestone. The slaked lime slurry prepared for ECTC operations this month was 25% solids at 190°F, while the limestone grind prepared for ECTC operations was 90% passing 325 mesh screen.

The P-5A demonstration project with Watson Process Systems and Environmental Systems Corporation (ESC) continued this month as measurements were conducted to determine droplet carryover and entrained mist exiting the Pilot wet scrubber vertical mist eliminator (VME) section. By tracking the P-5A monitor readings to various ECTC flue gas/operating parameters, relationships will be developed

between the P-5A readings and the amount of liquid carryover after the final mist eliminator. Preparations are in progress to thoroughly inspect the P-5A unit and probe assembly during the October outage so that all systems are in good working order for the Pilot High Velocity Scrubbing testing after the outage.

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

- The scheduled maintenance in the warehouse/administration facility (WASF) electrical room was completed.
- Scheduled maintenance and repairs were completed on the Air compressor and Drying Tower systems.
- The outstanding items from the High Velocity worklist were completed.

FINANCIAL REPORT

The Financial Report for the four Operations and Maintenance contract tasks are summarized below for the month of September 1995, the year to date, and the contract total.

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

	September	Year to Date	Contract Total
Task 100	\$ 111,357	\$ 949,324	\$ 13,362,016
Task 200	\$ 32,796	\$ 418,350	\$ 7,836,125
Task 300	\$ 10,023	\$ 50,146	\$ 1,120,182
Task 400	\$ 1,241	\$ 14,239	\$ 49,043
TOTAL*	\$ 155,417	\$ 1,432,059	\$ 22,367,366

* Includes \$168,455 unbudgeted, contracted cost of Pilot High Velocity modifications in 6/95

The attached graph illustrates the budgeted and actual expenses for ECTC O&M activities through September 1995.

Figure i.
1995 Operation & Maintenance Costs

SECTION II PILOT AND MINI-PILOT TEST ACTIVITY

PILOT

The Pilot Trace Elements Removal (TER) test block continued in September as part of EPRI's overall program to develop control technology options for trace element emissions. This experimental program investigates mercury removal and mercury speciation under different operating conditions. The 1995 six-month program is being conducted on the 4.0 MW Wet FGD pilot unit at EPRI's Environmental Control Technology Center (ECTC).

Objectives

The 1995 Trace Elements Removal (TER) test block is planned to 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
- Electrostatic charging of particulate material in the FGD inlet flue gas stream

Testing in September included the measurement of mercury removal across a magnesium-lime inhibited FGD system, a comparison of tris (hydroxymethyl) aminomethane (tris) impinger solution to peroxide impinger solution, and measurement of mercury removal via metal amalgamation (performed using impinger train). One of the overall objectives of the TER testing is to investigate the mercury speciation abilities of EPA Method 29 and to test methods of improvement if possible. This objective will be studied by:

- Spiking elemental mercury (Hg^0) into the gas sampling train (intratrain spiking) to determine the percent spike recovery in the various impinger solutions;
- Spiking the inlet flue gas with Hg^0 and HgCl_2 to determine the percent spike recovery in the various impinger solutions; and
- Using novel impinger solutions to investigate the effect of these solutions on speciation capabilities.

Summary of Operations

A detailed summary of operations for September is presented in Table 1. A simplified process flow diagram for the absorber process, as configured for the trace element testing in September, is shown in Figure 1. Figure 2 shows a more detailed gas-flow configuration and the locations of the mercury spiking and gas sampling ports used during all of the TER test block. Table 2 presents a gas sampling

summary and the impinger test conditions for the test block. (Impinger tests conducted prior to September are shaded.) During September, NYSEG continued its test burn with a 25% petcoke blend. From September 1 to 22, Exxon refinery pet-coke was used; and from September 26 to the start of the October outage, Chalmette refinery pet-coke was used.

During September, a magnesium-lime inhibited-oxidation FGD process was evaluated for mercury removal. Tris and peroxide impinger solutions were compared at the wet scrubber inlet with different gas sampling times, and mercury removal via metal amalgamation was evaluated using gold, silver, aluminum, copper, zinc, and lead wire. Additionally, sublimed sulfur, iodated carbon, and calcium chloride impregnated carbon were tested to determine overall vapor-phase mercury removal efficiency and their effect on mercury speciation.

For the metal amalgamation tests, 250 cm of metal wire (surface area of 39.4 cm²) was coiled into a spiral configuration and placed on the quartz filter normally used for gas sampling in Method 29. Before gas sampling, the gold, silver, iron, and copper wires were heated to 700°C for 15 to 30 minutes to drive off residual mercury. Because of the potential for softening and deformation, the aluminum wire was heated to 500°C, and the lead and zinc wires were not heated. The metal wires were rinsed with methanol then sandwiched between two pieces of filter paper on the quartz filter. Originally, the metal was coiled and placed onto a 45.6 cm² (three-inch diameter) filter; when resulting mercury removal efficiencies were lower than desired, an increased gas-metal contact design was used which placed the coiled metal wire on 20.3 cm² (two-inch diameter) of the original filter while the remaining area was masked. After testing, the gold, silver, copper, and iron wires were heated to 700°C while Argon gas was passed over the metal and bubbled into a permanganate solution to collect any mercury released from the metal. Aluminum was heated to 500°C, zinc was heated to 250°C, and lead wire was heated to 220°C. In all tests, no mercury was recovered from the permanganate solution.

Three runs with each metal (or carbon) were performed. After each run, the impingers were removed and replaced with fresh solutions and the metal (or carbon) was left in place. Thus, changes in mercury removal efficiency or speciation can be examined as the solid substrate was exposed to the flue gas for increasing lengths of time. In each of these tests, gas was sampled for approximately one hour. A baseline Method 29 gas sample was collected simultaneously with the metal (or carbon) sampling. Each baseline train sampled gas for 120 minutes, so each baseline train is compared with two metal (or carbon) trains.

Summary of TER Results

FGD Mercury Removal

Measurement of mercury removal efficiency across FGD systems was continued in September with tests T22-N, T22-E, and T22-EC. These Mg-lime tests were run under inhibited oxidation conditions using emulsified sulfur. Table 3 shows the results from these tests and compares them with Mg-lime/DBA forced oxidation tests run in August. There was no difference in total mercury removal between Mg-lime forced or inhibited operation. While there was some difference in the inlet mercury concentration without spiking (5.8 versus 8.1 $\mu\text{g}/\text{Nm}^3$), the removal efficiency was similar (87 versus 89%). Spiking with Hg^0 , and both Hg^0 and HgCl_2 , also show similar removal efficiencies between the Mg-lime inhibited- and forced-oxidation processes. The testing with these FGD conditions is consistent with other FGD processes showing that the Hg^{+2} was captured and the elemental mercury was not.

Tris Impinger Solution

One molar (1 M) Tris solutions were tested at the wet scrubber inlet during test T23-EY1. Gas sampling runs were performed for 30, 40, and 50 minutes. Table 4 shows these test results along with comparisons of Tris and peroxide impingers conducted in previous testing (previous tests are shaded). The total mercury determined by analysis of the Tris solutions was in good agreement with the peroxide impinger solutions at all three gas sampling times in T23-EY1. These results show that the total mercury collected in the Tris impinger solutions can be recovered with the same accuracy as the peroxide impinger solutions over gas sampling times of 30 to 50 minutes.

The previous Tris/peroxide comparisons showed much more variability, which may have been due to the different recovery techniques being tested. The specific recovery method for the Tris impinger solutions collected in September, as well as for other alternate impinger studies conducted previously, are shown in Table 5. The Tris impingers T23-EY1 were recovered by adding 25 mls of 30% peroxide and 20 mls of nitric acid at the sampling location with two minutes of mixing time accomplished by pulling air through the impingers. During sample recovery in the laboratory, 2.5 mls of HCl were added. The data indicate that this method of Tris sample recovery works well (97% of total mercury recovery seen in peroxide trains using M29*). However, further testing is needed to confirm these results with HgCl_2 spiking and to ensure that the results can be repeated.

Metal Amalgamation

Gas Sampling at the Absorber Outlet. Mercury removal results with metal amalgamation are shown in Figures 3 through 8. Figure 3 shows the percent removal of total mercury for all metals tested at the wet scrubber outlet. Only the gold wire had an observable effect on mercury removal. Gold, which was coiled and

placed on a 45.6 cm² filter, was tested first and showed approximately 22% removal. This removal percentage decreased with subsequent runs. The next test with gold wire was performed with 20.3 cm² of the filter open to the gas sample stream, after the gold wire was "reconditioned" at 700°C. Less mercury was removed with these increased gas-metal contact area tests, indicating that the gold wire was not returned to its original condition during the heating. In these tests, the total mercury removal decreased with subsequent runs, which is similar to the original test with gold. Figure 4 shows the decrease in mercury removal with subsequent runs for the original gas-metal contact area and the increased gas-metal contact area.

Although total mercury removal decreased with subsequent gas-metal contacting, the elemental mercury conversion to oxidized mercury increased, as shown in Figure 5. Figure 6 shows the increase in percent conversion of the increased gas-metal contact area and the original gas-metal contact area over the different runs. The increased gas-metal contact area had a greater conversion of elemental mercury to an oxidized form of mercury, indicated by capture in the peroxide impingers. It is unclear whether the mercury conversion would continue to increase with increased gas-metal contact time.

Gas Sampling at the Absorber Inlet. Several metals were tested at the absorber inlet with the increased gas-metal contact area configuration. As seen in Figure 7, no effect on total mercury removal can be discerned from these data. Relatively large negative removal values (-14%) as well as positive removal data as great as 9.6% illustrate variation in sampling and analysis. The effect of gold on the conversion of elemental mercury to oxidized mercury at the wet scrubber inlet is shown in Figure 6 (presented previously with the wet scrubber outlet data). Results are similar to those seen at the wet scrubber outlet, where the conversion was high and increased with subsequent runs.

Iodated carbon and calcium-chloride impregnated carbon were tested for mercury removal at the wet scrubber inlet. The amount of carbon used was calculated to give 2000:1 and 10000:1 C:Hg ratios; however, as the mercury concentration changes daily, the actual ratios tested were 3400:1 and 11300:1 for iodated carbon, and 2800:1 and 9500:1 for calcium chloride impregnated carbon. Figure 8 shows that the first run of the carbon tests removed more total mercury than the subsequent runs. (Calcium chloride impregnated carbon at 2800:1 C:Hg is an exception, with the greatest removal measured in the last run. However, all other runs at this ratio with calcium chloride impregnated carbon showed little removal so data from the last test are suspect). Carbon-iodide tests showed 16% removal with the low C:Hg ratio and 23% removal for the high ratio in the first run. Removal in subsequent runs was negligible.

Figure 9 shows the percent conversion of elemental to a form collected in the peroxide impingers for iodated and calcium chloride impregnated carbon at 11300:1 and 9500:1 C:Hg ratios, respectively. The percent converted increased with subsequent runs with conversions of 94% seen in run 3 for the iodated carbon and 76% seen in run 3 for the calcium-chloride impregnated carbon.

Future Tests

Testing in October will consist of alternate impinger solution tests before NYSEG's fall outage. After the outage, the high-velocity test block - Phase II (PHV) - will be conducted for approximately one month before returning to the trace element removal test block.

Figure 1. Wet FGD Process Flow Diagram for TER Tests

Figure 2. EPRI ECTC Pilot Wet FGD Toxics Gas Path

Figure 3. Percent of Total Mercury Removal During Metal Amalgamation Tests at Absorber Outlet.

(a) Increased gas:metal contact area

Figure 4. Percent Total Mercury Removal During Gold Amalgamation Test.

Figure 5. Percent Total Mercury Removal and Elemental Mercury Conversion During Gold Amalgamation Tests

Figure 6. Percent Elemental Mercury Conversion During Gold Amalgamation Tests

Figure 7. Percent of Total Mercury Removal During Metal Amalgamation Tests at Absorber Inlet.

Figure 8. Percent Total Mercury Removal Over Consecutive Runs Using Carbon

**Figure 9. Percent Conversion During 10000:1
C:Hg ratio Tests at the Absorber Inlet.**

Table 1. September Process Operating Conditions Summary

Date		Process Summary	Gas Summary
Fri. 9/1	T21 8250 scfm Mg-lime Forced oxidation	350 lbs of gypsum solids collected for AEP. Vacuum belt solids at 89 wt%. Switched to inhibited oxidation after gas sampling.	T21-EC. Gas sampling at the CRG, pilot inlet and outlet with elemental mercury and mercuric chloride spiking. The mercury injector was off at the beginning of the first run because of electrical problems. It was restarted before the first run ended.
Sat. 9/2	T22 8250 scfm L/G=130 12 ft PFLRT Inhibited oxid. 2000 ppm Thio.	Start of inhibited operation. Emulsified sulfur added to PFLRT. Lime delivery and slaking to HSSD tank. Mg(OH) ₂ spiked into P-RSST to maintain approx. 7000 ppm Mg in process.	
Sun. 9/3		FGD process in transition to inhibited oxidation.	
Mon. 9/4		Recycle water to ME tank pump broke down. Used service water to provide water for absorber quench and mist eliminator wash.	
Tue. 9/5		Liquid sulfite at 20.6 mM and thiosulfate at 1480 ppm. Vacuum belt solids at 43%. Recycle water flowmeter repaired.	Communication problems between the mercury analyzer and the computer controlling it.
Wed. 9/6		Liquid sulfite at 26 mM and 2370 ppm thiosulfate. Vacuum belt solids at 58 wt%.	T22-N. Gas sampling with no spiking at the CRG, pilot inlet, and outlet. BIOS installed on computer that operates the FIMS instrument.
Thur. 9/7		Liquid sulfite concentration has continued to increase. Now at 36 mM. Thiosulfate concentration steady at 2400 ppm; Vacuum belt solids at 44 wt%.	T22-E. Sampling at the CRG, pilot inlet and outlet with elemental mercury spiking.
Fri. 9/8		Liquid sulfite at 55 mM and thiosulfate still at 2400 ppm. Vacuum belt solids at 41 wt%. Pilot unit taken off line after gas sampling and PFLRT was de-watered, flushed, and tray removed. Baseline nozzles remain in the absorber. Fines were found in the thickener overflow.	T22-EC. Gas sampling at the CRG, pilot inlet and outlet with elemental mercury and mercuric chloride spiking. The sweep stream heater control for the elemental mercury spiking wasn't working during the testing.

**Table 1. September Process Operating Conditions Summary
(Continued)**

Date		Process Summary	Gas Summary
Sat.			
9/9		All tanks were filled, flushed and the VME was rinsed.	
Sun.			
9/10	T23 8250 scfm L/G = 130 12 ft. reaction tank O:SO ₂ = 16 pH = 5.5	Recirculation pump #7 can't be controlled from the WDPF. Run locally at the pump drive. Pressure gauge reading 30 psi.	
Mon.			
9/11		Pump #7 control repaired. Cleared solids in spray header #3. Replaced elbow in recirculation line of pump #8 and leaks in CRG duct patched. HCl monitor is off line because of a broken sampling pump.	Velocity traverse at the gas sampling ports: DRG, pilot inlet and outlet.
Tue.			
9/12		NYSEG petcoke burn with 25% blend of petcoke from Exxon refinery. Emptied ESP hoppers and waste silo to begin collecting ash for petcoke data. Pilot outlet CEM examined because SO ₂ conc. goes negative on blowback.	T23-N. Petcoke gas sampling at the DRG, pilot inlet and outlet. Sampling for 150 minutes at the pilot inlet and outlet. Radian also sampling at the pilot outlet for all metals and VOST during NYSEG petcoke burn.
Wed.			
9/13		NYSEG has low loads early in morning (170 MW) when gas sampling begins which results in high O ₂ percent in inlet flue gas. Usual operating loads of 600 MW seen by time of second run.	T23-N. Petcoke gas sampling at the DRG, pilot inlet, and outlet. Pilot inlet gas temperature varied from 296°C to 314°C during first run. Radian also sampling at the pilot outlet for all metals and VOST during NYSEG petcoke burn.
Thur			
9/14		Ballmilling limestone reagent. 32.7% wt% solids and 92% <325 mesh.	
Fri.			
9/15		Pilot taken off line at the completion of gas sampling.	T23-EY1. Tris comparison at the wet scrubber inlet with elemental mercury spiking. 25 mls of 30% peroxide and 20 mls HNO ₃ added at the gas sampling location. Three runs at 30, 40, and 50 minutes, respectively. Gold and copper metal wire was conditioned at 700°C to drive off any residual mercury.
Sat.			
9/16			

**Table 1. September Process Operating Conditions Summary
(Continued)**

Date	Process Summary	Gas Summary
Sun 9/17		
Mon. 9/18	Pilot brought on line at 0700.	T23-EZ1 and T23-EZ2. Gas sampling with gold and copper, respectively, at the wet scrubber outlet. Gas sampling started at 0900. Gas temperature at the pilot inlet increased during gas sampling from 250°F to 314°F at 1600. Sampling with 2 peroxides and 2 permanganates for all metal amalgamation tests.
Tue. 9/19		T23-EZ3 and T23-EZ4. Gas sampling with aluminum and sublime sulfur, respectively, at the wet scrubber outlet.
Wed. 9/20	ESP ash was pulled from the hoppers and a composite sample was taken when emptying the silo for petcoke data.	T23-EZ5 and T23-EZ6. Gas sampling with silver and zinc, respectively, at the wet scrubber outlet.
Thur. 9/21		T23-EZ7 and T23-EZ8. Gas sampling with gold and lead, respectively, at the wet scrubber outlet with increased gas-metal contact area configuration. Gasket-shaped rings of HDPE were constructed to reduce the gas flow areas of the filler.
Fri. 9/22	Pilot taken off line after gas sampling completed. NYSEG finished their petcoke blend of Exxon petcoke.	T23-EZ9 and T23-EZ10. Gas sampling with silver and iron, respectively, at the wet scrubber outlet with increased gas-metal contact area configuration.
Sat. 9/23	Installed 1/4 inch ball valve on humidification line to the oxidation air to the PFLRT.	
Sun. 9/24	Pilot on line at 2100, and the elemental mercury injection system was started shortly after.	

**Table 1. September Process Operating Conditions Summary
(Continued)**

Date	Process Summary	Gas Summary
Mon. 9/25	Pilot on baseline conditions. QA/QC calibrations of ME wash water, recycle water flow and tank levels.	Prepared gas sampling location at the pilot inlet.
Tue. 9/26	NYSEG using petcoke from Chalmette refinery in a 25% blend. This blend will continue until the outage.	T23-EY2 and T23-EY3. Testing with gold and copper, respectively, at the pilot inlet. The metal wire was coiled and placed on the gas sampling filter in the increased gas-metal contact area configuration. Sampling with 2 peroxides and 2 permanganates using a modified Method 29.
Wed. 9/27		T23-EY4 and T23-EY5. Testing with silver and aluminum, respectively, at the pilot inlet using same method as 9/26 tests.
Thur 9/28		T23-EY6 and T23-EY7. Testing with iodated carbon (3400:1 and 11300:1, respectively).
Fri. 9/29	Pilot taken off line after gas sampling completed.	T23-EY8 and T23-EY9. Testing with calcium chloride impregnated carbon (2800:1 and 9500:1, respectively).
Sat. 9/30		

Table 2
Trace Element Removal Impinger Test Conditions

Test ID	Test Description	Gas Sample Source	Spiking Conditions		Sampling Methods		
			Species Spiked	Spike Location	Method 29 Used?	Method 29* Used?	Sol'n of Extra Imp.
T1-NX	No spiking, method comparison.	CRG	NA	NA	Yes	Yes	Peroxide
T1-1A	Intrain Hg(0) gas spike with air.	Air	Hg(0)	Before 1st imp.	No	Yes	Peroxide
T4-1Y	Intrain Hg(0) gas spike at inlet.	WS inlet	Hg(0)	Before 1st imp.	No	Yes	Peroxide
T5-1Z	Intrain Hg(0) gas spike at outlet.	WS outlet	Hg(0)	Before 1st imp.	No	Yes	Peroxide
T6-1Z	Intrain Hg(0) gas spike at outlet.	WS outlet	Hg(0)	After 2nd imp.	No	Yes	Peroxide
T6-1Y	Intrain Hg(0) gas spike at inlet.	WS inlet	Hg(0)	After 2nd imp.	No	Yes	Peroxide
T7-1Y	Flue gas spiking, method comparison.	WS inlet	Hg(0)	Duct Injection	Yes	Yes	Peroxide
T8-1A	Flue gas spiking.	3 Locations	Hg(0)	Duct Injection	No	Yes	Peroxide
T8-1Z	Flue gas spiking.	3 Locations	Hg(0)	Duct Injection	Yes	No	NA
T10-1A	Intrain gas spike with ambient air.	Air	Hg(0)	After 2nd imp.	No	Yes	Peroxide
T9-1X	CRG sample followed by intrain gas spike with ambient air.	CRG/Air	Hg(0)	Before 1st imp.	No	Yes	Peroxide
T9-1A	Flue gas spiking with acetate impingers.	3 Locations	Hg(0)	Duct Injection	No	Yes	Acetate
T9-1Z	Flue gas spiking with phosphate impingers.	3 Locations	Hg(0)	Duct Injection	No	Yes	Phosphate
T10-1N	Baseline measurements with phosphate impingers.	3 Locations	NA	NA	No	Yes	Phosphate
T11-1Y	Intrain Hg(0) gas spike using phosphate impingers.	WS inlet	Hg(0)	Before 1st imp.	No	Yes	Phosphate
T12-1Y	Flue gas spiking, method comparison.	WS inlet	Hg(0)	Duct Injection	No	Yes	Phosphate
T12-1Y	Method comparison without flue gas spiking.	WS inlet	NA	NA	No	Yes	Phosphate
T13-1Y	Method comparison without flue gas spiking.	WS inlet	NA	NA	No	Yes	Phosphate
T13-1Y	Baseline measurements with phosphate impingers.	WS inlet	Hg(0)	Duct Injection	No	Yes	Phosphate/Peroxide
T14-1A	Aqueous Hg intrain spike.	Air	Aq. Hg Std.	In 1st H ₂ O ₂ & KMnO ₄ imp.	Yes	No	NA
T15-1N	Lime slurry injection upstream of the ESP.	DRG, CRG	NA	NA	No	Yes	Tris

Table 2
Trace Element Removal Impinger Test Conditions

Test ID	Test Description	Gas Sample Source	Spiking Conditions		Sampling Methods		
			Species Spiked	Spike Location	Method 29 Used?	Method 29* Used?	Sol'n of Extra Imp.
T18S-N	Limestone slurry injection upstream of the ESP.	DRG,CRG	NA	NA	No	Yes	Tris
T18W-N	Water injection upstream of the ESP.	DRG,CRG	NA	NA	No	Yes	Tris
T19-NY	No spiking; Tris comparison at Pilot inlet.	WS inlet	NA	NA	No	Yes	Tris
T19-EXY	Flue gas spiking; Tris comparison at Pilot inlet.	CRG/WS Inlet	Hg(0)	Duct Injection	No	Yes	Tris
T19-B	Flue gas spiking; Tris comparison at the Pilot inlet.	3 Locations	Hg(0)	Duct Injection	No	Yes	Tris
T20-C	Flue gas spiking; Tris comparison at the Pilot inlet.	3 Locations	HgCl ₂	Duct Injection	No	Yes	Tris
T20-EC	Flue gas spiking; Tris comparison at the Pilot inlet.	3 Locations	Hg (0) and HgCl ₂	Duct Injection	No	Yes	Tris
T21-N	No spiking; Mg-lime wet scrubber conditions, forced oxidation.	3 Locations	NA	NA	Yes	No	NA
T21-B	Flue gas spiking; Mg-lime wet scrubber conditions, forced oxidation.	3 Locations	Hg(0)	Duct Injection	Yes	No	NA
T21-EC	Flue gas spiking; Mg-lime wet scrubber conditions, forced oxidation.	3 Locations	Hg (0) and HgCl ₂	Duct Injection	Yes	No	NA
T22-N	No spiking; Mg-lime wet scrubber conditions, inhibited oxidation.	3 Locations	NA	NA	Yes	No	NA
T22-B	Flue gas spiking; Mg-lime wet scrubber conditions, inhibited oxidation.	3 Locations	Hg(0)	Duct Injection	Yes	No	NA
T22-EC	Flue gas spiking; Mg-lime wet scrubber conditions, inhibited oxidation.	3 Locations	Hg (0) and HgCl ₂	Duct Injection	Yes	No	NA
T23-EY1	Tris comparison test	WS inlet	Hg(0)	Duct Injection	No	Yes	Tris
T23-EZ1	Gold amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ2	Copper amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ3	Aluminum amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA

Table 2
Trace Element Removal Impinger Test Conditions

Test ID	Test Description	Gas Sample Source	Spiking Conditions		Sampling Methods		
			Species Spiked	Spike Location	Method 29 Used?	Method 29* Used?	Sol'n of Extra Imp.
T23-EZ4	Sulfur amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ5	Silver amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ6	Zinc amalgamation with full filter area used during gas sampling.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ7	Gold amalgamation with increased gas:metal contact area.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ8	Lead amalgamation with increased gas:metal contact area.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ9	Silver amalgamation with increased gas:metal contact area.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EZ10	Iron amalgamation with increased gas:metal contact area.	WS outlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY2	Gold amalgamation with increased gas:metal contact area.	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY3	Copper amalgamation with increased gas:metal contact area.	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY4	Silver amalgamation with increased gas:metal contact area.	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY5	Aluminum amalgamation with increased gas:metal contact area.	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY6	Iodated carbon (3400:1 C:Hg ratio)	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY7	Iodated carbon (11300:1 C:Hg ratio)	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY8	Calcium chloride impregnated carbon (2800:1 C:Hg ratio)	WS inlet	Hg(0)	Duct Injection	Yes	No	NA
T23-EY9	Calcium chloride impregnated carbon (9500:1 C:Hg ratio)	WS inlet	Hg(0)	Duct Injection	Yes	No	NA

NOTE: Tests in shaded area were conducted prior to September.

Table 3
Effect of FGD System Operating Variables on Mercury Removal

Test ID	Spiking	Total Hg WS Inlet ($\mu\text{g}/\text{Nm}^3$)	Total Hg WS Outlet ($\mu\text{g}/\text{Nm}^3$)	Total Hg Removal ¹ (%)
<i>Mg/Lime, Forced Oxidation, L/G = 30</i>				
T21-N	NA	5.8	0.8	87
T21-E	Hg(0)	18.2	11.4	40
T21-EC	Hg(0) & HgCl ₂	29.0	13.0	56
<i>Mg/Lime, Inhibited Oxidation, L/G = 30</i>				
T22-N	NA	8.1	0.9	89
T22-E	Hg(0)	21.8	14.1	35
T22-EC	Hg(0) & HgCl ₂	36.4	14.6	60

¹ 5% O₂ basis

Table 4
Tris vs. Peroxide as Impinger Solution

Test ID	Solution Composition	Sampling Time (min)	Species Spiked	Total Hg ($\mu\text{g}/\text{Nm}^3$)		Recovery Difference ($\mu\text{g}/\text{Nm}^3$)	Tris Train Recovery (% of Peroxide Train)
				Peroxide Train	Tris Train		
T18 L-N	1 M Tris	20	NA	1.6	1.2	-0.4	75.0
T18S-N	1 M Tris	20	NA	3.5	3.4	-0.1	97.1
T18W-N	1 M Tris	20	NA	5.7	6.4	0.7	112.3
T19-EXY	1 M Tris	30	Hg(0)	17.3	18.4	1.1	106.4
T19-E	1 M Tris	20	Hg(0)	19.7	20.6	0.9	104.6
T20-C	1 M Tris	25	HgCl ₂	13.4	13.8	0.4	75.0
T20-EC	1 M Tris	25	Hg(0) and HgCl ₂	32.0	21.1	-10.9	65.9
T23-EY1 (Run 1)	1 M Tris	30	Hg(0)	16.3	15.8	-0.5	97.1
T23-EY1 (Run 2)	1 M Tris	40	Hg(0)	15.6	14.9	-0.7	95.4
T23-EY1 (Run 3)	1 M Tris	50	Hg(0)	15.5	15.3	-0.1	99.2

NOTE: Tests in shaded area were conducted prior to September.

Table 5
Alternate Impinger Solutions Summary

Test ID	Alternate Impinger Solution	Solution Composition	Sampling Time (min)	Spiking Conditions		Sample Recovery	Observations
				Species Spiked	Spike Location		
T9-E1	Acetate	1 M $\text{NaC}_2\text{H}_3\text{O}_2$ 0.05 M Acetic Acid	60	Hg(0)	Duct Injection	5 ft ³ of air through impingers with DI water rinse (standard peroxide impinger recovery method).	Migration of acetic acid vapor through the train consumed the permanganate in the final impingers.
T9-E2	Phosphate	0.3 M Na_2HPO_4 0.2 M KH_2PO_4	60 at Inlet 100 at Outlet	Hg(0)	Duct Injection	5 ft ³ of air through impingers with DI water rinse.	Pilot fan tripped during sampling causing the data to be questionable. The pH in impinger 1 fell below 2. Solids formed in second impinger.
T10-N	Phosphate	0.4 M Na_2HPO_4 0.3 M KH_2PO_4	60 at Inlet 100 at Outlet	NA	NA	5 ft ³ of air through impingers with DI water rinse.	The pH in impinger 1 fell below 2. Higher total phosphate was used. Solids formed in second impinger.
T11-EY	Phosphate	0.7 M Na_2HPO_4 0.3 M KH_2PO_4	60	Hg(0)	Before 1st Imp.	5 ft ³ of air through impingers with DI water rinse and 15 ml peroxide.	1M total phosphate species used to increase pH. Solids formed in second impinger during gas sampling.
T12-EY	Phosphate	0.7 M Na_2HPO_4 0.3 M KH_2PO_4	60	Hg(0)	Duct Injection	5 ft ³ of air through impingers with DI water rinse and 15 ml peroxide.	The pH of the 1st impinger solution dropped below 2 after 1 hour of gas sampling. Solids found in second impinger.
T12-NY	Phosphate	0.5 M Na_2PO_4 0.5 M K_2PO_4	60	NA	NA	No air purge. 15 ml peroxide and 15 ml nitric added at location. 10% nitric impinger rinse.	Tribasic phosphate used to increase pH. The pH of the 1st impinger solution dropped below 2 after 1 hour of gas sampling. Solids found in second impinger.
T13-NY	Phosphate	0.5 M Na_2PO_4 0.5 M K_2PO_4	20	NA	NA	No air purge. 15 ml peroxide and 15 ml nitric added at location. 10% nitric impinger rinse.	The pH of the 1st impinger solution remained above 6.5 after only 20 minutes of gas sampling. Solids found in first impinger in some runs.

Table 5
Alternate Impinger Solutions Summary

Test ID	Alternate Impinger Solution	Solution Composition	Sampling Time (min)	Spiking Conditions		Sample Recovery	Observations
				Species Spiked	Location		
T13-NY	Phosphate	0.4 M Na_2PO_4 0.5 M K_2PO_4	60	NA	NA	No air purge. 15 ml peroxide and 15 ml nitric added at location. 10% nitric impinger rinsc.	The pH of the 1st impinger solution was below 2 after 60 minutes of gas sampling. Solids found in second impinger.
T16-EY	Phosphate/ Peroxide	0.5 M Na_2PO_4 0.5 M K_2PO_4 5% peroxide	60	Hg(0)	Duct Injection	No air purge. 5 ml peroxide added. 5 ml nitric added.	Impinger solution very unstable. Peroxide decomposed over time. SO ₂ odor in the impingers after sampling.
T16-EY	Phosphate	0.4 M Na_2PO_4 0.4 M K_2PO_4 2.5% Bleach	60	Hg(0)	Duct Injection	No air purge. 5 ml peroxide added. 5 ml nitric added.	Could not analyze the impinger solutions, solids formed, offgassed fumes interfered with the FIDMS.
T18-LN	Tris	1M Tris	20	NA	NA	15 ml peroxide in 1st imp. 5 ml peroxide in 2nd imp.	The pH of impinger 1 remained above 6.5.
T18S-N	Tris	1M Tris	20	NA	NA	After Run #1, 15 ml of 30% peroxide and 7.5 ml of nitric acid were added to the 1st impinger. 5 ml of 30% peroxide and 7.5 ml of nitric acid were added to imp. #2. After Run #2, 8.5 g of potassium permanganate was added to each Tris impinger.	The pH of impinger 1 remained above 6.5.
T18W-N	Tris	1M Tris	20	NA	NA	8.5 g of potassium permanganate added to first and second Tris solution impingers	The pH of impinger 1 remained above 6.5.

Table 5
Alternate Impinger Solutions Summary

Test ID	Alternate Impinger Solution	Solution Composition	Sampling Time (min)	Spiking Conditions		Sample Recovery	Observations
				Species Spiked	Spike Location		
T19-NY	Tris	1 M Tris	60	Aq. Hg Std.	4 µg Hg(II) added to 1st imp. before run	15 g of potassium permanganate added to first and second Tris solution impingers.	The pH of impinger 1 remained above 6.5.
T19-EXY	Tris	1 M Tris	30	Hg(0)	duct injection	25 ml of 30% peroxide and 20 ml of nitric acid added to 1st and 2nd Tris impinger solutions.	The pH of impinger 1 remained above 7.0
T19-EXY	Tris	1 M Tris	30	Aq. Hg Std. at CRG	4 µg Hg(II) added to 1st imp. before run	25 ml of 30% peroxide and 20 ml of nitric acid added to 1st and 2nd Tris impinger solutions.	The pH of impinger 1 remained above 7.0
T19-E	Tris	1 M Tris	20	Hg(0)	duct injection	5g of potassium permanganate added to each Tris solution impinger	The pH of impinger 1 remained above 7.0
T20-C	Tris	1 M Tris	25	HgCl ₂	duct injection	5g of potassium permanganate added to each Tris solution impinger	The pH of impinger 1 remained above 7.0
T20-EC	Tris	1 M Tris	25	Hg(0) and HgCl ₂	duct injection	5g of potassium permanganate added to each Tris solution impinger	The pH of impinger 1 remained above 7.0
T23-EY1	Tris	1 M Tris	30	Hg(0)	duct injection	25 mls of 30% peroxide and 20 mls of HNO ₃ were added to the first two impingers after gas sampling, but before removing from the sampling location. 2.5 mls of HCl was added during recovery.	

Table 5
Alternate Impinger Solutions Summary

Test ID	Alternate Impinger Solution	Solution Composition	Sampling Time (min)	Spiking Conditions		Sample Recovery	Observations
				Species Spiked	Spike Location		
T23-EY1	Tris	1 M Tris	40	Hg(0)	duct injection	25 mls of 30% peroxide and 20 mls of HNO ₃ were added to the first two impingers after gas sampling, but before removing from the sampling location. 2.5 mls of HCl was added during recovery.	
T23-EY1	Tris	1 M Tris	50	Hg(0)	duct injection	25 mls of 30% peroxide and 20 mls of HNO ₃ were added to the first two impingers after gas sampling, but before removing from the sampling location. 2.5 mls of HCl was added during recovery.	

NOTE: Samples collected prior to September 1995 are in shaded area.

APPENDIX A
TEST SCHEDULES

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

September 1995 (Updated Oct. 18)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					Trace Element Rem. T21-EC ¹ FGD Inlet, Outlet and CRG	Trace Element Rem. T22 ² Mg-line inhibited 8250 scfm, pH = 6.5 2000 ppm Thio.
Trace Element Rem. T22 ³ Transition to Inhibited wet scrubber conditions	Trace Element Rem. T22 ⁴ Transition to Inhibited wet scrubber conditions	Trace Element Rem. T22 ⁵ Transition to Inhibited wet scrubber conditions	Trace Element Rem. T22-N ⁶ FGD Inlet, Outlet and CRG	Trace Element Rem. T22-E ⁷ FGD Inlet, Outlet and CRG	Trace Element Rem. T22-EC ⁸ FGD Inlet, Outlet and CRG Unit down after sampl.	Trace Element Rem. Unit Off-line ⁹
Trace Element Rem. T23 ¹⁰	Trace Element Rem. T23 ¹¹ Baseline FGD 1600 inlet SO2 Forced Oxidation	Trace Element Rem. T23-N1 ¹² Gas Sampl. for Metals and VOST under Petcoke Conditions	Trace Element Rem. T23-N2 ¹³ Gas Sampl. for Metals and VOST under Petcoke Conditions	Trace Element Rem. T23-N2 ¹⁴	Trace Element Rem. T23-N2 ¹⁵ Tris Comparison Wet Scrubber Inlet	Trace Element Rem. Unit Off-line ¹⁶
Trace Element Rem. T23 ¹⁷	Trace Element Rem. T23-EZ1 and T23-EZ2 ¹⁸ Gold and Copper Metal Amalgamation FGD Outlet	Trace Element Rem. T23-EZ3 and T23-EZ4 ¹⁹ Aluminum and Sulfur Metal Amalgamation FGD Outlet	Trace Element Rem. T23-EZ5 and T23-EZ6 ²⁰ Silver and Zinc Metal Amalgamation FGD Outlet	Trace Element Rem. T23-EZ7 and T23-EZ8 ²¹ Gold and Lead Metal Amalgamation FGD Outlet	Trace Element Rem. T23-EZ9 and T23-EZ10 ²² Silver and Iron Incr. Gas:Metal Contact FGD Outlet	Trace Element Rem. Unit Off-line ²³
Trace Element Rem. T23 ²⁴	Trace Element Rem. T23 ²⁵	Trace Element Rem. T23-EY2 and T23-EY3 ²⁶ Gold and Copper Incr. Gas:Metal Contact FGD Outlet	Trace Element Rem. T23-EY4 and T23-EY5 ²⁷ Silver and Aluminum Incr. Gas:Metal Contact FGD Outlet	Trace Element Rem. T23-EY6 and T23-EY7 ²⁸ Iodated Carbon 3400:1 and 11300:1 FGD Inlet	Trace Element Rem. T23-EY8 and T23-EY9 ²⁹ CaCl ₂ Impregn. Carbon 2800:1 and 9500:1 FGD Inlet	Trace Element Rem. Unit Off-line ³⁰

EPRI ENVIRONMENTAL CONTROL TECHNOLOGY CENTER TEST CALENDAR

October 1995 (Updated Oct. 18)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 Trace Element Rem. T23 Baseline FGD 1600 inlet SO2 Forced Oxidation	2 Trace Element Rem. T23-IV* Tris comparison at WS Inlet Intrain spiking	3 Trace Element Rem. T23-EXY1 Tris comparison at WS Inlet	4 Trace Element Rem. T23-EXY2 Tris comparison at WS Inlet	5 High Velocity Fan Test 20000 scfm	6 High Velocity Fan Test 20000 scfm	7 NYSEG's 1995 OUTAGE
8 NYSEG's 1995 OUTAGE	9 NYSEG's 1995 OUTAGE	10 NYSEG's 1995 OUTAGE	11 NYSEG's 1995 OUTAGE	12 NYSEG's 1995 OUTAGE	13 NYSEG's 1995 OUTAGE	14 NYSEG's 1995 OUTAGE
15 NYSEG's 1995 OUTAGE	16 NYSEG's 1995 OUTAGE	17 NYSEG's 1995 OUTAGE	18 NYSEG's 1995 OUTAGE	19 NYSEG's 1995 OUTAGE	20 NYSEG's 1995 OUTAGE	21 NYSEG's 1995 OUTAGE
22 High Velocity Phase II Pilot unit back on line	23 High Velocity Phase II PHV-200 to PHV-203 Baseline Nozzles 1700 gpm Munters Mist Elim.	24 High Velocity Phase II PHV-204 to PHV-208 Baseline Nozzles 1300 gpm Munters Mist Elim.	25 High Velocity Phase II PHV-209 to PHV-211 Baseline Nozzles 650 gpm Munters Mist Elim.	26 High Velocity Phase II PHV-212 Baseline Nozzles Carryover Test Munters Mist Elim.	27 High Velocity Phase II PHV-213 Baseline Nozzles Carryover Test Munters Mist Elim.	28 High Velocity Phase II PHV-214 Baseline Nozzles Carryover Test Munters Mist Elim.
29 High Velocity Phase II PHV-215 Baseline Nozzles Carryover Test Munters Mist Elim.	30 High Velocity Phase II PHV-215 Baseline Nozzles Carryover Test Munters Mist Elim.	31 High Velocity Phase II PHV-216 Baseline Nozzles Carryover Test Munters Mist Elim.				

PILOT

MINI-PILOT

1994											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
UNIT DOWN		SUNCOR	High Velocity Scrubbing		TECO High Vel. Packing	High Velocity Scrubbing (B&W tray testing)		Air Toxics Tests	Outage	Air Toxics Tests	
Limestone CLS Phase II (cont.)	Redox Sulfur testing	LCLS Phase II (cont.)	UNIT DOWN		SUNCOR II	UNIT DOWN					

PILOT

MINI-PILOT

1995											
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
			UNIT DOWN			Lime/DBA Gypsum tests	UNIT DOWN				

PILOT

1 9 9 6											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PRDA - Mercury and HAPs Control			High-Velocity FGD Testing			Wet FGD Toxics Testing			PRDA - Clear Liquor FGD Testing		

ECTC Pilot-scale Testing Schedule ('94-'96)

APPENDIX B
PILOT AND MINI-PILOT DATA

T21 Process Summary Report
(8/31/95 20:00:00 to 9/01/95 19:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.8	93.4	92.3	0.3	22
SO2 Removal (NTU)	2.63	2.71	2.56	0.04	22
L/G Ratio (gal/macf)	31	31	30	0	22
Reaction Tank pH	6.00	6.00	6.00	0.00	22
Absorber pH	5.32	5.37	5.27	0.03	22
Flue Gas Flow Rate (scfm)	8251	8265	8250	3	22
Header 1 Flow (gpm)	300	301	300	0	22
Header 3 Flow (gpm)	0	0	0	0	22
Header 5 Flow (gpm)	0	0	0	0	22
Blowdown to Sump Rate (gpm)	0.23	0.52	0.16	0.08	22
Centrifuge Feed Rate (gpm)	3.55	4.40	2.50	0.64	22
Reagent Feed to FLRT (gpm)	1.33	1.44	1.28	0.06	22
Facility Inlet SO2 Conc. (ppm)	1500	1660	1298	113	22
Inlet SO2 Concentration (ppm)	2000	2007	1996	3	22
Outlet SO2 Concentration (ppm)	135	146	125	5	22
Inlet O2 Concentration (%)	9.96	11.37	8.17	0.99	22
Outlet O2 Concentration (%)	9.68	10.86	8.39	0.78	22
Absorber Gas Velocity (ft/sec)	8.33	8.37	8.28	0.03	22
Inlet Gas Temperature (F)	303	310	295	4	22
Outlet Gas Temperature (F)	120	123	118	1	22
SO2 Absorbed (mmole/L)	16.14	16.25	16.08	0.05	22
Solids Residence Time (hrs)	19.0	19.1	18.9	0.1	22
Slurry Residence Time (min)	19.02	19.04	19.01	0.01	22
Absorber Pressure Drop (in H2O)	3.33	3.37	3.31	0.02	22
Spray Zone Pressure Drop (in H2O)	1.68	1.78	1.56	0.08	22
Tray Pressure Drop (in H2O)	2.06	3.44	1.58	0.59	22
ME Pressure Drop (in H2O)	0.38	0.39	0.38	0.00	22
Oxidation Air to Rxn Tank (scfm)	500	501	499	0	22
DBA Addition Rate (mL/min)	80	102	69	14	22
Inlet HCl Concentration (ppm)	33	41	28	4	22
NYSEG Load (MW)	581	707	378	111	22

T22 Process Summary Report
(9/06/95 21:00:00 to 9/08/95 13:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.2	91.5	89.2	0.8	40
SO2 Removal (NTU)	2.33	2.46	2.23	0.08	40
L/G Ratio (gal/macf)	31	31	30	0	40
Reaction Tank pH	6.50	6.50	6.50	0.00	40
Absorber pH	6.17	6.24	6.08	0.05	40
Flue Gas Flow Rate (scfm)	8250	8265	8249	2	40
Header 1 Flow (gpm)	300	301	299	1	40
Header 3 Flow (gpm)	0	0	0	0	40
Header 5 Flow (gpm)	0	0	0	0	40
Blowdown to Sump Rate (gpm)	0.07	0.23	0.00	0.10	40
Centrifuge Feed Rate (gpm)	3.82	4.50	3.60	0.35	40
Reagent Feed to FLRT (gpm)	1.41	1.45	1.39	0.01	40
Facility Inlet SO2 Conc. (ppm)	1540	1788	1214	176	40
Inlet SO2 Concentration (ppm)	2001	2012	1995	3	40
Outlet SO2 Concentration (ppm)	184	203	160	14	40
Inlet O2 Concentration (%)	9.80	10.90	9.02	0.61	40
Outlet O2 Concentration (%)	10.13	11.30	9.30	0.64	40
Absorber Gas Velocity (ft/sec)	8.32	8.37	8.26	0.03	40
Inlet Gas Temperature (F)	303	315	287	6	40
Outlet Gas Temperature (F)	119	122	116	2	40
SO2 Absorbed (mmole/L)	15.71	15.95	15.49	0.15	40
Solids Residence Time (hrs)	25.1	25.4	24.7	0.2	40
Slurry Residence Time (min)	19.03	19.10	18.98	0.04	40
Absorber Pressure Drop (in H2O)	2.54	2.62	2.49	0.04	40
Spray Zone Pressure Drop (in H2O)	1.07	1.14	0.57	0.11	40
Tray Pressure Drop (in H2O)	0.98	1.12	0.48	0.10	40
ME Pressure Drop (in H2O)	0.34	0.35	0.33	0.00	40
Oxidation Air to Rxn Tank (scfm)	0	0	0	0	40
NYSEG Load (MW)	613	710	426	104	40

T21-EC Process Summary Report
(9/01/95 08:00:00 to 9/01/95 13:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.7	92.8	92.7	0.0	5
SO2 Removal (NTU)	2.62	2.63	2.62	0.00	5
L/G Ratio (gal/macf)	30	31	30	0	5
Reaction Tank pH	6.00	6.00	6.00	0.00	5
Absorber pH	5.33	5.34	5.33	0.00	5
Flue Gas Flow Rate (scfm)	8278	8374	8250	48	5
Header 1 Flow (gpm)	300	300	300	0	5
Header 3 Flow (gpm)	0	0	0	0	5
Header 5 Flow (gpm)	0	0	0	0	5
Blowdown to Sump Rate (gpm)	0.25	0.32	0.19	0.06	5
Centrifuge Feed Rate (gpm)	3.21	3.29	3.19	0.04	5
Reagent Feed to FLRT (gpm)	1.30	1.32	1.29	0.01	5
Facility Inlet SO2 Conc. (ppm)	1621	1660	1600	21	5
Inlet SO2 Concentration (ppm)	2000	2003	1998	2	5
Outlet SO2 Concentration (ppm)	137	137	136	1	5
Inlet O2 Concentration (%)	9.45	9.77	9.08	0.30	5
Outlet O2 Concentration (%)	9.21	9.48	8.94	0.23	5
Absorber Gas Velocity (ft/sec)	8.37	8.47	8.34	0.05	5
Inlet Gas Temperature (F)	305	306	303	1	5
Outlet Gas Temperature (F)	121	122	120	0	5
SO2 Absorbed (mmole/L)	16.19	16.38	16.12	0.10	5
Solids Residence Time (hrs)	19.0	19.1	18.7	0.1	5
Slurry Residence Time (min)	19.03	19.04	19.02	0.01	5
Absorber Pressure Drop (in H2O)	3.33	3.35	3.32	0.01	5
Spray Zone Pressure Drop (in H2O)	1.74	1.77	1.67	0.04	5
Tray Pressure Drop (in H2O)	2.09	3.38	1.66	0.66	5
MB Pressure Drop (in H2O)	0.39	0.39	0.38	0.00	5
Oxidation Air to Rxn Tank (scfm)	500	500	499	0	5
DBA Addition Rate (mL/min)	76	94	69	9	5
Inlet HCl Concentration (ppm)	34	36	32	2	5
NYSEG Load (MW)	669	701	612	31	5

T22-N Process Summary Report
(9/06/95 07:00:00 to 9/06/95 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	89.8	96.4	85.7	4.2	6
SO2 Removal (NTU)	2.41	3.34	1.94	0.54	6
L/G Ratio (gal/macf)	30	31	30	0	6
Reaction Tank pH	6.50	6.50	6.50	0.00	6
Absorber pH	6.01	6.04	5.96	0.03	6
Flue Gas Flow Rate (scfm)	8243	8250	8208	16	6
Header 1 Flow (gpm)	300	301	299	0	6
Header 3 Flow (gpm)	0	0	0	0	6
Header 5 Flow (gpm)	0	0	0	0	6
Blowdown to Sump Rate (gpm)	0.31	0.56	0.26	0.11	6
Centrifuge Feed Rate (gpm)	3.59	3.59	3.59	0.00	6
Reagent Feed to FLRT (gpm)	1.47	1.52	1.40	0.04	6
Facility Inlet SO2 Conc. (ppm)	1061	1136	948	64	6
Inlet SO2 Concentration (ppm)	2062	2382	1995	143	6
Outlet SO2 Concentration (ppm)	199	293	67	86	6
Inlet O2 Concentration (%)	9.75	10.84	9.19	0.57	6
Outlet O2 Concentration (%)	10.42	13.67	8.95	1.52	6
Absorber Gas Velocity (ft/sec)	8.37	8.39	8.32	0.02	6
Inlet Gas Temperature (F)	313	315	307	3	6
Outlet Gas Temperature (F)	122	123	121	1	6
SO2 Absorbed (mmole/L)	16.09	17.92	14.93	1.06	6
Solids Residence Time (hrs)	24.6	26.4	22.0	1.6	6
Slurry Residence Time (min)	19.04	19.08	19.01	0.02	6
Absorber Pressure Drop (in H2O)	2.63	2.65	2.60	0.01	6
Spray Zone Pressure Drop (in H2O)	1.15	1.15	1.14	0.00	6
Tray Pressure Drop (in H2O)	1.05	1.06	1.04	0.01	6
MB Pressure Drop (in H2O)	0.36	0.36	0.36	0.00	6
Oxidation Air to Rxn Tank (scfm)	0	0	0	0	6
DBA Addition Rate (mL/min)	5	8	3	2	6
Inlet HCl Concentration (ppm)	26	42	9	17	2
NYSEG Load (MW)	675	691	599	34	6

T22-E Process Summary Report
(9/07/95 07:00:00 to 9/07/95 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	89.4	89.8	89.2	0.2	6
SO2 Removal (NTU)	2.25	2.29	2.23	0.02	6
L/G Ratio (gal/macf)	31	31	30	0	6
Reaction Tank pH	6.50	6.50	6.50	0.00	6
Absorber pH	6.11	6.13	6.08	0.02	6
Flue Gas Flow Rate (scfm)	8250	8250	8249	0	6
Header 1 Flow (gpm)	301	301	300	0	6
Header 3 Flow (gpm)	0	0	0	0	6
Header 5 Flow (gpm)	0	0	0	0	6
Blowdown to Sump Rate (gpm)	0.09	0.23	0.00	0.10	6
Centrifuge Feed Rate (gpm)	3.60	3.60	3.60	0.00	6
Reagent Feed to FLRT (gpm)	1.42	1.45	1.40	0.02	6
Facility Inlet SO2 Conc. (ppm)	1598	1682	1523	66	6
Inlet SO2 Concentration (ppm)	2002	2012	1996	5	6
Outlet SO2 Concentration (ppm)	199	203	192	4	6
Inlet O2 Concentration (%)	9.27	9.76	9.05	0.25	6
Outlet O2 Concentration (%)	9.56	10.13	9.31	0.29	6
Absorber Gas Velocity (ft/sec)	8.35	8.37	8.33	0.01	6
Inlet Gas Temperature (F)	309	312	303	3	6
Outlet Gas Temperature (F)	121	122	120	1	6
SO2 Absorbed (mmole/L)	15.55	15.70	15.49	0.07	6
Solids Residence Time (hrs)	25.3	25.4	25.0	0.1	6
Slurry Residence Time (min)	19.00	19.02	18.99	0.01	6
Absorber Pressure Drop (in H2O)	2.56	2.57	2.55	0.01	6
Spray Zone Pressure Drop (in H2O)	1.12	1.13	1.12	0.00	6
Tray Pressure Drop (in H2O)	1.01	1.01	1.01	0.00	6
ME Pressure Drop (in H2O)	0.34	0.34	0.33	0.00	6
Oxidation Air to Rxn Tank (scfm)	0	0	0	0	6
NYSEG Load (MW)	683	709	623	28	6

T22-EC Process Summary Report
(9/8/95 07:00:00 to 9/8/95 13:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.3	91.5	91.2	0.1	6
SO2 Removal (NTU)	2.44	2.46	2.43	0.01	6
L/G Ratio (gal/macf)	31	31	31	0	6
Reaction Tank pH	6.50	6.50	6.50	0.00	6
Absorber pH	6.24	6.24	6.23	0.01	6
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	6
Header 1 Flow (gpm)	300	300	299	0	6
Header 3 Flow (gpm)	0	0	0	0	6
Header 5 Flow (gpm)	0	0	0	0	6
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	6
Centrifuge Feed Rate (gpm)	4.50	4.50	4.50	0.00	6
Reagent Feed to FLRT (gpm)	1.41	1.42	1.40	0.00	6
Facility Inlet SO2 Conc. (ppm)	1728	1788	1640	47	6
Inlet SO2 Concentration (ppm)	2001	2003	1999	1	6
Outlet SO2 Concentration (ppm)	163	165	160	2	6
Inlet O2 Concentration (%)	9.45	10.03	9.02	0.33	6
Outlet O2 Concentration (%)	9.73	10.32	9.30	0.33	6
Absorber Gas Velocity (ft/sec)	8.30	8.32	8.28	0.02	6
Inlet Gas Temperature (F)	302	306	299	3	6
Outlet Gas Temperature (F)	118	119	117	1	6
SO2 Absorbed (mmole/L)	15.93	15.95	15.89	0.02	6
Solids Residence Time (hrs)	24.8	24.8	24.7	0.0	6
Slurry Residence Time (min)	19.07	19.10	19.03	0.03	6
Absorber Pressure Drop (in H2O)	2.50	2.50	2.49	0.01	6
Spray Zone Pressure Drop (in H2O)	1.05	1.08	1.00	0.03	6
Tray Pressure Drop (in H2O)	1.01	1.07	0.96	0.04	6
ME Pressure Drop (in H2O)	0.34	0.34	0.34	0.00	6
Oxidation Air to Rxn Tank (scfm)	0	0	0	0	6
NYSEG Load (MW)	663	704	548	54	6

T23-N1 Process Summary Report
(9/12/95 10:00:00 to 9/12/95 17:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.3	95.3	93.3	0.7	7
SO2 Removal (NTU)	2.87	3.06	2.71	0.13	7
L/G Ratio (gal/macf)	132	133	131	1	7
Reaction Tank pH	5.50	5.51	5.49	0.01	7
Absorber pH	4.71	4.79	4.62	0.06	7
Flue Gas Flow Rate (scfm)	8250	8250	8249	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	649	650	644	2	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.49	5.79	4.00	0.74	7
Reagent Feed to FLRT (gpm)	1.81	2.07	1.59	0.18	7
Facility Inlet SO2 Conc. (ppm)	1394	1434	1368	20	7
Inlet SO2 Concentration (ppm)	1599	1602	1595	2	7
Outlet SO2 Concentration (ppm)	86	100	70	11	7
Inlet O2 Concentration (%)	9.26	9.47	8.93	0.17	7
Outlet O2 Concentration (%)	8.92	9.10	8.65	0.14	7
Absorber Gas Velocity (ft/sec)	8.37	8.39	8.31	0.03	7
Inlet Gas Temperature (F)	312	315	300	5	7
Outlet Gas Temperature (F)	122	123	119	1	7
SO2 Absorbed (mmole/L)	3.03	3.08	3.00	0.03	7
Solids Residence Time (hrs)	18.3	18.4	18.1	0.1	7
Slurry Residence Time (min)	4.40	4.41	4.39	0.01	7
Absorber Pressure Drop (in H2O)	3.61	3.63	3.58	0.02	7
Spray Zone Pressure Drop (in H2O)	1.67	1.67	1.65	0.01	7
Tray Pressure Drop (in H2O)	1.40	1.40	1.39	0.00	7
ME Pressure Drop (in H2O)	0.34	0.34	0.34	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	682	683	680	1	7

T23-N2 Process Summary Report
(9/13/95 09:00:00 to 9/13/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.8	95.5	94.3	0.5	7
SO2 Removal (NTU)	2.96	3.10	2.87	0.09	7
L/G Ratio (gal/macf)	132	132	131	0	7
Reaction Tank pH	5.50	5.53	5.48	0.01	7
Absorber pH	4.95	5.00	4.92	0.03	7
Flue Gas Flow Rate (scfm)	8250	8250	8249	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	1	4	0	2	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	5.22	5.50	5.00	0.15	7
Reagent Feed to FLRT (gpm)	1.45	1.72	1.22	0.18	7
Facility Inlet SO2 Conc. (ppm)	1707	1764	1624	45	7
Inlet SO2 Concentration (ppm)	1601	1609	1595	4	7
Outlet SO2 Concentration (ppm)	78	85	68	7	7
Inlet O2 Concentration (%)	8.84	9.24	8.57	0.20	7
Outlet O2 Concentration (%)	8.87	9.44	8.67	0.24	7
Absorber Gas Velocity (ft/sec)	8.39	8.41	8.35	0.02	7
Inlet Gas Temperature (F)	312	315	303	4	7
Outlet Gas Temperature (F)	123	124	122	1	7
SO2 Absorbed (mmole/L)	3.05	3.07	3.02	0.02	7
Solids Residence Time (hrs)	18.1	18.3	18.0	0.1	7
Slurry Residence Time (min)	4.39	4.39	4.38	0.00	7
Absorber Pressure Drop (in H2O)	3.64	3.67	3.60	0.02	7
Spray Zone Pressure Drop (in H2O)	1.70	1.72	1.67	0.02	7
Tray Pressure Drop (in H2O)	1.41	1.43	1.39	0.02	7
ME Pressure Drop (in H2O)	0.33	0.33	0.33	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	691	697	686	3	7

T23-EY1 Process Summary Report
(9/15/95 08:00:00 to 9/15/95 12:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.6	92.7	92.4	0.1	5
SO2 Removal (NTU)	2.60	2.61	2.58	0.01	5
L/G Ratio (gal/macf)	135	140	133	3	5
Reaction Tank pH	5.53	5.66	5.50	0.07	5
Absorber pH	4.94	5.00	4.82	0.06	5
Flue Gas Flow Rate (scfm)	7577	8250	4884	1346	5
Header 1 Flow (gpm)	600	650	401	100	5
Header 3 Flow (gpm)	600	650	400	100	5
Header 5 Flow (gpm)	0	0	0	0	5
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	5
Centrifuge Feed Rate (gpm)	4.67	5.50	3.21	0.80	5
Reagent Feed to FLRT (gpm)	0.91	1.00	0.65	0.13	5
Facility Inlet SO2 Conc. (ppm)	1002	1043	957	28	5
Inlet SO2 Concentration (ppm)	1466	1600	936	265	5
Outlet SO2 Concentration (ppm)	102	114	66	18	5
Inlet O2 Concentration (%)	11.73	13.86	11.06	1.07	5
Outlet O2 Concentration (%)	11.57	13.73	10.89	1.09	5
Absorber Gas Velocity (ft/sec)	7.58	8.28	4.85	1.37	5
Inlet Gas Temperature (F)	292	300	287	4	5
Outlet Gas Temperature (F)	115	116	110	2	5
SO2 Absorbed (mmole/L)	2.71	2.98	1.67	0.52	5
Solids Residence Time (hrs)	25.6	53.7	18.6	14.1	5
Slurry Residence Time (min)	4.94	7.13	4.39	1.10	5
Absorber Pressure Drop (in H2O)	3.27	3.61	1.98	0.65	5
Spray Zone Pressure Drop (in H2O)	1.53	1.70	0.93	0.30	5
Tray Pressure Drop (in H2O)	1.30	1.44	0.81	0.25	5
ME Pressure Drop (in H2O)	0.32	0.35	0.22	0.05	5
Oxidation Air to Rxn Tank (scfm)	412	441	301	56	5
NYSEG Load (MW)	373	405	326	32	5

T23-EZ1,2 Process Summary Report
(9/18/95 10:00:00 to 9/18/95 17:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.4	96.6	91.9	1.8	7
SO2 Removal (NTU)	2.94	3.39	2.51	0.34	7
L/G Ratio (gal/macf)	134	136	131	1	7
Reaction Tank pH	5.65	5.79	5.52	0.10	7
Absorber pH	5.16	5.34	5.00	0.11	7
Flue Gas Flow Rate (scfm)	8250	8250	8249	0	7
Header 1 Flow (gpm)	649	650	644	2	7
Header 3 Flow (gpm)	648	650	637	4	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	3.20	3.42	3.14	0.09	7
Reagent Feed to FLRT (gpm)	0.77	0.95	0.33	0.24	7
Facility Inlet SO2 Conc. (ppm)	1213	1292	1107	63	7
Inlet SO2 Concentration (ppm)	1280	1601	864	329	7
Outlet SO2 Concentration (ppm)	73	121	28	38	7
Inlet O2 Concentration (%)	10.49	11.27	9.77	0.45	7
Outlet O2 Concentration (%)	10.38	11.27	9.61	0.50	7
Absorber Gas Velocity (ft/sec)	8.25	8.35	8.14	0.07	7
Inlet Gas Temperature (F)	292	314	269	15	7
Outlet Gas Temperature (F)	116	118	112	2	7
SO2 Absorbed (mmole/L)	2.42	3.03	1.68	0.59	7
Solids Residence Time (hrs)	24.4	33.0	18.5	6.3	7
Slurry Residence Time (min)	4.40	4.46	4.39	0.02	7
Absorber Pressure Drop (in H2O)	3.57	3.62	3.52	0.04	7
Spray Zone Pressure Drop (in H2O)	1.66	1.71	1.63	0.03	7
Tray Pressure Drop (in H2O)	1.40	1.44	1.38	0.02	7
ME Pressure Drop (in H2O)	0.34	0.34	0.34	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	519	598	386	69	7

T23-EZ3,4 Process Summary Report
(9/19/95 9:00:00 to 9/19/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.7	95.2	92.8	0.9	7
SO2 Removal (NTU)	2.78	3.04	2.63	0.15	7
L/G Ratio (gal/macf)	132	133	132	0	7
Reaction Tank pH	5.50	5.50	5.50	0.00	7
Absorber pH	5.08	5.17	4.96	0.07	7
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.92	5.23	4.75	0.21	7
Reagent Feed to FLRT (gpm)	0.92	0.98	0.87	0.04	7
Facility Inlet SO2 Conc. (ppm)	1517	1549	1491	20	7
Inlet SO2 Concentration (ppm)	1599	1602	1597	2	7
Outlet SO2 Concentration (ppm)	94	108	71	13	7
Inlet O2 Concentration (%)	9.47	9.56	9.20	0.12	7
Outlet O2 Concentration (%)	9.52	10.20	9.20	0.29	7
Absorber Gas Velocity (ft/sec)	8.35	8.37	8.33	0.01	7
Inlet Gas Temperature (F)	313	315	307	3	7
Outlet Gas Temperature (F)	120	121	119	1	7
SO2 Absorbed (mmole/L)	3.01	3.06	2.98	0.03	7
Solids Residence Time (hrs)	18.4	18.5	18.1	0.2	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.63	3.64	3.62	0.01	7
Spray Zone Pressure Drop (in H2O)	1.66	1.67	1.66	0.00	7
Tray Pressure Drop (in H2O)	1.40	1.40	1.40	0.00	7
ME Pressure Drop (in H2O)	0.34	0.34	0.34	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	672	689	633	18	7

T23-EZ5,6 Process Summary Report
(9/20/95 09:00:00 to 9/20/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.1	91.2	90.9	0.1	7
SO2 Removal (NTU)	2.42	2.43	2.40	0.01	7
L/G Ratio (gal/macf)	132	132	132	0	7
Reaction Tank pH	5.50	5.50	5.50	0.00	7
Absorber pH	4.74	4.76	4.71	0.02	7
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.56	4.75	4.43	0.15	7
Reagent Feed to FLRT (gpm)	0.91	0.92	0.90	0.01	7
Facility Inlet SO2 Conc. (ppm)	1547	1592	1495	38	7
Inlet SO2 Concentration (ppm)	1599	1604	1594	3	7
Outlet SO2 Concentration (ppm)	133	136	132	1	7
Inlet O2 Concentration (%)	9.13	9.37	8.82	0.24	7
Outlet O2 Concentration (%)	9.14	9.34	8.89	0.20	7
Absorber Gas Velocity (ft/sec)	8.37	8.38	8.36	0.01	7
Inlet Gas Temperature (F)	313	315	309	2	7
Outlet Gas Temperature (F)	121	122	121	0	7
SO2 Absorbed (mmole/L)	2.93	2.94	2.91	0.01	7
Solids Residence Time (hrs)	18.9	19.0	18.8	0.1	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.67	3.67	3.66	0.00	7
Spray Zone Pressure Drop (in H2O)	1.67	1.67	1.67	0.00	7
Tray Pressure Drop (in H2O)	1.41	1.41	1.40	0.00	7
ME Pressure Drop (in H2O)	0.35	0.35	0.35	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	686	694	658	12	7

T23-EZ7,8 Process Summary Report
(9/21/95 09:00:00 to 9/21/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.9	92.0	91.8	0.1	7
SO2 Removal (NTU)	2.51	2.52	2.50	0.01	7
L/G Ratio (gal/macf)	132	133	132	0	7
Reaction Tank pH	5.50	5.50	5.48	0.01	7
Absorber pH	4.83	4.86	4.81	0.02	7
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.29	4.99	4.00	0.36	7
Reagent Feed to FLRT (gpm)	1.03	1.12	0.90	0.10	7
Facility Inlet SO2 Conc. (ppm)	1425	1500	1376	41	7
Inlet SO2 Concentration (ppm)	1600	1604	1597	2	7
Outlet SO2 Concentration (ppm)	122	123	120	1	7
Inlet O2 Concentration (%)	9.36	9.73	8.95	0.25	7
Outlet O2 Concentration (%)	9.37	9.67	9.01	0.21	7
Absorber Gas Velocity (ft/sec)	8.36	8.38	8.32	0.02	7
Inlet Gas Temperature (F)	312	315	302	5	7
Outlet Gas Temperature (F)	121	122	120	1	7
SO2 Absorbed (mmole/L)	2.95	2.96	2.95	0.01	7
Solids Residence Time (hrs)	18.7	18.8	18.7	0.0	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.68	3.70	3.66	0.01	7
Spray Zone Pressure Drop (in H2O)	1.67	1.68	1.66	0.01	7
Tray Pressure Drop (in H2O)	1.40	1.41	1.40	0.00	7
ME Pressure Drop (in H2O)	0.35	0.35	0.34	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	634	668	581	32	7

T23-EZ9,10 Process Summary Report
(9/22/95 8:00:00 to 9/22/95 15:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.4	91.6	91.2	0.1	7
SO2 Removal (NTU)	2.45	2.48	2.43	0.02	7
L/G Ratio (gal/macf)	132	132	132	0	7
Reaction Tank pH	5.50	5.53	5.49	0.01	7
Absorber pH	4.77	4.79	4.71	0.03	7
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.91	5.50	4.50	0.41	7
Reagent Feed to FLRT (gpm)	1.34	1.49	1.00	0.15	7
Facility Inlet SO2 Conc. (ppm)	1519	1568	1472	30	7
Inlet SO2 Concentration (ppm)	1600	1605	1596	2	7
Outlet SO2 Concentration (ppm)	129	132	125	2	7
Inlet O2 Concentration (%)	9.36	9.50	9.03	0.15	7
Outlet O2 Concentration (%)	9.26	9.40	8.96	0.14	7
Absorber Gas Velocity (ft/sec)	8.38	8.38	8.37	0.00	7
Inlet Gas Temperature (F)	314	315	314	0	7
Outlet Gas Temperature (F)	121	121	121	0	7
SO2 Absorbed (mmole/L)	2.94	2.94	2.93	0.01	7
Solids Residence Time (hrs)	18.8	18.9	18.8	0.0	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.68	3.69	3.67	0.01	7
Spray Zone Pressure Drop (in H2O)	1.67	1.68	1.66	0.00	7
Tray Pressure Drop (in H2O)	1.41	1.41	1.40	0.00	7
ME Pressure Drop (in H2O)	0.35	0.35	0.35	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	441	439	0	7
NYSEG Load (MW)	674	685	662	8	7

T23-EY2,3 Process Summary Report
(9/26/95 09:00:00 to 9/26/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.1	91.5	91.0	0.1	7
SO2 Removal (NTU)	2.42	2.46	2.41	0.02	7
L/G Ratio (gal/macf)	132	132	132	0	7
Reaction Tank pH	5.50	5.50	5.50	0.00	7
Absorber pH	4.86	4.88	4.83	0.02	7
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	4.49	4.64	4.06	0.20	7
Reagent Feed to FLRT (gpm)	0.88	0.89	0.87	0.01	7
Facility Inlet SO2 Conc. (ppm)	1240	1270	1205	24	7
Inlet SO2 Concentration (ppm)	1600	1603	1598	2	7
Outlet SO2 Concentration (ppm)	133	135	128	2	7
Inlet O2 Concentration (%)	9.73	9.90	9.49	0.16	7
Outlet O2 Concentration (%)	9.53	9.68	9.34	0.13	7
Absorber Gas Velocity (ft/sec)	8.37	8.38	8.37	0.00	7
Inlet Gas Temperature (F)	314	315	314	0	7
Outlet Gas Temperature (F)	121	121	121	0	7
SO2 Absorbed (mmole/L)	2.93	2.94	2.92	0.00	7
Solids Residence Time (hrs)	18.9	18.9	18.8	0.0	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.68	3.70	3.67	0.01	7
Spray Zone Pressure Drop (in H2O)	1.67	1.68	1.66	0.01	7
Tray Pressure Drop (in H2O)	1.40	1.40	1.40	0.00	7
MB Pressure Drop (in H2O)	0.35	0.35	0.34	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	441	439	1	2
NYSEG Load (MW)	620	683	559	37	7

T23-EY4,5 Process Summary Report
(9/27/95 09:00:00 to 9/27/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.8	91.0	90.5	0.2	7
SO2 Removal (NTU)	2.39	2.41	2.36	0.02	7
L/G Ratio (gal/macf)	132	132	132	0	7
Reaction Tank pH	5.50	5.50	5.50	0.00	7
Absorber pH	4.78	4.80	4.76	0.01	7
Flue Gas Flow Rate (scfm)	8250	8250	8249	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	2.71	5.01	-0.01	2.38	7
Reagent Feed to FLRT (gpm)	0.85	0.87	0.83	0.01	7
Facility Inlet SO2 Conc. (ppm)	1303	1382	1241	55	7
Inlet SO2 Concentration (ppm)	1599	1605	1594	3	7
Outlet SO2 Concentration (ppm)	138	142	134	3	7
Inlet O2 Concentration (%)	10.02	10.45	9.41	0.40	7
Outlet O2 Concentration (%)	9.79	10.19	9.29	0.36	7
Absorber Gas Velocity (ft/sec)	8.36	8.37	8.36	0.00	7
Inlet Gas Temperature (F)	314	315	312	1	7
Outlet Gas Temperature (F)	120	121	120	0	7
SO2 Absorbed (mmole/L)	2.92	2.93	2.90	0.01	7
Solids Residence Time (hrs)	19.0	19.1	18.9	0.1	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.70	3.74	3.67	0.02	7
Spray Zone Pressure Drop (in H2O)	1.68	1.69	1.67	0.01	7
Tray Pressure Drop (in H2O)	1.41	1.42	1.41	0.00	7
MB Pressure Drop (in H2O)	0.35	0.35	0.35	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	441	440	0	7
NYSEG Load (MW)	534	654	468	66	7

T23-EY6,7 Process Summary Report
(9/28/95 08:00:00 to 9/28/95 15:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.8	91.3	90.3	0.3	7
SO2 Removal (NTU)	2.39	2.44	2.33	0.03	7
L/G Ratio (gal/macf)	132	132	132	0	7
Reaction Tank pH	5.50	5.50	5.50	0.00	7
Absorber pH	4.79	4.81	4.78	0.01	7
Flue Gas Flow Rate (scfm)	8250	8251	8250	0	7
Header 1 Flow (gpm)	650	650	650	0	7
Header 3 Flow (gpm)	650	650	650	0	7
Header 5 Flow (gpm)	0	0	0	0	7
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	7
Centrifuge Feed Rate (gpm)	3.93	5.44	-0.03	2.34	7
Reagent Feed to FLRT (gpm)	0.88	0.90	0.87	0.01	7
Facility Inlet SO2 Conc. (ppm)	1369	1467	1266	68	7
Inlet SO2 Concentration (ppm)	1600	1602	1598	1	7
Outlet SO2 Concentration (ppm)	137	146	130	5	7
Inlet O2 Concentration (%)	9.93	10.20	9.48	0.26	7
Outlet O2 Concentration (%)	9.75	10.01	9.33	0.24	7
Absorber Gas Velocity (ft/sec)	8.36	8.37	8.36	0.00	7
Inlet Gas Temperature (F)	314	315	314	0	7
Outlet Gas Temperature (F)	120	120	119	0	7
SO2 Absorbed (mmole/L)	2.92	2.94	2.90	0.01	7
Solids Residence Time (hrs)	18.9	19.1	18.8	0.1	7
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	7
Absorber Pressure Drop (in H2O)	3.74	3.75	3.73	0.00	7
Spray Zone Pressure Drop (in H2O)	1.68	1.68	1.68	0.00	7
Tray Pressure Drop (in H2O)	1.42	1.43	1.42	0.00	7
ME Pressure Drop (in H2O)	0.35	0.35	0.35	0.00	7
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	7
NYSEG Load (MW)	609	671	507	65	7

T23-EY8,9 Process Summary Report
(9/29/95 08:00:00 to 9/29/95 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.8	91.5	90.4	0.3	8
SO2 Removal (NTU)	2.39	2.47	2.34	0.04	8
L/G Ratio (gal/macf)	132	133	132	1	8
Reaction Tank pH	5.51	5.52	5.50	0.00	8
Absorber pH	4.77	4.79	4.74	0.01	8
Flue Gas Flow Rate (scfm)	8250	8250	8250	0	8
Header 1 Flow (gpm)	650	650	650	0	8
Header 3 Flow (gpm)	650	650	647	1	8
Header 5 Flow (gpm)	0	0	0	0	8
Blowdown to Sump Rate (gpm)	0.00	0.00	0.00	0.00	8
Centrifuge Feed Rate (gpm)	4.77	4.82	4.62	0.07	8
Reagent Feed to FLRT (gpm)	0.84	0.85	0.83	0.01	8
Facility Inlet SO2 Conc. (ppm)	1450	1493	1394	32	8
Inlet SO2 Concentration (ppm)	1599	1602	1596	2	8
Outlet SO2 Concentration (ppm)	137	144	128	5	8
Inlet O2 Concentration (%)	9.88	10.10	9.61	0.14	8
Outlet O2 Concentration (%)	9.75	10.00	9.56	0.13	8
Absorber Gas Velocity (ft/sec)	8.34	8.37	8.27	0.03	8
Inlet Gas Temperature (F)	310	315	297	6	8
Outlet Gas Temperature (F)	119	121	117	1	8
SO2 Absorbed (mmole/L)	2.92	2.94	2.91	0.01	8
Solids Residence Time (hrs)	19.0	19.1	18.8	0.1	8
Slurry Residence Time (min)	4.40	4.41	4.39	0.00	8
Absorber Pressure Drop (in H2O)	3.70	3.74	3.65	0.03	8
Spray Zone Pressure Drop (in H2O)	1.67	1.67	1.66	0.01	8
Tray Pressure Drop (in H2O)	1.41	1.42	1.41	0.00	8
ME Pressure Drop (in H2O)	0.35	0.35	0.35	0.00	8
Oxidation Air to Rxn Tank (scfm)	440	440	440	0	8
NYSEG Load (MW)	690	697	668	9	8

APPENDIX C

TRACE ELEMENT REMOVAL (TER) MERCURY SAMPLING DATA

**Pilot FLRT Liquid Analytical Summary:
Trace Element Removal Test Block**

Gas				FLRT	ABS	L-Ca++	L-Mg++	L-Na+	L-K+	L-Al	L-Fe	L-Mn	L-Cl-	L-F	L-CO3=	L-SO3=	L-SO4=	ICE DBA	ICE Adipic	ICE Glutaric	ICE Succinic	ICE Formate	Thio-sulfate	CaSO3 RS	CaSO4 RS	CaCO3 RS	% SO2 Rem.	
Test ID	Sample ID	Date	Time	pH	pH	(mM)	(mM)	(mM)	(ppm)	(ppm)	(ppm)	(ppm)	(mM)		(mM)	(mM)	(mM)	(ppm)	(mM)	(mM)	(mM)	(ppm)	(ppm)					
Mg-Lime, F.O.																												
T21*		Mon 8/28	07:40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21*		Mon 8/28	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21*		Tue 8/29	07:40	6.04	4.93	26.05	247.63	14.75	-	-	-	-	-	-	-	-	-	2228	-	-	-	-	-	-	-	-	91	
T21*		Tue 8/29	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21* N		Wed 8/30	07:40	6.00	5.29	24.36	185.11	12.87	-	-	-	-	211.89	-	-	1.17	-	-	-	-	-	-	-	-	-	-	92	
T21*		Wed 8/30	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21* B		Thu 8/31	07:40	6.04	5.19	23.83	262.46	13.13	-	-	-	-	293.36	-	-	1.47	-	-	-	-	-	-	-	-	-	-	92	
T21		Thu 8/31	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21 BC		Fri 9/01	08:30	6.02	5.34	20.55	327.57	12.33	-	-	-	-	279.59	-	-	2.88	-	-	-	-	-	-	-	-	-	-	92	
T21		Fri 9/01	15:34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T21		Fri 9/01	15:47	5.93	5.30	19.89	325.23	12.63	64.63	6.86	0.02	6.93	279.80	-	0.76	2.83	168.59	2314	1.75	10.30	5.92	-	-	0.83	0.99	0.01	92	
T21		Fri 9/01	16:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Averages				5.98	5.32	20.22	326.40	12.48	64.63	6.86	0.02	6.93	279.70	-	0.76	2.86	168.59	2314	1.75	10.30	5.92	-	-	0.83	0.99	0.01	92	
Mg-Lime, Inhibited																												
T22*		Tue 9/05	07:40	6.48	5.65	8.12	268.51	5.93	56.03	0.31	0.12	0.13	211.28	-	-	20.60	-	-	-	-	-	-	1480	-	-	-	88	
T22*		Tue 9/05	14:05	6.48	-	-	-	-	-	-	-	-	-	-	-	21.78	-	-	-	-	-	-	1432	-	-	-	-	
T22 N		Wed 9/06	07:25	6.45	5.97	5.67	300.07	6.32	-	-	-	-	-	-	-	25.84	-	-	-	-	-	-	2370	-	-	-	84	
T22 B		Thu 9/07	07:18	6.52	6.13	3.05	274.53	5.82	-	-	-	-	-	-	-	35.49	-	-	-	-	-	-	2387	-	-	-	-	
T22		Thu 9/07	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T22 BC		Fri 9/08	07:30	6.53	6.21	1.95	292.52	5.16	58.62	0.35	0.03	0.05	255.46	-	2.82	55.32	87.56	-	-	-	-	-	2414	2.54	0.05	0.03	90	
T22		Fri 9/08	14:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Averages				6.50	6.10	3.56	289.04	5.77	58.62	0.35	0.03	0.05	255.46	-	2.82	38.88	87.56	-	-	-	-	-	2390	2.54	0.05	0.03	87	
Baseline, Limestone reagent																												
T23*		Mon 9/11	15:00	5.65	-	123.34	130.32	11.71	-	-	-	-	-	-	-	1.24	-	-	-	-	-	-	-	-	-	-	-	
T23*		Mon 9/11	21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23 PET		Tue 9/12	07:25	5.67	5.06	120.35	121.27	12.05	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	94	
T23 PET		Tue 9/12	14:00	5.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23		Tue 9/12	16:50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23 PET		Wed 9/13	07:45	5.42	4.80	129.19	138.96	14.77	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	93	
T23 PET		Wed 9/13	14:00	5.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23		Wed 9/13	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23		Thu 9/14	06:30	5.50	4.80	130.11	145.83	16.65	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	92	
T23 EY1		Fri 9/15	07:45	5.53	4.72	129.91	134.46	15.51	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	93	
T23		Fri 9/15	13:15	5.49	-	-	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	
T23 EZ1,2		Mon 9/18	09:30	5.70	5.24	134.34	130.23	16.09	-	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	94	
T23 EZ3		Tue 9/19	07:45	5.60	4.96	134.25	136.50	17.05	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	95	
T23 EZ4		Tue 9/19	13:30	5.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23 EZ5,6		Wed 9/20	07:25	5.55	4.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
T23 EZ7,8		Thu 9/21	07:40	5.50	4.70	141.65	139.09	18.73	38.01	3.13	0.00	5.48	517.77	-	1.82	0.11	16.47	-	-	-	-	-	0.16	0.93	0.07	91		
T23 EZ9,10		Fri 9/22	07:30	5.55	4.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89	
T23		Mon 9/25	07:50	5.50	4.81	142.81	137.70	22.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
T23 EY2,3		Tue 9/26	06:40	5.54	4.80	138.79	134.62	22.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
T23 EY4,5		Wed 9/27	07:40	5.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
T23 EY6,7		Thu 9/28	07:45	5.56	4.85	146.88	140.68	24.48	44.73	0.77	0.00	23.14	519.01	-	1.95	0.12	16.37	-	-	-	-	-	0.19	0.94	0.10	90		
T23 EY8,9		Fri 9/29	07:20	5.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
Averages				5.54	4.84	134.83	135.93	18.06	41.37	1.95	0.00	14.31	518.39	-	1.89	0.03	16.42	-	-	-	-	-	0.18	0.94	0.09	92		

* Indicates data not included in averages.

ND= Not measured because solids did not settle to 30 wt%.

PL04 FLRT Solid Analytical Summary:
Trace Element Removal Test Block

[illegible]

* Indicates data not included in averages.
† Not measured because soils did not settle to 30 cm.

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Pre-Spiking Inlet Location
(CRG)

Test ID	Date	Start Time	Other Imp. Cool.	ID	Gas Volume (dscf)	Moisture (% H ₂ O)	Other Sample [Hg] (ng/ml)	Other Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	KMnO ₄ Sample [Hg] (ng/ml)	Other Sample Mass (g)	Other Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	KMnO ₄ Sample Mass (g)	Other [Hg] In Gas (ug/Nm ³)	Other [Hg] In Gas (ug/Nm ³)	H ₂ O ₂ [Hg] In Gas (ug/Nm ³)	H ₂ O ₂ [Hg] In Gas (ug/Nm ³)	KMnO ₄ [Hg] In Gas (ug/Nm ³)	Total [Hg] In Gas (ug/Nm ³)
Mg/Lime IO, baseline																						
T22-N	Wed-9/6	08:00	-	U209	46.47	6.51	-	-	21.45	2.79	0.69	-	-	273.1	215.1	494.4	-	-	4.78	0.49	0.28	5.54
T22-N	Wed-9/6	10:00	-	U212	67.95	6.37	-	-	30.10	3.61	0.83	-	-	282.4	231.6	456.3	-	-	4.74	0.47	0.21	5.42
T22-N	Wed-9/6	11:30	-	U215	48.87	6.74	-	-	23.40	3.16	0.67	-	-	264.9	228.3	469.2	-	-	4.81	0.56	0.24	5.61
Averages																			4.8	0.5	0.2	5.5
Mg/Lime IO, Hg spk																						
T22-E	Thu-9/7	08:00	-	U218	47.76	6.84	-	-	19.75	1.72	0.48	-	-	243.3	233.1	557.1	-	-	3.81	0.32	0.21	4.34
T22-E	Thu-9/7	09:30	-	U221	53.62	6.56	-	-	20.10	2.15	0.50	-	-	259.3	223.4	465.6	-	-	3.68	0.34	0.16	4.18
T22-E	Thu-9/7	11:00	-	U224	63.92	6.59	-	-	22.10	1.77	0.37	-	-	260.4	226.0	457.2	-	-	3.41	0.24	0.10	3.75
Averages																			3.6	0.3	0.2	4.1
Mg/Lime IO, Hg+HgCL₂ spk																						
T22-EC	Fri-9/8	08:00	-	U227	53.56	5.58	-	-	17.75	1.88	0.42	-	-	250.2	239.0	559.0	-	-	3.14	0.32	0.17	3.63
T22-EC	Fri-9/8	10:00	-	U230	51.28	5.72	-	-	16.70	2.19	0.38	-	-	224.6	261.5	472.0	-	-	2.77	0.42	0.13	3.33
T22-EC	Fri-9/8	11:30	-	U233	84.41	5.36	-	-	24.30	2.63	0.51	-	-	274.7	225.8	475.0	-	-	3.00	0.27	0.11	3.37
Averages																			2.9	0.3	0.1	3.3
Tris Comp @ WS In																						
T23-EY1	Fri-9/15	08:00	H	U251	86.73	4.70	18.60	1.86	0.72	0.53	0.08	286.5	270.0	234.3	227.5	495.6	2.33	0.22	0.07	0.05	0.02	2.69
T23-EY1	Fri-9/15	08:00	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	09:30	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	09:30	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	11:30	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	11:30	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Averages																						
Gold Amalgamation Test																						
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ1	Mon-9/18	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper Amalgamation Test																						
T23-EZ2	Mon-9/18	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ2	Mon-9/18	16:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*C=CEM's operating incorrectly, data from 9/7. B=Baseline. Italicized areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Pre-Spiking Inlet Location
(CRG)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H2O)	Other	Other	H2O2	H2O2	KMnO4	Other	Other	H2O2	H2O2	KMnO4	Other	Other	H2O2	H2O2	KMnO4	Total
							Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)
Aluminum Amalgamation Test																						
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ3	Tue-9/19	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur (5gms) Test																						
T23-EZ4	Tue-9/19	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ4	Tue-9/19	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver Amalgamation Test																						
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ5	Wed-9/20	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc Amalgamation Test																						
T23-EZ6	Wed-9/20	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ6	Wed-9/20	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold Amalgam (Inc. Contact)																						
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ7	Thu-9/21	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Amalgam (Inc. Contact)																						
T23-EZ8	Thu-9/21	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ8	Thu-9/21	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*C-CEM's operating incorrectly, data from 9/7. B=Baseline. Boldfaced areas indicate mercury values below low standard. A=Acetate. H=Peroxide. PH=Phosphate. TH=Thio Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Pre-Spiking Inlet Location
(CRG)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H ₂ O)	Other Sample [Hg] (ng/ml)	Other Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	KMnO ₄ Sample [Hg] (ng/ml)	Other Sample Mass (g)	Other Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	KMnO ₄ Sample Mass (g)	Other [Hg] In Gas (ug/Nm ³)	Other [Hg] In Gas (ug/Nm ³)	H ₂ O ₂ [Hg] In Gas (ug/Nm ³)	H ₂ O ₂ [Hg] In Gas (ug/Nm ³)	KMnO ₄ [Hg] In Gas (ug/Nm ³)	Total [Hg] In Gas (ug/Nm ³)
<i>Silver Amalgam (Inc. Contact)</i>																						
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ9	Fri-9/22	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Iron Amalgam (Inc. Contact)</i>																						
T23-EZ10	Fri-9/22	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EZ10	Fri-9/22	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gold Amalgam (Inc. Contact)</i>																						
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Copper Amalgam (Inc. Contact)</i>																						
T23-EY3	Tue-9/26	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Silver Amalgam (Inc. Contact)</i>																						
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aluminum Amalgam (Inc. Contact)</i>																						
T23-EY5	Wed-9/27	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*C=CEM's opening incorrectly, data from 9/7. B=Baseline. Italicized areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Pre-Spiking Inlet Location
(CRG)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H2O)	Other	Other	H2O2	H2O2	KMnO4	Other	Other	H2O2	H2O2	KMnO4	Other	Other	H2O2	H2O2	KMnO4	Total
							Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)
Carbon-12, 2000:1																						
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-12 10,000:1																						
T23-EY7	Thu-9/28	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-C1, 2000:1																						
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-C1 10,000:1																						
T23-EY9	Fri-9/29	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*C-CRM's opening incorrectly, data from 9/7. B-Baseline. Boldfaced areas indicate mercury values below low standard. A=Acetate, H=Peroxide, P=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Post-Spiking Inlet Location
(WS Inlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas	Inlet	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Total	
					Volume (dscf)	Moisture (% H2O)	O2 (%)	Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)
Mg/Lime IO, baseline																										
T22-N	Wed-9/6	08:00	-	U210	61.95	6.95	9.40	-	-	-	30.70	2.76	0.40	-	-	-	283.9	235.8	493.1	-	-	-	5.33	0.40	0.12	5.85
T22-N	Wed-9/6	10:00	-	U213	65.98	6.81	9.30	-	-	-	33.40	4.03	0.50	-	-	-	287.5	224.6	464.1	-	-	-	5.51	0.52	0.13	6.17
T22-N	Wed-9/6	11:30	-	U216	59.20	7.13	9.00	-	-	-	33.90	2.91	0.44	-	-	-	248.9	211.4	468.4	-	-	-	5.40	0.39	0.13	5.93
Averages																							5.4	0.4	0.1	6.0
Mg/Lime IO, Hg spk																										
T22-E	Thu-9/7	08:00	-	U219	51.12	7.05	9.39	-	-	-	43.90	10.50	16.80	-	-	-	248.8	236.1	544.7	-	-	-	8.09	1.84	6.78	16.71
T22-E	Thu-9/7	09:30	-	U222	54.08	6.79	9.32	-	-	-	42.60	10.20	18.60	-	-	-	252.9	244.9	514.6	-	-	-	7.55	1.75	6.70	16.00
T22-E	Thu-9/7	11:00	-	U225	68.48	6.96	9.05	-	-	-	44.40	11.60	26.90	-	-	-	287.5	233.6	448.8	-	-	-	7.06	1.50	6.68	15.24
Averages																							7.6	1.7	6.7	16.0
Mg/Lime IO, Hg+HgCL2 spk																										
T22-EC	Fri-9/8	08:00	-	U228	51.30	5.89	9.63	-	-	-	92.50	16.60	17.00	-	-	-	253.4	244.0	534.1	-	-	-	17.31	2.99	6.71	27.01
T22-EC	Fri-9/8	10:00	-	U231	53.90	5.10	9.09	-	-	-	95.60	19.70	19.70	-	-	-	265.3	224.4	472.1	-	-	-	17.83	3.11	6.54	27.47
T22-EC	Fri-9/8	11:30	-	U234	59.62	5.70	9.18	-	-	-	108.60	20.10	20.90	-	-	-	250.7	217.3	486.2	-	-	-	17.30	2.78	6.46	26.53
Averages																							17.6	2.9	6.5	27.0
Tris Comp @ WS In																										
T23-EY1	Fri-9/15	08:00	H	U249	40.24	5.06	11.15	-	28.10	11.25	8.12	6.16	10.50	-	232.3	237.8	229.6	199.0	478.6	-	6.15	2.52	1.75	1.15	4.73	16.30
T23-EY1	Fri-9/15	08:00	Tris	U250	31.05	7.77	11.15	-	7.62	0.79	1.05	1.08	20.45	-	289.7	269.2	229.0	223.0	492.4	-	2.69	0.26	0.29	0.29	12.29	15.83
T23-EY1	Fri-9/15	09:30	H	U252	45.14	5.05	11.06	-	29.90	14.80	12.00	8.88	11.90	-	227.6	197.5	192.6	170.7	426.5	-	5.71	2.45	1.94	1.27	4.26	15.63
T23-EY1	Fri-9/15	09:30	Tris	U253	41.17	7.49	11.06	-	10.42	0.76	1.96	0.90	29.90	-	269.7	278.4	179.4	189.1	423.3	-	2.59	0.19	0.32	0.16	11.65	14.91
T23-EY1	Fri-9/15	11:30	H	U255	53.76	4.70	11.13	-	37.70	14.80	12.20	7.42	12.40	-	234.5	237.5	190.1	203.7	465.3	-	6.23	2.48	1.63	1.06	4.07	15.47
T23-EY1	Fri-9/15	11:30	Tris	U256	52.79	6.42	11.13	-	10.61	1.04	1.47	1.62	37.30	-	308.7	327.9	211.0	205.9	459.0	-	2.35	0.24	0.22	0.24	12.29	15.34
Averages																										
Gold Amalgamation Test																										
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ1	Mon-9/18	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper Amalgamation Test																										
T23-EZ2	Mon-9/18	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ2	Mon-9/18	16:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

*C=CBM's operating incorrectly, data from 9/7. B=Baseline. Relined areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Post-Spiking Inlet Location
(WS Inlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Solid Hg Other Other H2O2 H2O2 KMnO4 Solid Hg Other Other H2O2 H2O2 KMnO4											Solid Hg Other Other H2O2 H2O2 KMnO4 Total										
					Gas Volume (dscf)	Moisture (% H2O)	Inlet O2 (%)	Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)
Aluminum Amalgamation Test																										
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ3	Tue-9/19	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulfur (Sgms) Test																										
T23-EZ4	Tue-9/19	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ4	Tue-9/19	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver Amalgamation Test																										
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ5	Wed-9/20	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc Amalgamation Test																										
T23-EZ6	Wed-9/20	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ6	Wed-9/20	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gold Amalgam (Inc. Contact)																										
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ7	Thu-9/21	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead Amalgam (Inc. Contact)																										
T23-EZ8	Thu-9/21	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ8	Thu-9/21	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

*C-CEM's opening is incorrectly, data from 9/7. B=Baseline. Italicized areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Post-Spiking Inlet Location
(WS Inlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H2O)	Inlet O2 (%)	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Total
								Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)	[Hg] In Gas (μg/Nm3)
Silver Amalgam (Inc. Contact)																										
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ9	Fri-9/22	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron Amalgam (Inc. Contact)																										
T23-EZ10	Fri-9/22	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EZ10	Fri-9/22	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gold Amalgam (Inc. Contact)																										
T23-EY2	Tue-9/26	08:00	-	U302	84.42	5.95	9.86	-	-	-	65.70	21.80	23.45	-	-	-	274.5	264.1	487.0	-	-	-	8.09B	2.58B	5.12B	15.80B
T23-EY2	Tue-9/26	08:00	-	U303	75.25	6.00	9.86	-	-	-	75.40	14.90	15.30	-	-	-	283.6	226.9	455.1	-	-	-	10.76	1.70	3.51	15.97
T23-EY2	Tue-9/26	09:30	-	U304	64.48	6.25	9.86	-	-	-	68.50	14.00	10.40	-	-	-	271.2	232.8	487.6	-	-	-	10.91	1.91	2.98	15.81
T23-EY2	Tue-9/26	11:00	-	U305	125.56	6.07	9.90	-	-	-	76.60	31.60	31.20	-	-	-	297.2	233.8	454.9	-	-	-	6.87B	2.23B	4.28B	13.38B
T23-EY2	Tue-9/26	11:00	-	U306	62.50	6.07	9.90	-	-	-	70.00	11.40	9.55	-	-	-	248.4	225.1	459.9	-	-	-	10.54	1.56	2.66	14.75
Copper Amalgam (Inc. Contact)																										
T23-EY3	Tue-9/26	12:00	-	U307	57.10	6.41	9.90	-	-	-	36.80	6.67	27.30	-	-	-	242.5	213.2	461.4	-	-	-	5.92	0.94	8.36	15.22
T23-EY3	Tue-9/26	13:30	-	U308	83.53	5.93	9.90	-	-	-	84.70	20.10	19.30	-	-	-	272.1	228.2	463.2	-	-	-	10.45B	2.08B	4.07B	16.60B
T23-EY3	Tue-9/26	13:30	-	U309	49.14	5.96	9.90	-	-	-	45.20	8.46	14.70	-	-	-	233.2	229.9	454.1	-	-	-	8.13	1.50	5.15	14.77
T23-EY3	Tue-9/26	15:00	-	U310	49.10	6.07	9.90	-	-	-	43.20	8.92	13.80	-	-	-	256.2	242.9	451.3	-	-	-	8.54	1.67	4.81	15.02
Silver Amalgam (Inc. Contact)																										
T23-EY4	Wed-9/27	08:00	-	U311	90.03	6.02	9.30	-	-	-	79.97	21.50	24.80	-	-	-	262.4	244.0	482.5	-	-	-	8.83B	2.21B	5.03B	16.07B
T23-EY4	Wed-9/27	08:00	-	U312	57.58	6.01	9.30	-	-	-	37.00	11.00	29.70	-	-	-	244.6	242.5	466.3	-	-	-	5.95	1.76	9.11	16.82
T23-EY4	Wed-9/27	09:30	-	U313	58.57	5.93	9.30	-	-	-	36.40	12.20	28.10	-	-	-	266.2	241.1	450.3	-	-	-	6.27	1.90	8.18	16.35
T23-EY4	Wed-9/27	11:00	-	U314	109.95	4.54	10.25	-	-	-	71.10	20.80	21.30	-	-	-	280.5	262.5	503.6	-	-	-	6.87B	1.88B	3.70B	12.45B
T23-EY4	Wed-9/27	11:00	-	U315	57.92	5.53	10.25	-	-	-	37.90	11.40	27.10	-	-	-	243.8	248.2	444.6	-	-	-	6.04	1.85	7.88	15.78
Aluminum Amalgam (Inc. Contact)																										
T23-EY5	Wed-9/27	12:00	-	U316	58.42	5.42	10.25	-	-	-	48.90	8.68	22.80	-	-	-	236.9	230.2	455.7	-	-	-	7.51	1.30	6.74	15.55
T23-EY5	Wed-9/27	13:30	-	U317	90.86	5.62	9.72	-	-	-	81.40	20.50	22.80	-	-	-	253.7	234.3	494.6	-	-	-	8.61B	2.00B	4.70B	15.31B
T23-EY5	Wed-9/27	13:30	-	U318	51.80	5.68	9.72	-	-	-	53.20	10.80	16.90	-	-	-	225.5	198.1	427.9	-	-	-	8.77	1.56	5.29	15.63
T23-EY5	Wed-9/27	15:00	-	U319	57.35	5.01	9.72	-	-	-	50.10	10.10	13.50	-	-	-	237.8	231.0	536.3	-	-	-	7.87	1.54	4.78	14.19

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Post-Spiking Inlet Location
(WS Inlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dec)	Moisture (% H2O)	Inlet O2 (%)	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Total
								Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)
Carbon-I2, 2000:1																										
T23-EY6	Thu-9/28	08:00	-	U320	86.40	5.37	9.82	-	-	-	72.70	16.80	24.40	-	-	-	267.1	242.4	499.1	-	-	-	8.51B	1.79B	5.34B	15.64B
T23-EY6	Thu-9/28	08:00	-	U321	46.84	5.37	9.82	-	-	-	52.20	12.20	0.69	-	-	-	246.5	252.1	454.6	-	-	-	10.41	2.49	0.25	13.15
T23-EY6	Thu-9/28	09:30	-	U322	34.71	5.30	9.82	-	-	-	39.60	7.41	8.88	-	-	-	229.4	215.4	450.0	-	-	-	9.92	1.74	4.36	16.02
T23-EY6	Thu-9/28	11:00	-	U323	93.89	5.60	10.19	-	-	-	80.20	21.80	25.90	-	-	-	262.2	240.8	451.9	-	-	-	8.48B	2.12B	4.72B	15.33B
T23-EY6	Thu-9/28	11:00	-	U324	32.65	4.42	10.19	-	-	-	39.70	6.49	6.09	-	-	-	234.5	218.2	489.7	-	-	-	10.80	1.64	3.46	15.90
Carbon-I2 10,000:1																										
T23-EY7	Thu-9/28	12:00	-	U325	71.72	5.57	10.19	-	-	-	84.60	9.14	0.05	-	-	-	237.4	245.9	478.3	-	-	-	10.61	1.19	0.01	11.81
T23-EY7	Thu-9/28	13:30	-	U326	65.48	5.10	9.77	-	-	-	34.60	11.20	7.23	-	-	-	265.4	207.2	471.2	-	-	-	4.28B	1.33B	2.13B	8.74B
T23-EY7	Thu-9/28	13:30	-	U327	45.68	5.58	9.77	-	-	-	67.30	6.59	1.66	-	-	-	265.6	226.5	512.6	-	-	-	14.82	1.24	0.71	16.77
T23-EY7	Thu-9/28	15:00	-	U328	53.25	5.69	9.77	-	-	-	80.20	8.87	2.53	-	-	-	248.6	230.4	558.3	-	-	-	14.19	1.45	1.00	16.64
Carbon-Cl, 2000:1																										
T23-EY8	Fri-9/29	08:00	-	U329	89.72	5.18	10.10	-	-	-	63.55	20.60	26.95	-	-	-	266.7	225.8	419.8	-	-	-	7.16B	1.96B	4.78B	13.90B
T23-EY8	Fri-9/29	08:00	-	U330	64.59	5.25	10.10	-	-	-	58.60	7.86	10.90	-	-	-	259.7	231.0	523.2	-	-	-	8.93	1.06	3.34	13.34
T23-EY8	Fri-9/29	09:30	-	U331	51.16	5.54	10.10	-	-	-	55.00	6.74	7.71	-	-	-	274.6	246.1	483.5	-	-	-	11.18	1.23	2.76	15.17
T23-EY8	Fri-9/29	11:00	-	U332	68.64	6.73	9.80	-	-	-	60.30	19.30	21.80	-	-	-	282.7	239.5	456.9	-	-	-	9.41B	2.55B	5.50B	17.46B
T23-EY8	Fri-9/29	11:00	-	U333	67.76	5.71	9.80	-	-	-	81.70	9.55	8.43	-	-	-	250.4	234.4	461.7	-	-	-	11.44	1.25	2.18	14.86
Carbon-Cl 10,000:1																										
T23-EY9	Fri-9/29	12:00	-	U334	74.64	5.81	9.80	-	-	-	59.00	5.74	8.83	-	-	-	264.1	254.5	520.9	-	-	-	7.91	0.74	2.33	10.98
T23-EY9	Fri-9/29	13:30	-	U335	48.35	6.09	9.92	-	-	-	43.20	12.10	11.70	-	-	-	247.2	230.5	472.7	-	-	-	8.37B	2.19B	4.33B	14.89B
T23-EY9	Fri-9/29	13:30	-	U336	50.49	5.89	9.92	-	-	-	61.90	6.67	4.95	-	-	-	254.5	225.7	453.7	-	-	-	11.82	1.13	1.68	14.63
T23-EY9	Fri-9/29	15:00	-	U337	53.78	5.83	9.92	-	-	-	70.40	8.11	4.61	-	-	-	253.1	227.9	472.0	-	-	-	12.55	1.30	1.53	15.39

*C=CEM's operating incorrectly, data from 9/7. B=Baseline. Bolded areas indicate mercury values below low standard. A=Acetate, H=Hydroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Outlet Location
(WS Outlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H ₂ O)	Out O ₂ (%)	Solid Hg Sample [Hg] (ppm)	Other Sample [Hg] (ng/ml)	Other Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	KMnO ₄ Sample [Hg] (ng/ml)	Solid Hg Sample Mass (g)	Other Sample Mass (g)	Other Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	KMnO ₄ Sample Mass (g)	Solid Hg In Gas [Hg] (μg/Nm ³)	Other In Gas [Hg] (μg/Nm ³)	Other In Gas [Hg] (μg/Nm ³)	H ₂ O ₂ In Gas [Hg] (μg/Nm ³)	H ₂ O ₂ In Gas [Hg] (μg/Nm ³)	KMnO ₄ In Gas [Hg] (μg/Nm ³)	Total In Gas [Hg] (μg/Nm ³)
<i>Mg/Lime IO, baseline</i>																										
T22-N	Wed-9/6	08:00	-	U211	90.78	12.08	9.7 C	-	-	-	1.73	0.76	1.24	-	-	-	370.7	292.3	537.9	-	-	-	0.27	0.09	0.28	0.64
T22-N	Wed-9/6	10:00	-	U214	97.08	12.23	6.5 C	-	-	-	2.30	1.06	1.29	-	-	-	427.5	282.7	538.0	-	-	-	0.38	0.12	0.27	0.77
T22-N	Wed-9/6	11:30	-	U217	113.89	12.48	9.3 C	-	-	-	2.41	1.08	1.58	-	-	-	375.6	309.4	449.9	-	-	-	0.30	0.11	0.24	0.65
<i>Averages</i>																							0.3	0.1	0.3	0.7
<i>Mg/Lime IO, Hg spk</i>																										
T22-E	Thu-9/7	08:00	-	U220	92.82	12.16	9.65	-	-	-	9.01	4.65	44.50	-	-	-	380.7	278.0	500.6	-	-	-	1.40	0.53	9.09	11.02
T22-E	Thu-9/7	09:30	-	U223	93.30	12.08	6.61	-	-	-	8.74	4.38	43.30	-	-	-	426.8	262.9	494.8	-	-	-	1.51	0.47	8.70	10.68
T22-E	Thu-9/7	11:00	-	U226	116.87	12.19	9.32	-	-	-	12.60	5.84	53.20	-	-	-	424.2	318.1	499.0	-	-	-	1.73	0.60	8.60	10.94
<i>Averages</i>																							1.5	0.5	8.8	10.9
<i>Mg/Lime IO, Hg+HgCL₂ spk</i>																										
T22-EC	Fri-9/8	08:00	-	U229	95.92	10.72	9.34	-	-	-	12.60	7.09	45.30	-	-	-	341.1	240.1	485.3	-	-	-	1.70	0.67	8.68	11.05
T22-EC	Fri-9/8	10:00	-	U232	102.04	11.05	8.94	-	-	-	13.60	9.19	51.10	-	-	-	368.1	266.0	442.4	-	-	-	1.86	0.91	8.39	11.16
T22-EC	Fri-9/8	11:30	-	U235	88.38	10.82	9.10	-	-	-	12.10	7.40	41.90	-	-	-	358.8	239.3	446.5	-	-	-	1.86	0.76	8.02	10.64
<i>Averages</i>																							1.9	0.8	8.2	10.9
<i>Tris Comp @ WS In</i>																										
T23-EY1	Fri-9/15	08:00	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	08:00	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	09:30	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	09:30	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	11:30	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY1	Fri-9/15	11:30	Tris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Averages</i>																										
<i>Gold Amalgamation Test</i>																										
T23-EZ1	Mon-9/18	09:00	-	U257	136.02	9.00	11.27	-	-	-	2.48	2.70	75.90	-	-	-	373.5	337.0	498.5	-	-	-	0.26B	0.25B	10.54B	11.05B
T23-EZ1	Mon-9/18	09:00	-	U258	60.29	8.65	11.27	-	-	-	6.36	1.78	25.10	-	-	-	297.7	224.2	455.8	-	-	-	1.19	0.25	7.19	8.63
T23-EZ1	Mon-9/18	10:30	-	U259	66.78	9.45	11.27	-	-	-	11.90	3.14	21.70	-	-	-	327.2	254.2	537.4	-	-	-	2.21	0.45	6.62	9.28
T23-EZ1	Mon-9/18	12:00	-	U260	144.44	10.13	10.02	-	-	-	6.42	8.38	77.75	-	-	-	394.6	310.8	473.3	-	-	-	0.66B	0.68B	9.65B	11.00B
T23-EZ1	Mon-9/18	12:00	-	U261	62.56	9.87	10.02	-	-	-	14.30	4.05	21.60	-	-	-	328.2	218.7	490.1	-	-	-	2.84	0.54	6.41	9.79
<i>Copper Amalgamation Test</i>																										
T23-EZ2	Mon-9/18	13:30	-	U262	61.84	10.52	10.02	-	-	-	3.38	1.68	35.20	-	-	-	318.7	216.1	492.8	-	-	-	0.66	0.22	10.63	11.51
T23-EZ2	Mon-9/18	15:00	-	U263	115.36	11.18	9.62	-	-	-	4.82	10.20	64.00	-	-	-	346.9	307.8	425.7	-	-	-	0.55B	1.03B	8.95B	10.53B
T23-EZ2	Mon-9/18	15:00	-	U264	60.60	11.04	9.62	-	-	-	5.22	4.68	31.10	-	-	-	359.7	237.8	481.7	-	-	-	1.17	0.70	9.37	11.23
T23-EZ2	Mon-9/18	16:30	-	U265	64.24	11.41	9.62	-	-	-	7.10	5.53	35.10	-	-	-	330.8	225.2	449.1	-	-	-	1.39	0.73	9.30	11.42

*C=CMB's operating incorrectly, data from 9/7. B=Baseline. Italicized notes indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Outlet Location
(WS Outlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (dscf)	Moisture (% H ₂ O)	Out O ₂ (%)	Solid Hg Sample [Hg] (ppm)	Other Sample [Hg] (ng/ml)	Other Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	H ₂ O ₂ Sample [Hg] (ng/ml)	KMnO ₄ Sample [Hg] (ng/ml)	Solid Hg Sample Mass (g)	Other Sample Mass (g)	Other Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	H ₂ O ₂ Sample Mass (g)	KMnO ₄ Sample Mass (g)	Solid Hg In Gas [Hg] (μg/Nm ³)	Other In Gas [Hg] (μg/Nm ³)	Other In Gas [Hg] (μg/Nm ³)	H ₂ O ₂ In Gas [Hg] (μg/Nm ³)	H ₂ O ₂ In Gas [Hg] (μg/Nm ³)	KMnO ₄ In Gas [Hg] (μg/Nm ³)	Total In Gas [Hg] (μg/Nm ³)
Aluminum Amalgamation Test																										
T23-EZ3	Tue-9/19	07:30	-	U266	120.70	11.26	10.20	-	-	-	6.57	4.75	51.40	-	-	-	326.9	363.1	574.8	-	-	-	0.67B	0.54B	9.27B	10.49B
T23-EZ3	Tue-9/19	07:30	-	U267	61.81	11.44	10.20	-	-	-	6.37	4.95	34.30	-	-	-	330.3	241.1	440.9	-	-	-	1.29	0.73	9.27	11.29
T23-EZ3	Tue-9/19	09:00	-	U268	61.32	11.52	10.20	-	-	-	7.03	5.49	33.75	-	-	-	332.1	259.0	444.2	-	-	-	1.44	0.88	9.26	11.58
T23-EZ3	Tue-9/19	10:30	-	U269	131.39	11.42	9.39	-	-	-	7.57	7.96	69.90	-	-	-	374.5	359.0	444.4	-	-	-	0.82B	0.82B	8.96B	10.60B
T23-EZ3	Tue-9/19	10:30	-	U270	46.64	11.63	9.39	-	-	-	6.41	3.96	25.30	-	-	-	346.3	216.7	431.2	-	-	-	1.80	0.70	8.86	11.36
Sulfur (5gms) Test																										
T23-EZ4	Tue-9/19	12:00	-	U271	59.50	11.62	9.39	-	-	-	4.66	2.20	34.30	-	-	-	333.6	223.1	407.8	-	-	-	0.99	0.31	8.91	10.21
T23-EZ4	Tue-9/19	13:15	-	U272	110.89	11.60	9.50	-	-	-	5.77	6.06	48.90	-	-	-	395.5	338.0	528.1	-	-	-	0.78B	0.70B	8.82B	10.30B
T23-EZ4	Tue-9/19	13:15	-	U273	59.20	11.85	9.50	-	-	-	4.27	2.23	29.70	-	-	-	375.0	273.5	471.9	-	-	-	1.02	0.39	8.97	10.38
T23-EZ4	Tue-9/19	14:30	-	U274	64.83	11.93	9.50	-	-	-	6.05	2.86	28.60	-	-	-	368.6	270.9	512.4	-	-	-	1.30	0.45	8.56	10.32
Silver Amalgamation Test																										
T23-EZ5	Wed-9/20	07:30	-	U275	124.36	11.97	8.93	-	-	-	1.81	4.94	72.45	-	-	-	385.1	358.8	488.7	-	-	-	0.21B	0.54B	10.79B	11.54B
T23-EZ5	Wed-9/20	07:30	-	U276	61.09	12.01	8.93	-	-	-	4.90	1.94	32.20	-	-	-	352.1	272.3	505.4	-	-	-	1.07	0.33	10.09	11.49
T23-EZ5	Wed-9/20	09:00	-	U277	64.75	12.16	8.93	-	-	-	3.50	0.82	37.20	-	-	-	364.1	244.4	476.3	-	-	-	0.75	0.12	10.37	11.23
T23-EZ5	Wed-9/20	10:30	-	U278	132.89	12.28	9.33	-	-	-	3.66	3.41	70.40	-	-	-	409.4	419.7	508.6	-	-	-	0.43B	0.41B	10.21B	11.04B
T23-EZ5	Wed-9/20	10:30	-	U279	61.72	12.42	9.33	-	-	-	3.62	1.00	34.60	-	-	-	373.4	238.6	485.4	-	-	-	0.83	0.15	10.31	11.29
Zinc Amalgamation Test																										
T23-EZ6	Wed-9/20	12:00	-	U280	59.47	12.20	9.33	-	-	-	1.91	0.98	32.50	-	-	-	387.5	259.5	512.1	-	-	-	0.47	0.16	10.60	11.23
T23-EZ6	Wed-9/20	13:15	-	U281	124.17	12.19	8.89	-	-	-	3.70	3.43	64.10	-	-	-	355.8	359.6	524.4	-	-	-	0.40B	0.38B	10.26B	11.03B
T23-EZ6	Wed-9/20	13:15	-	U282	60.00	12.27	8.89	-	-	-	2.44	1.82	30.90	-	-	-	391.1	250.0	528.2	-	-	-	0.60	0.29	10.31	11.19
T23-EZ6	Wed-9/20	14:30	-	U283	62.54	12.29	8.89	-	-	-	2.53	1.82	36.30	-	-	-	358.3	231.8	455.2	-	-	-	0.55	0.26	10.01	10.81
Gold Amalgam (Inc. Contact)																										
T23-EZ7	Thu-9/21	07:30	-	U284	120.25	11.58	9.17	-	-	-	2.75	2.91	62.90	-	-	-	412.8	432.8	508.1	-	-	-	0.36B	0.40B	10.07B	10.82B
T23-EZ7	Thu-9/21	07:30	-	U285	58.14	12.15	9.17	-	-	-	17.40	1.19	14.85	-	-	-	346.6	234.3	509.7	-	-	-	3.93	0.18	4.93	9.04
T23-EZ7	Thu-9/21	09:00	-	U286	61.92	11.92	9.17	-	-	-	21.35	1.78	16.20	-	-	-	347.7	229.4	516.4	-	-	-	4.54	0.25	5.12	9.91
T23-EZ7	Thu-9/21	10:30	-	U287	110.98	11.87	9.68	-	-	-	3.61	1.45	58.40	-	-	-	392.7	367.8	483.4	-	-	-	0.48B	0.18B	9.64B	10.30B
T23-EZ7	Thu-9/21	10:30	-	U288	57.24	12.14	9.68	-	-	-	21.65	0.89	17.00	-	-	-	335.8	233.5	432.7	-	-	-	4.81	0.14	4.87	9.82
Lead Amalgam (Inc. Contact)																										
T23-EZ8	Thu-9/21	12:00	-	U289	58.58	12.31	9.68	-	-	-	2.08	0.60	31.40	-	-	-	351.9	248.4	498.5	-	-	-	0.47	0.10	10.12	10.69
T23-EZ8	Thu-9/21	13:15	-	U290	97.11	11.83	9.01	-	-	-	3.04	2.70	49.90	-	-	-	422.9	321.0	450.4	-	-	-	0.50B	0.34B	8.77B	9.61B
T23-EZ8	Thu-9/21	13:15	-	U291	56.51	12.31	9.01	-	-	-	2.27	0.99	33.30	-	-	-	322.7	234.8	450.4	-	-	-	0.49	0.16	10.05	10.70
T23-EZ8	Thu-9/21	14:30	-	U292	60.52	12.40	9.01	-	-	-	2.46	1.29	31.20	-	-	-	324.7	233.5	510.5	-	-	-	0.50	0.19	9.97	10.66

*C-CEM's operating incorrectly, data from 9/7, B=Baseline. Boldfaced areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Outlet Location
(WS Outlet)

Test ID	Date	Start Time	Other Imp. Cont.	Other ID	Gas Volume (scf)	Moisture (% H2O)	Out O2 (%)	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Total						
								Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)	[Hg] In Gas (ug/Nm3)
Silver Amalgam (Inc. Contact)																										
T23-EZ9	Fri-9/22	07:30	-	U293	96.78	12.15	9.35	-	-	-	3.14	1.93	58.50	-	-	-	335.6	349.4	439.7	-	-	-	0.41B	0.26B	10.07B	10.74B
T23-EZ9	Fri-9/22	07:30	-	U294	60.85	12.11	9.35	-	-	-	1.90	1.23	33.30	-	-	-	337.2	236.4	474.9	-	-	-	0.40	0.18	9.85	10.43
T23-EZ9	Fri-9/22	09:00	-	U295	67.43	12.24	9.35	-	-	-	3.14	1.20	40.10	-	-	-	328.0	254.7	441.3	-	-	-	0.58	0.17	9.94	10.69
T23-EZ9	Fri-9/22	10:30	-	U296	129.19	12.15	9.37	-	-	-	3.17	3.46	64.20	-	-	-	399.4	407.3	496.5	-	-	-	0.37B	0.41B	9.35B	10.13B
T23-EZ9	Fri-9/22	10:30	-	U297	64.34	12.10	9.37	-	-	-	3.00	0.75	30.50	-	-	-	412.3	256.8	530.7	-	-	-	0.73	0.11	9.53	10.37
Iron Amalgam (Inc. Contact)																										
T23-EZ10	Fri-9/22	12:00	-	U298	64.81	12.21	9.37	-	-	-	2.32	0.79	29.20	-	-	-	388.3	260.0	542.5	-	-	-	0.53	0.12	9.26	9.91
T23-EZ10	Fri-9/22	13:15	-	U299	82.03	11.69	9.41	-	-	-	2.98	1.57	46.50	-	-	-	370.4	242.1	441.2	-	-	-	0.51B	0.18B	9.47B	10.16B
T23-EZ10	Fri-9/22	13:15	-	U300	59.58	12.15	9.41	-	-	-	2.43	1.35	29.00	-	-	-	374.4	239.2	501.6	-	-	-	0.58	0.21	9.25	10.03
T23-EZ10	Fri-9/22	14:30	-	U301	59.45	12.09	9.41	-	-	-	3.15	1.77	31.50	-	-	-	336.1	219.1	458.8	-	-	-	0.67	0.25	9.21	10.13
Gold Amalgam (Inc. Contact)																										
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY2	Tue-9/26	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper Amalgam (Inc. Contact)																										
T23-EY3	Tue-9/26	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY3	Tue-9/26	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver Amalgam (Inc. Contact)																										
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY4	Wed-9/27	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum Amalgam (Inc. Contact)																										
T23-EY5	Wed-9/27	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
T23-EY5	Wed-9/27	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

ECTC Pilot Trace Elements Removal Testing
Mercury Gas Sampling Results
Pilot Outlet Location
(WS Outlet)

Test ID	Date	Start Time	Other Imp. Cont.	ID	Gas Volume (scf)	Moisture (% H2O)	Out O2 (%)	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Solid Hg	Other	Other	H2O2	H2O2	KMnO4	Total
								Sample [Hg] (ppm)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample [Hg] (ng/ml)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	Sample Mass (g)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)	[Hg] In Gas (µg/Nm3)
Carbon-12, 2000:1																										
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-12 10,000:1																										
T23-EY7	Thu-9/28	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY7	Thu-9/28	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-Cl, 2000:1																										
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon-Cl 10,000:1																										
T23-EY9	Fri-9/29	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T23-EY9	Fri-9/29	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*C-CEN's operating incorrectly, data from 9/7. B=Baseline. Rejected mass indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, TIS=Tris Buffer

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

				Other					H2O2					KMnO4					Total Vapor				
Test ID	Date	Start Time	Other Imp. Cont.	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal (%)	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal (%)	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal (%)	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Removal (%)
				(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)	(µg/Nm3)
Mg/Lime IO, baseline																							
T22-N	Wed-9/6	08:00	-	-	-	-	-	-	7.26	7.89	0.51	0.64	93.6	0.38	0.17	0.39	-0.22	-136.1	7.64	8.06	0.90	0.42	88.8
T22-N	Wed-9/6	10:00	-	-	-	-	-	-	6.49	8.26	0.56	1.77	93.3	0.93	0.18	0.30	-0.75	-65.5	7.42	8.45	0.86	1.03	89.8
T22-N	Wed-9/6	11:30	-	-	-	-	-	-	6.43	7.76	0.56	1.32	92.7	1.07	0.18	0.32	-0.89	-82.3	7.51	7.93	0.89	0.43	88.8
Averages									6.7	8.0	0.5	1.2	93.2	0.8	0.2	0.3	-0.6	-94.6	7.5	8.1	0.9	0.6	89.2
Mg/Lime IO, Hg spk																							
T22-E	Thu-9/7	08:00	-	-	-	-	-	-	5.69	13.69	2.72	8.00	80.1	0.29	9.35	12.82	9.05	-37.2	5.98	23.03	15.54	17.05	32.5
T22-E	Thu-9/7	09:30	-	-	-	-	-	-	5.04	12.73	2.20	7.69	82.7	0.69	9.18	9.67	8.50	-5.3	5.73	21.92	11.87	16.19	45.8
T22-E	Thu-9/7	11:00	-	-	-	-	-	-	4.57	11.46	3.20	6.90	72.1	0.45	8.94	11.79	8.49	-31.8	5.02	20.40	14.98	15.39	26.6
Averages									5.1	12.6	2.7	7.5	78.3	0.5	9.2	11.4	8.7	-24.8	5.6	21.8	14.1	16.2	35.0
Mg/Lime IO, Hg+HgCL2 spk																							
T22-EC	Fri-9/8	08:00	-	-	-	-	-	-	4.87	28.58	3.25	23.71	88.6	0.23	9.44	11.91	9.20	-26.2	5.10	38.02	15.17	32.91	60.1
T22-EC	Fri-9/8	10:00	-	-	-	-	-	-	3.72	28.12	3.67	24.39	87.0	0.75	8.78	11.13	8.03	-26.8	4.47	36.90	14.80	32.43	59.9
T22-EC	Fri-9/8	11:30	-	-	-	-	-	-	4.05	27.17	3.52	23.11	87.0	0.51	8.74	10.78	8.23	-23.4	4.56	35.91	14.30	31.34	60.2
Averages									3.9	27.6	3.6	23.8	87.0	0.6	8.8	11.0	8.1	-25.1	4.5	36.4	14.6	31.9	60.0
Tris Comp @ WS In																							
T23-EY1	Fri-9/15	08:00	H	4.14	14.08	-	9.94	-	0.20	4.73	-	4.52	-	0.03	7.69	-	7.66	-	4.37	26.49	-	22.12	-
T23-EY1	Fri-9/15	08:00	Tris	-	4.80	-	0.66	-	-	0.95	-	0.75	-	-	19.96	-	19.93	-	-	25.72	-	21.35	-
T23-EY1	Fri-9/15	09:30	H	-	13.14	-	9.00	-	-	5.17	-	4.96	-	-	6.85	-	6.82	-	-	25.16	-	20.79	-
T23-EY1	Fri-9/15	09:30	Tris	-	4.48	-	0.34	-	-	0.77	-	0.57	-	-	18.74	-	18.71	-	-	23.99	-	19.62	-
T23-EY1	Fri-9/15	11:30	H	-	14.11	-	9.98	-	-	4.38	-	4.17	-	-	6.59	-	6.56	-	-	25.08	-	20.71	-
T23-EY1	Fri-9/15	11:30	Tris	-	4.21	-	0.07	-	-	0.75	-	0.54	-	-	19.91	-	19.88	-	-	24.87	-	20.50	-
Averages																							
Gold Amalgamation Test																							
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	0.84B	-	-	-	-	17.33B	-	-	-	-	18.17B	-	-
T23-EZ1	Mon-9/18	09:00	-	-	-	-	-	-	-	-	2.37	-	-	-	-	11.82	-	-	-	-	14.19	-	21.9
T23-EZ1	Mon-9/18	10:30	-	-	-	-	-	-	-	-	4.38	-	-	-	-	10.88	-	-	-	-	15.25	-	16.0
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	1.96B	-	-	-	-	14.06B	-	-	-	-	16.02B	-	-
T23-EZ1	Mon-9/18	12:00	-	-	-	-	-	-	-	-	4.92	-	-	-	-	9.34	-	-	-	-	14.26	-	11.0
Copper Amalgamation Test																							
T23-EZ2	Mon-9/18	13:30	-	-	-	-	-	-	-	-	1.29	-	-	-	-	15.48	-	-	-	-	16.77	-	-4.6
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	2.22B	-	-	-	-	12.57B	-	-	-	-	14.79B	-	-
T23-EZ2	Mon-9/18	15:00	-	-	-	-	-	-	-	-	2.63	-	-	-	-	13.16	-	-	-	-	15.79	-	-6.7
T23-EZ2	Mon-9/18	16:30	-	-	-	-	-	-	-	-	2.98	-	-	-	-	13.06	-	-	-	-	16.04	-	-8.4

*C-CEN's opening incorrectly, data from 9/7. B=Baseline. Italicized areas indicate mercury values below low standard. A=Acetate. H=Peroxide. PH=Phosphate. Tris=Tris Buffer

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

Test ID	Date	Start Time	Other Imp. Cont.	Other					H2O2					KMnO4					Total Vapor				
				Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Removal
				(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)
Aluminum Amalgamation Test																							
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	1.80B	-	-	-	-	13.74B	-	-	-	-	15.54B	-	-
T23-EZ3	Tue-9/19	07:30	-	-	-	-	-	-	-	-	2.99	-	-	-	-	13.73	-	-	-	-	16.73	-	-7.6
T23-EZ3	Tue-9/19	09:00	-	-	-	-	-	-	-	-	3.44	-	-	-	-	13.72	-	-	-	-	17.16	-	-10.4
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	2.26B	-	-	-	-	12.35B	-	-	-	-	14.61B	-	-
T23-EZ3	Tue-9/19	10:30	-	-	-	-	-	-	-	-	3.45	-	-	-	-	12.22	-	-	-	-	15.66	-	-7.2
Sulfur (Sgms) Test																							
T23-EZ4	Tue-9/19	12:00	-	-	-	-	-	-	-	-	1.80	-	-	-	-	12.28	-	-	-	-	14.07	-	3.7
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	2.06B	-	-	-	-	12.27B	-	-	-	-	14.33B	-	-
T23-EZ4	Tue-9/19	13:15	-	-	-	-	-	-	-	-	1.97	-	-	-	-	12.47	-	-	-	-	14.44	-	-0.8
T23-EZ4	Tue-9/19	14:30	-	-	-	-	-	-	-	-	2.44	-	-	-	-	11.91	-	-	-	-	14.35	-	-0.2
Silver Amalgamation Test																							
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	1.00B	-	-	-	-	14.29B	-	-	-	-	15.29B	-	-
T23-EZ5	Wed-9/20	07:30	-	-	-	-	-	-	-	-	1.85	-	-	-	-	13.37	-	-	-	-	15.22	-	0.4
T23-EZ5	Wed-9/20	09:00	-	-	-	-	-	-	-	-	1.14	-	-	-	-	13.74	-	-	-	-	14.88	-	2.7
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	1.14B	-	-	-	-	13.99B	-	-	-	-	15.13B	-	-
T23-EZ5	Wed-9/20	10:30	-	-	-	-	-	-	-	-	1.34	-	-	-	-	14.13	-	-	-	-	15.47	-	-2.2
Zinc Amalgamation Test																							
T23-EZ6	Wed-9/20	12:00	-	-	-	-	-	-	-	-	0.87	-	-	-	-	14.53	-	-	-	-	15.40	-	-1.7
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	1.03B	-	-	-	-	13.55B	-	-	-	-	14.58B	-	-
T23-EZ6	Wed-9/20	13:15	-	-	-	-	-	-	-	-	1.17	-	-	-	-	13.62	-	-	-	-	14.79	-	-1.5
T23-EZ6	Wed-9/20	14:30	-	-	-	-	-	-	-	-	1.06	-	-	-	-	13.22	-	-	-	-	14.29	-	2.0
Gold Amalgam (Inc. Contact)																							
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	1.02B	-	-	-	-	13.62B	-	-	-	-	14.64B	-	-
T23-EZ7	Thu-9/21	07:30	-	-	-	-	-	-	-	-	5.56	-	-	-	-	6.67	-	-	-	-	12.23	-	16.4
T23-EZ7	Thu-9/21	09:00	-	-	-	-	-	-	-	-	6.48	-	-	-	-	6.92	-	-	-	-	13.40	-	8.4
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	0.94B	-	-	-	-	13.61B	-	-	-	-	14.56B	-	-
T23-EZ7	Thu-9/21	10:30	-	-	-	-	-	-	-	-	6.99	-	-	-	-	6.88	-	-	-	-	13.87	-	4.7
Lead Amalgam (Inc. Contact)																							
T23-EZ8	Thu-9/21	12:00	-	-	-	-	-	-	-	-	0.81	-	-	-	-	14.30	-	-	-	-	15.11	-	-3.8
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	1.12B	-	-	-	-	11.70B	-	-	-	-	12.82B	-	-
T23-EZ8	Thu-9/21	13:15	-	-	-	-	-	-	-	-	0.86	-	-	-	-	13.42	-	-	-	-	14.28	-	-11.4
T23-EZ8	Thu-9/21	14:30	-	-	-	-	-	-	-	-	0.92	-	-	-	-	13.30	-	-	-	-	14.22	-	-10.9

*C-CBM's operating incorrectly, data from 9/7. B=Baseline. Boldfaced zeros indicate mercury values below low standard. A=Acetate, H=Hydroxide, PH=Phosphate, Tris=Tris Buffer

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

Test ID	Date	Start Time	Other Imp.	Other					H ₂ O ₂					KMnO ₄					Total Vapor				
				Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Removal
				(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(µg/Nm ³)	(%)
Silver Amalgam (Inc. Contact)																							
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	0.93B	-	-	-	-	13.83B	-	-	-	-	14.75B	-	-
T23-EZ9	Fri-9/22	07:30	-	-	-	-	-	-	-	-	0.80	-	-	-	-	13.52	-	-	-	-	14.32	-	3.0
T23-EZ9	Fri-9/22	09:00	-	-	-	-	-	-	-	-	1.03	-	-	-	-	13.65	-	-	-	-	14.68	-	0.5
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	1.08B	-	-	-	-	12.86B	-	-	-	-	13.93B	-	-
T23-EZ9	Fri-9/22	10:30	-	-	-	-	-	-	-	-	1.16	-	-	-	-	13.11	-	-	-	-	14.27	-	-2.4
Iron Amalgam (Inc. Contact)																							
T23-EZ10	Fri-9/22	12:00	-	-	-	-	-	-	-	-	0.89	-	-	-	-	12.74	-	-	-	-	13.62	-	2.2
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	0.95B	-	-	-	-	13.08B	-	-	-	-	14.02B	-	-
T23-EZ10	Fri-9/22	13:15	-	-	-	-	-	-	-	-	1.08	-	-	-	-	12.76	-	-	-	-	13.84	-	1.3
T23-EZ10	Fri-9/22	14:30	-	-	-	-	-	-	-	-	1.27	-	-	-	-	12.71	-	-	-	-	13.98	-	0.3
Gold Amalgam (Inc. Contact)																							
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	15.33B	-	-	-	-	7.36B	-	-	-	-	22.70B	-	-	-
T23-EY2	Tue-9/26	08:00	-	-	-	-	-	-	-	17.90	-	-	-	-	5.03	-	-	-	-	22.94	-	-	-1.1
T23-EY2	Tue-9/26	09:30	-	-	-	-	-	-	-	18.42	-	-	-	-	4.28	-	-	-	-	22.70	-	-	0.0
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	13.11B	-	-	-	-	6.17B	-	-	-	-	19.28B	-	-	-
T23-EY2	Tue-9/26	11:00	-	-	-	-	-	-	-	17.43	-	-	-	-	3.84	-	-	-	-	21.27	-	-	-10.3
Copper Amalgam (Inc. Contact)																							
T23-EY3	Tue-9/26	12:00	-	-	-	-	-	-	-	9.89	-	-	-	-	12.05	-	-	-	-	21.94	-	-	-13.8
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	18.07B	-	-	-	-	5.87B	-	-	-	-	23.93B	-	-	-
T23-EY3	Tue-9/26	13:30	-	-	-	-	-	-	-	13.87	-	-	-	-	7.42	-	-	-	-	21.29	-	-	11.0
T23-EY3	Tue-9/26	15:00	-	-	-	-	-	-	-	14.72	-	-	-	-	6.93	-	-	-	-	21.64	-	-	9.6
Silver Amalgam (Inc. Contact)																							
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	15.09B	-	-	-	-	6.89B	-	-	-	-	21.98B	-	-	-
T23-EY4	Wed-9/27	08:00	-	-	-	-	-	-	-	10.54	-	-	-	-	12.46	-	-	-	-	23.00	-	-	-4.7
T23-EY4	Wed-9/27	09:30	-	-	-	-	-	-	-	11.17	-	-	-	-	11.19	-	-	-	-	22.36	-	-	-1.8
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	13.03B	-	-	-	-	5.50B	-	-	-	-	18.53B	-	-	-
T23-EY4	Wed-9/27	11:00	-	-	-	-	-	-	-	11.75	-	-	-	-	11.73	-	-	-	-	23.48	-	-	-26.7
Aluminum Amalgam (Inc. Contact)																							
T23-EY5	Wed-9/27	12:00	-	-	-	-	-	-	-	13.11	-	-	-	-	10.03	-	-	-	-	23.14	-	-	-24.9
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	15.05B	-	-	-	-	6.67B	-	-	-	-	21.72B	-	-	-
T23-EY5	Wed-9/27	13:30	-	-	-	-	-	-	-	14.66	-	-	-	-	7.50	-	-	-	-	22.16	-	-	-2.0
T23-EY5	Wed-9/27	15:00	-	-	-	-	-	-	-	13.35	-	-	-	-	6.78	-	-	-	-	20.13	-	-	7.3

*C=CEM's opening is incorrectly, data from 9/7, B=Baseline. Italicized areas indicate mercury values below low standard. A=Acetate, H=Hydroxide, PH=Phosphate, Tris=Tris Buffer

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

				Other					H2O2					KMnO4					Total Vapor					
Test ID	Date	Start Time	Other Imp. Cont.	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Hg Spiked	Hg Removal	Pre-Spike Inlet	Post-Spike Inlet	Outlet [Hg]	Total Hg Spiked	Hg Removal	
				(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)	(µg/Nm3)	(µg/Nm3)
Carbon-I2, 2000:1																								
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	14.74B	-	-	-	-	7.64B	-	-	-	-	22.38B	-	-	-	-
T23-EY6	Thu-9/28	08:00	-	-	-	-	-	-	-	18.45	-	-	-	-	0.36	-	-	-	-	18.81	-	-	-	15.9
T23-EY6	Thu-9/28	09:30	-	-	-	-	-	-	-	16.68	-	-	-	-	6.24	-	-	-	-	22.92	-	-	-	-2.4
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	15.69B	-	-	-	-	6.99B	-	-	-	-	22.68B	-	-	-	-
T23-EY6	Thu-9/28	11:00	-	-	-	-	-	-	-	18.42	-	-	-	-	5.12	-	-	-	-	23.54	-	-	-	-3.8
Carbon-I2 10,000:1																								
T23-EY7	Thu-9/28	12:00	-	-	-	-	-	-	-	17.46	-	-	-	-	0.02	-	-	-	-	17.48	-	-	-	23.0
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	9.42B	-	-	-	-	3.03B	-	-	-	-	12.45B	-	-	-	-
T23-EY7	Thu-9/28	13:30	-	-	-	-	-	-	-	22.88	-	-	-	-	1.01	-	-	-	-	23.89	-	-	-	-6.0
T23-EY7	Thu-9/28	15:00	-	-	-	-	-	-	-	22.28	-	-	-	-	1.43	-	-	-	-	23.71	-	-	-	-5.2
Carbon-Cl, 2000:1																								
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	13.39B	-	-	-	-	7.01B	-	-	-	-	20.40B	-	-	-	-
T23-EY8	Fri-9/29	08:00	-	-	-	-	-	-	-	14.66	-	-	-	-	4.91	-	-	-	-	19.57	-	-	-	4.0
T23-EY8	Fri-9/29	09:30	-	-	-	-	-	-	-	18.22	-	-	-	-	4.05	-	-	-	-	22.27	-	-	-	-9.2
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	17.09B	-	-	-	-	7.85B	-	-	-	-	24.94B	-	-	-	-
T23-EY8	Fri-9/29	11:00	-	-	-	-	-	-	-	18.13	-	-	-	-	3.11	-	-	-	-	21.24	-	-	-	14.9
Carbon-Cl 10,000:1																								
T23-EY9	Fri-9/29	12:00	-	-	-	-	-	-	-	12.36	-	-	-	-	3.33	-	-	-	-	15.69	-	-	-	37.1
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	15.24B	-	-	-	-	6.26B	-	-	-	-	21.50B	-	-	-	-
T23-EY9	Fri-9/29	13:30	-	-	-	-	-	-	-	18.70	-	-	-	-	2.43	-	-	-	-	21.13	-	-	-	1.7
T23-EY9	Fri-9/29	15:00	-	-	-	-	-	-	-	20.00	-	-	-	-	2.21	-	-	-	-	22.22	-	-	-	-3.4

*C-CEM's opening incorrectly, data from 9/7. B=Baseline. Re-Etched areas indicate mercury values below low standard. A=Acetate. H=Hydroxide. PH=Phosphate. Tris=Tris Buffer

		Spike Recovery					Spike Capture (By Impinger)					Spiked Mercury Removal Efficiency (By Impinger)					Total Hg Capture (CRG) (By Impinger)					Total Hg Capture (WS Inlet) (By Impinger)					Total Hg Capture (WS Outlet) (By Impinger)				
Test ID	Date	Start Time	Other Imp. Cont.	Actual Spiked (ug/Nm3)	Spiked Theo Hg (ug/Nm3)	Percent Spike Rec. (%)	Other [Hg] (%)	Other [Hg] (%)	H2O2 [Hg] (%)	H2O2 [Hg] (%)	KMnO4 [Hg] (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	
Mg/Lime IO, baseline																															
T22-N	Wed-9/6	08:00	-	0.31	-	-	-	-	-	-	-	-	-	-	-	-	-	86.2	8.8	5.0	-	-	91.1	6.8	2.1	-	-	41.9	14.5	43.6	
T22-N	Wed-9/6	10:00	-	0.62	-	-	-	-	-	-	-	-	-	-	-	-	-	87.5	8.6	3.9	-	-	89.4	8.4	2.2	-	-	49.6	15.2	35.2	
T22-N	Wed-9/6	11:30	-	0.51	-	-	-	-	-	-	-	-	-	-	-	-	-	85.7	10.0	4.3	-	-	91.1	6.6	2.2	-	-	46.4	17.1	36.5	
Averages																		86.5	9.1	4.4			90.6	7.3	2.2			46.0	15.6	38.4	
Mg/Lime IO, Hg spk																															
T22-E	Thu-9/7	08:00	-	12.37	12.60	98.2	-	-	34.6	12.3	53.1	-	-	34.6	18.8	-	-	87.8	7.3	4.9	-	-	48.4	11.0	40.6	-	-	12.7	4.8	82.5	
T22-E	Thu-9/7	09:30	-	11.66	12.60	92.5	-	-	33.1	12.1	56.1	-	-	32.7	17.7	-	-	88.0	8.1	3.9	-	-	47.2	10.9	41.9	-	-	14.2	4.4	81.4	
T22-E	Thu-9/7	11:00	-	11.06	12.60	87.7	-	-	33.0	11.4	59.5	-	-	31.8	16.1	-	-	91.0	6.3	2.7	-	-	46.3	9.8	43.8	-	-	15.8	5.5	78.7	
Averages						92.8			33.6	11.9	56.2							88.9	7.3	3.8			47.3	10.6	42.1			14.2	4.9	80.9	
Mg/Lime IO, Hg+HgCl2 spk																															
T22-EC	Fri-9/8	08:00	-	23.38	25.50	91.7	-	-	60.6	11.4	28.0	-	-	60.6	29.0	-	-	86.6	8.8	4.6	-	-	64.1	11.1	24.8	-	-	15.4	6.1	78.6	
T22-EC	Fri-9/8	10:00	-	23.85	25.50	93.5	-	-	63.1	11.3	26.9	-	-	62.4	29.5	-	-	83.3	12.7	4.0	-	-	64.9	11.3	23.8	-	-	16.7	8.1	75.2	
T22-EC	Fri-9/8	11:30	-	23.20	25.50	91.0	-	-	61.6	10.8	27.4	-	-	61.8	28.3	-	-	88.9	7.9	3.2	-	-	65.2	10.5	24.3	-	-	17.5	7.1	75.4	
Averages									61.8	11.2	27.4							86.3	9.8	3.9			64.7	11.0	24.3			16.5	7.1	76.4	
Tris Comp @ WS In																															
T23-EY1	Fri-9/15	08:00	H	13.61	12.60	108.0	28.0	16.9	12.4	8.1	34.6	28.0	23.5	22.4	18.9	86.5	8.2	2.7	1.9	0.7	37.7	15.4	10.8	7.1	29.0	-	-	-	-	-	
T23-EY1	Fri-9/15	08:00	Tris	13.14	12.60	104.3	2.8	0.3	1.7	1.8	93.4	2.8	0.3	1.7	1.9	-	-	-	-	-	17.0	1.6	1.9	1.9	77.6	-	-	-	-	-	
T23-EY1	Fri-9/15	09:30	H	12.94	12.60	102.7	26.1	17.3	14.4	9.4	32.8	26.1	23.4	25.5	22.3	-	-	-	-	-	36.5	15.7	12.4	8.1	27.2	-	-	-	-	-	
T23-EY1	Fri-9/15	09:30	Tris	12.22	12.60	97.0	2.1	-0.2	2.0	0.9	95.2	2.1	-0.2	2.1	0.9	-	-	-	-	-	17.4	1.3	2.2	1.1	78.1	-	-	-	-	-	
T23-EY1	Fri-9/15	11:30	H	12.78	12.60	101.4	30.5	17.7	12.2	7.9	31.7	30.5	25.4	23.6	20.0	-	-	-	-	-	40.3	16.0	10.6	6.9	26.3	-	-	-	-	-	
T23-EY1	Fri-9/15	11:30	Tris	12.65	12.60	100.4	0.2	0.2	1.2	1.5	97.0	0.2	0.2	1.2	1.5	-	-	-	-	-	15.3	1.6	1.5	1.6	80.1	-	-	-	-	-	
Averages																															
Gold Amalgamation Test																															
T23-EZ1	Mon-9/18	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	2.3	95.4	
T23-EZ1	Mon-9/18	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.8	2.9	83.3	
T23-EZ1	Mon-9/18	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.8	4.9	71.3	
T23-EZ1	Mon-9/18	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.0	6.2	87.7	
T23-EZ1	Mon-9/18	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.0	5.5	65.5	
Copper Amalgamation Test																															
T23-EZ2	Mon-9/18	13:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	1.9	92.3	
T23-EZ2	Mon-9/18	15:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	9.8	85.0	
T23-EZ2	Mon-9/18	15:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.4	6.2	83.4	
T23-EZ2	Mon-9/18	16:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.1	6.4	81.4	

*C-CEM's operating incorrectly, data from 9/7. B-Baseline. Italicized areas indicate mercury values below low standard. A-Acetate, H-Peroxide, PH-Phosphate, Tris-Tris Buffer

Test ID		Date	Start Time	Other Imp. Cont.	Spike Recovery			Spike Capture (By Impinger)					Spiked Mercury Removal Efficiency (By Impinger)					Total Hg Capture (CRG) (By Impinger)					Total Hg Capture (WS Inlet) (By Impinger)					Total Hg Capture (WS Outlet) (By Impinger)				
					Actual Spiked (µg/Nm3)	Spiked Theo Hg (µg/Nm3)	Percent Spike Rec (%)	Other [Hg] (%)	Other [Hg] (%)	H2O2 [Hg] (%)	H2O2 [Hg] (%)	KMnO4 [Hg] (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	
Aluminum Amalgamation Test																																
T23-EZ3	Tue-9/19	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.4	5.2	88.4		
T23-EZ3	Tue-9/19	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.4	6.5	82.1		
T23-EZ3	Tue-9/19	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.5	7.6	80.0		
T23-EZ3	Tue-9/19	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	7.8	84.5		
T23-EZ3	Tue-9/19	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.9	6.1	78.0		
Sulfur (5gms) Test																																
T23-EZ4	Tue-9/19	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.7	3.1	87.2		
T23-EZ4	Tue-9/19	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.6	6.8	85.6		
T23-EZ4	Tue-9/19	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.9	3.8	86.4		
T23-EZ4	Tue-9/19	14:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.6	4.4	83.0		
Silver Amalgamation Test																																
T23-EZ5	Wed-9/20	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	4.7	93.5		
T23-EZ5	Wed-9/20	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.3	2.9	87.8		
T23-EZ5	Wed-9/20	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.6	1.0	92.3		
T23-EZ5	Wed-9/20	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9	3.7	92.4		
T23-EZ5	Wed-9/20	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	1.3	91.4		
Zinc Amalgamation Test																																
T23-EZ6	Wed-9/20	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	1.4	94.4		
T23-EZ6	Wed-9/20	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	3.4	92.9		
T23-EZ6	Wed-9/20	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4	2.6	92.1		
T23-EZ6	Wed-9/20	14:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	2.4	92.6		
Gold Amalgam (Inc. Contact)																																
T23-EZ7	Thu-9/21	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	3.7	93.0		
T23-EZ7	Thu-9/21	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.5	2.0	54.5		
T23-EZ7	Thu-9/21	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45.8	2.5	51.6		
T23-EZ7	Thu-9/21	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7	1.8	93.5		
T23-EZ7	Thu-9/21	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49.0	1.4	49.6		
Lead Amalgam (Inc. Contact)																																
T23-EZ8	Thu-9/21	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	0.9	94.7		
T23-EZ8	Thu-9/21	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	3.5	91.3		
T23-EZ8	Thu-9/21	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.6	1.4	94.0		
T23-EZ8	Thu-9/21	14:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7	1.8	93.5		

*C-CRM's operating incorrectly, data from 97. B=Baseline. Boldfaced areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

Test ID	Date	Start Time	Other Imp. Cont.	Spike Recovery			Spike Capture (By Impinger)					Spiked Mercury Removal Efficiency (By Impinger)					Total Hg Capture (CRG) (By Impinger)					Total Hg Capture (WS Inlet) (By Impinger)					Total Hg Capture (WS Outlet) (By Impinger)					
				Actual Spiked (µg/Nm3)	Spiked Theo Hg (µg/Nm3)	Percent Spike Rec (%)	Other [Hg] (%)	Other [Hg] (%)	H2O2 [Hg] (%)	H2O2 [Hg] (%)	KMnO4 [Hg] (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)	Other (%)	Other (%)	H2O2 (%)	H2O2 (%)	KMnO4 (%)		
Silver Amalgam (Inc. Contact)																																
T23-EZ9	Fri-9/22	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	2.5	93.7
T23-EZ9	Fri-9/22	07:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	1.7	94.4
T23-EZ9	Fri-9/22	09:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4	1.6	93.0
T23-EZ9	Fri-9/22	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	4.1	92.3
T23-EZ9	Fri-9/22	10:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.0	1.1	91.9
Iron Amalgam (Inc. Contact)																																
T23-EZ10	Fri-9/22	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.3	1.2	93.5
T23-EZ10	Fri-9/22	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	1.7	93.3
T23-EZ10	Fri-9/22	13:15	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.8	2.0	92.2
T23-EZ10	Fri-9/22	14:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	2.4	90.9
Gold Amalgam (Inc. Contact)																																
T23-EY2	Tue-9/26	08:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51.2	16.4	32.4	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	08:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.4	10.7	21.9	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	09:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	69.0	12.1	18.8	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	11:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51.3	16.7	32.0	-	-	-	-	-	-	-
T23-EY2	Tue-9/26	11:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71.4	10.5	18.0	-	-	-	-	-	-	-
Copper Amalgam (Inc. Contact)																																
T23-EY3	Tue-9/26	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.9	6.2	54.9	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	13:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62.9	12.5	24.5	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	13:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55.0	10.2	34.8	-	-	-	-	-	-	-
T23-EY3	Tue-9/26	15:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.9	11.1	32.0	-	-	-	-	-	-	-
Silver Amalgam (Inc. Contact)																																
T23-EY4	Wed-9/27	08:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54.9	13.7	31.3	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	08:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.4	10.4	54.2	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	09:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.3	11.6	50.0	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	11:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55.2	15.1	29.7	-	-	-	-	-	-	-
T23-EY4	Wed-9/27	11:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.3	11.7	50.0	-	-	-	-	-	-	-
Aluminum Amalgam (Inc. Contact)																																
T23-EY5	Wed-9/27	12:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.3	8.3	43.3	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	13:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.2	13.1	30.7	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	13:30	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56.1	10.0	33.8	-	-	-	-	-	-	-
T23-EY5	Wed-9/27	15:00	-	-	12.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55.4	10.9	33.7	-	-	-	-	-	-	-

*C-CEM's operating incorrectly, data from 9/7. B=Baseline. Bolded areas indicate mercury values below low standard. A=Acetate, H=Peroxide, PH=Phosphate, Tris=Tris Buffer

*C-CATS's operating incorrectly, data from 9/7. B=Baseline. Batched areas indicate accuracy values below low standard. A=Acetone. H=Hydroxide. PH=Phosphate. Tris=Tris Buffer.

APPENDIX D
QA/QC REPORT

ECTC Laboratory Quality Control/Quality Assurance

July - September 1995

During the second quarter of 1995, the ICAPES developed communication problems between the controlling computer and the unit. Typically the analysis can be performed with the unit, but occasionally the analyst has to restart the analytical procedure because of the software miscommunication. The manufacturer has been consulted and suggested that the power supplied to the unit be investigated for noise. We have conducted short investigations of the ICAPES computer power supply and the electrical power supplies to the ICAPES unit. Nothing appears abnormal at this time, but we need to conduct longer term tests and correlate them with the communications problems.

The Flow-Injection Mercury System (FIMS) has been operating reliably throughout the quarter. The computer used to control the FIMS unit had a hardware problem with the static RAM buffer. The static RAM chip does not fit properly in the socket. The manufacturer is aware of this problem in all of its units. The Perkin Elmer Company supplied us with an updated version of the flash BIOS system (Basic Input Output System). After installing that update, the FIMS unit has operated without any problems. Apparently the new BIOS has changed the timing on the computer motherboard to compensate for the inefficient link to the static RAM buffer.

The QA/QC data continue to be compiled, graphed, and submitted to the program manager in a quarterly memorandum. In general the QA/QC data indicate very good data quality. Those samples which fail the QA/QC criteria are typically rerun as necessary.

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FE-22/GTN
Washington, DC 20545
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Fax: (202) 353-4399

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

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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. Jonas S. Klingspor
ABB Environmental Systems
31 Inverness Center Parkway
Birmingham, AL 35243
Ph: (205) 995-5360
Fax: (205) 995-5364

Mr. Takayuki Ogawa
Electric Power Development Co., Ltd
6-15-1, Ginza, Chuo-ku
Tokyo 104 JAPAN
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