Electric Power
Research Institute

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**SUBJECT: TRANSMITTAL OF THE EPRI/ ECTC MONTHLY REPORT -
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Dear JoAnn:

Enclosed is the June 1994 monthly Report to the Steering Committee.
A separate copy of the Executive Summary section of this report is attached
for your convenience. The July, August, and September reports will follow
within the next few weeks.

Sincerely,

Gerry B. Maybach
ECTC Engineering Specialist
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Enclosure

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Monthly
June

ELECTRIC POWER RESEARCH INSTITUTE

ENVIRONMENTAL CONTROL TECHNOLOGY CENTER

REPORT TO THE STEERING COMMITTEE

June 1994

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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 FGD unit continued this month with High Velocity Scrubbing and the Tampa Electric Company (TECo) Tailored Collaboration test block. Additionally, phase II of the Toxics Removal/Carbon Injection test block was conducted concurrently with FGD testing.

At the beginning of the month, a second phase of third-party testing began for Suncor, Inc. The Suncor Gypsum Sample Collection test block (MSUN) began on June 5 on the 0.4 MW Mini-Pilot Wet FGD unit. Testing was completed on June 13.

On the Cold-Side Selective Catalytic Reduction (SCR) unit, testing continued this month as ammonia slip measurements were conducted under low catalyst inlet temperatures and at baseline conditions.

Pilot and Mini-Pilot Testing Highlights

Pilot

Five Pilot High Velocity (PHV) tests were completed on the ECTC's 4.0 MW Pilot system in June. Figure 1 shows the PHV process configuration. All of the tests in June were performed using the Koch type mist eliminator (denoted with a "B" in the test ID). Note that tests performed using the Munters type mist eliminator are denoted with an "A" in the test ID. Tests PHV-B6, -B4, -B2, -B3, and -B1 were performed at baseline chemistry conditions which include:

- 140 mM Ca^{++} ;
- 85 mM Mg^{++} ;
- 5.8 slurry pH;
- 2000 ppm inlet SO_2 ; and
- Forced oxidation.

The PHV tests were completed during the first two weeks of June. The objective of these tests was to continue to investigate the effects of gas and liquid rate on SO_2 removal and mist eliminator performance using the baseline slurry nozzles.

Testing during the latter half of the month was dedicated to the Tampa Electric Company Packing test block (TECo). A total of 87 tests were completed during the TECo test block. These tests investigated the effects of two different types of packing on SO_2 removal and pressure drop at three liquid rates and four gas rates under both baseline and gas-film limited (high DBA) conditions.

Mini-Pilot

At the beginning of the month, a second phase of third-party testing began for Suncor, Inc. The Suncor Gypsum Sample Collection test block (MSUN) began on June 5 on the 0.4 MW Mini-Pilot FGD unit and was completed on June 13. These tests involved the preparation of Suncor limestone for on-site solids dewatering equipment and flocculant testing by various vendors, and the collection of the FGD slurry/solids for shipment and analysis by others. The operational parameters for the Mini Pilot Wet Scrubber included: gas flow at 750 scfm; 3000 ppm inlet SO₂; recycle slurry flows of 60 gpm; and an absorber inlet temperature of 310°F. A report detailing this phase of Suncor testing will be included in the monthly progress report as the data analysis is completed.

SECTION I FACILITY STATUS

GENERAL

The NYSEG Kintigh Station provided flue gas to the ECT Center 99% of the time during this performance period. The brief outage period this month was caused by a Master Fuel trip at the Station on June 21. As the Kintigh Station operated with a variety of coals, fluctuations in the Center's inlet SO₂ concentrations were experienced.

Safety training for the month was conducted by the Operations Supervisor, Maintenance Supervisor and the Shift Supervisors. "Hand Tool Safety" was the topic of the month. Inspections were completed on the Facility air-packs, fire extinguishers, and other safety equipment to insure there were no deficiencies in the equipment.

There were no injuries or close call reports filed for the month of June. By continuing to emphasize safe work habits at the Center, we have raised the total number of days without a lost time injury to 756 as of 6/30/94.

The monthly safety meeting with the NYSEG Kintigh Station was held on June 3 to discuss various shared safety responsibilities, operations, and future activities. The major topics of discussion for this meeting included a review of the ECTC lockout/tagout program and an update on the Haz-Mat responder training course scheduled for this year.

PILOT WET FGD SYSTEM

The equivalent and actual availabilities for the ECTC Pilot FGD System testing were both 81% during this period. The Pilot FGD System did not operate during the following periods:

- June 6 - 7 for 27 hours due to the installation of ports and dampers.
- June 13 - 15 for 57 hours due to packing installation and a test change.
- June 17 for 9 hours due to the change-out of recirculation nozzles.
- June 20 for 2 hours due to a packing inspection.
- June 21 for 4 hours due to a packing change-out.
- June 21 for 2 hours due to a NYSEG boiler trip.
- June 22 for 7 hours due to a packing change-out.
- June 23 for 6 hours due to a packing change-out.
- June 24 for 4 hours due to a packing change-out.
- June 27 for 4 hours due to a packing change-out.
- June 28 for 9 hours due to a packing change-out.
- June 29 for 8 hours due to a packing change-out.

The High Velocity Test block continued this month with the completion of tests PHV-B6; PHV-B4; PHV-B3; and PHV-B2. These tests were performed with a Koch two-stage VME (flexichevron style XIII-2-2.5 (317L) in the lower section and flexichevron style XII-2-1.5 (317LMN) in the upper section) and with various gas flows and recycle slurry rates. The operational parameters for the Pilot Wet Scrubber during this testing included: gas flows of 9800-13,000 scfm; 2000 ppm inlet SO₂; recycle slurry flows of 1400 and 1700 gpm; and an absorber inlet temperature of 315°F.

The TECo Tailored Collaboration test block was completed this month; absorber modifications were necessary during this testing to accommodate two unique packing materials (PolyPac and Noell packing) in the following tests: TECO-1X through TECO-4X; TECO-1 through TECO-36; TECO-1M through TECO-4M; TECO 1L through TECO-4L; TECO-17L through TECO-20L; TECO-1LR through TECO-4LR and TECO-1R; TECO-2R; TECO-18R; TECO-2RR; TECO-18LR; and TECO-18MR. Throughout the test block, two different spray nozzles styles (Bete series NC Whirl nozzles and STXP Spiral nozzles) were used for slurry flow through the packing. Additionally, in the following test series, Adipic acid was used to enhance the system performance: tests TECO-17 through TECO-20; TECO-17L through TECO-20L; TECO 29L through TECO-36L; TECO-17M through TECO-20M; TECO-29M through TECO-36M; TECO-18MR; TECO-18LR; and TECO-34LR. The operational parameters for the Pilot Wet Scrubber during this testing included: gas flows of 8000-14,000 scfm; 2000 ppm inlet SO₂; recycle slurry flows of 430, 540, and 650 gpm; and an absorber inlet temperature of 315°F. The Koch VME was installed in the Pilot unit during this test block. Additionally, the On-line Chemistry Monitor (OLCM) was utilized extensively to gather the key FGD chemistry process data needed before each subsequent test could begin.

As part of the TECo test block, daily packing adjustments and nozzle changes were required to meet the desired internal configuration in the Pilot and the selected packing thicknesses. The removal and installation of these materials was very labor intensive and resulted in the numerous outage periods indicated above.

In addition to the TECo and High Velocity test blocks, the following Toxics Removal/Carbon Injection tests were completed across the PJFF unit this month: tests CIP-B; CIP-10; CIP-BH; and CIP-3H. These tests were completed at baseline conditions (no carbon injection) and at a carbon injection rate of 10,000 lbs. carbon/lb. of Hg. The operational parameters for the carbon injection tests included: gas temperatures of 225°F (conducted with limestone slurry atomization) and 325°F, and a gas flow rate of 4000 scfm.

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

- The SDA inlet gas heater was inspected; estimates were prepared for future repairs.
- The SDA and the PJFF equipment were prepared and energized for service in the Toxics tests.
- Scheduled maintenance was performed on the centrifuge.
- The WDPF graphics were updated to reflect the different test configurations.
- A 7' spool piece was removed from the absorber; two 3.5' spools were modified and installed in its place for accessibility and installation of the packing material.
- The hose was replaced in the centrifuge feed pump 14.
- All scheduled packing changes and system reconfigurations were completed.
- The spindle was replaced in the atomizer.
- Several leaks in the PJFF blanking plate seals were repaired.
- The Pilot absorber pH probe was replaced.
- The switching valves in the Pilot inlet CEM cabinet #5 were replaced.
- Scheduled maintenance was completed on the inlet flue gas heater.

MINI-PILOT WET FGD SYSTEM

At the beginning of the month, a second phase of third-party testing began for Suncor, Inc. The Suncor Gypsum Sample Collection test block (MSUN) began on June 5 on the 0.4 MW Mini-Pilot FGD unit and was completed on June 13.

These tests involved the preparation of Suncor limestone for on-site solids dewatering equipment and flocculant testing by various vendors, and the collection of the FGD slurry/solids for shipment and analysis by others. The operational parameters for the Mini Pilot Wet Scrubber included: gas flow at 750 scfm; 3000 ppm inlet SO₂; recycle slurry flows of 60 gpm; and an absorber inlet temperature of 310°F. The mini-pilot system was purged and flushed at the completion of this testing. The equipment was prepared for repair and for long term storage as well.

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

- A new tray was fabricated and installed in the absorber.
- The installation, operation, removal, packaging, and shipment of various vendor test equipment (including two filter presses and a pilot-scale centrifuge with related pumps, motors, piping, and controls) was completed.
- The collection, storage, labeling, and shipment of numerous FGD slurry/solid samples was completed.

COLD-SIDE SELECTIVE CATALYTIC REDUCTION SYSTEM (SCR)

The equivalent and actual availabilities for the ECTC SCR System testing were 100% and 96% respectively during this period. The SCR System did not operate during the following periods:

- June 21- 22 for 29 hours due to a NYSEG boiler trip and restart of the unit.

Testing continued this month on the SCR unit at baseline conditions, and at low catalyst inlet temperatures, as several ammonia slip measurements were conducted. Upon completion of the low temperature tests, the unit was brought back to baseline temperature conditions; this appeared to halt a drop in catalyst activity seen at the lower temperatures. As the unit operated at the higher temperatures, the catalyst activity came back to the previous baseline levels. The operational parameters for the SCR unit included: gas flow rate of 2000 scfm; catalyst inlet temperatures of 550-650°F; inlet NH₃ pressures of 50 psi; and NH₃/NO_x ratios of 0.7 to 1.0.

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

- All safety equipment was inspected.
- A portable eyewash station was installed in the trailer.
- The NH₃ flow orifice was calibrated.
- An O₂ cell was replaced in analyzer #2.
- The spare vacuum and sample pumps were inspected; scheduled maintenance was completed.

MISCELLANEOUS

Ball mill operation was normal this month during the preparation of limestone reagent. The grind prepared for ECTC operations was 90% passing 325 mesh screen. Additionally, a truckload of reagent from Suncor, Inc. was received and processed to their test specifications (95% passing 200 mesh screen). A new seal was installed in the Hydrocyclone feed pump used in the grinding circuit.

Work continued this month on the development of the On-Line Chemistry Monitor (OLCM) prototype. During the TECO test block, the OLCM was utilized on a continuous basis to gather the key FGD chemistry process data (slurry carbonate for limestone loading/limestone utilization determinations) needed before each subsequent test could begin. Current plans anticipate continued development of the OLCM prototype through full-scale utility testing.

In the full-scale demonstration test program, the Outokumpu Mintec particle size indicator (PSI-200) has been moved from PSI Energy's Gibson Station to the Hoosier Energy Merom Station, the last scheduled utility demonstration site. The testing at

the Merom Station is planned to last a few weeks. Following this utility test, the PSI unit will be returned to the Gibson Station for extended testing.

Preparations continued this month for the configuration of the PJFF into the gas path for phase II and III of the Toxics Removal/Carbon Injection test block. The activities involved with this work included: the installation of new bags, cages, blanking plates, and dampers for various gas flow configurations.

The following general plant maintenance activities were completed this month:

- The monthly inspection of all safety equipment was completed.
- Vibration surveys were taken on all booster fans.
- The OLCM prototype unit continued operation this month as a sample pump was replaced in one of the analyzers.
- Preparations were completed for the Toxics Removal/Carbon Injection test block.
- An MBC board in the WDPF calculator was replaced.
- The bearings and oil seal in the waste silo fluidizing blower were replaced.

FINANCIAL REPORT

The Financial Report for the four Operations and Maintenance contract tasks are summarized below for June 1994, the year to date, and for the contract total.

Table 1
Monthly Operating Costs by Task

	June	Year to Date	Contract Total
Task 100	\$ 109,500	\$ 603,047	\$ 11,898,655
Task 200	\$ 23,860	\$ 171,213	\$ 7,008,679
Task 200*	\$ 37,186	\$ 37,186	\$ 37,186
Task 300	\$ 6,889	\$ 22,340	\$ 1,033,487
Task 400	\$ 0	\$ 10,919	\$ 39,212
TOTAL	\$ 177,435	\$ 844,705	\$ 20,017,219

Task Definitions:

Task 100: Operation & Maintenance Labor

Task 200: Purchased Materials

Task 300: Engineering Support

Task 400: Training

Task 200*: Expenditures funded from third party testing revenues.

The attached graph illustrates the budgeted and actual expenses for ECTC O&M activities through June 1994.

Figure 1
1994 Operation & Maintenance Costs

SECTION II PILOT AND MINI-PILOT TEST ACTIVITY

PILOT

Summary of Operations

A total of 92 tests were completed on the pilot unit in June. The first 5 tests were part of the PHV test block; the final 87 were part of the TECo test block. The following sections describe the pertinent facility operations that occurred during June.

PHV Test Block

On May 30, pump 6 was energized to increase the liquid rate for test PHV-B6 (13,000 scfm, 1700 gpm). Reagent flow problems caused the SO₂ removal efficiency to fluctuate on both May 31 and June 1. The test was ended on June 2. Following PHV-B6, the gas rate was decreased to 11,300 scfm for test PHV-B4 while the slurry recirculation rate was kept at 1700 gpm. The test ran without incident and was ended on June 4 when the gas rate was further decreased for PHV-B2 (9800 scfm, 1700 gpm). Aside from a large pH probe adjustment on June 5, the test ran smoothly and was ended on June 6. Following this test, the unit was taken off-line to reconfigure the gas path for a series of carbon injection tests. (These tests were performed with the spray dryer absorber as part of a separate EPRI test program.)

The pilot was brought on-line on June 7 with PHV-B3 (11,300 scfm, 1300 gpm). On June 9, reagent addition was interrupted to clean the lines, resulting in a brief drop in pH. The test was ended on June 10 when the gas rate was decreased to 9800 scfm for PHV-B1. The test ran without incident until it was ended on June 13. Following this test, the pilot was taken off-line to reconfigure for the TECo test block.

TECo Test Block

While off-line, two feet of Poly packing were installed in the absorber as shown in Figure 3. The pilot remained off-line until June 16 when BETE type NCM40250M (low pressure Whirl) nozzles were installed. With gas flow off, slurry was recirculated through header #3 at the three liquid rates that would be used during the TECo test block. A visual inspection of the spray pattern from a manway above the header revealed incomplete coverage of the packing surface at liquid rates below 650 gpm. Four tests were completed through the night. The following morning, the Whirl nozzles were replaced with BETE type FST96XPN (low pressure spiral) nozzles for the remaining tests in the test block.

The first set of tests using the low-pressure spiral nozzles was completed on June 17. The ECTC's On-Line Chemical Monitoring (OLCM) system was used during the TECo test block to track the solid carbonate level (limestone utilization) in the

reaction tank. Although the monitor tracked well on June 17, the unit went down early in the morning on June 18 and was not repaired until the evening. On June 20, the operators began relying on the monitor to adjust the reagent feed rate and thereby maintain a constant limestone utilization in the reaction tank.

The pilot was taken off-line on June 21 to remove one foot of the Poly packing. Shortly after start-up, NYSEG had a master fuel trip, and the pilot remained off-line for about three more hours. On June 22, two feet of Noell packing were installed for the next series of tests. On June 23, one foot of the Noell packing was removed and then reinstalled on June 24 when adipic acid was added to the reaction tank for the gas-film limited tests.

On June 25, solid carbonate results from the lab revealed a difference of about 0.23 mmol/g carbonate between the actual result and the OLCM (apparently due to the addition of adipic acid). Consequently, the set-point for the operators to control the reagent feed was changed to account for this difference. On June 27, sporadic pressure drop values were noticed, and the test conditions over the weekend were repeated after blowing the pressure taps to obtain accurate pressure drop data.

One foot of the Noell packing was removed on June 27 and later replaced with one foot of Poly packing on June 28. A second foot of Poly packing was installed on June 29. A series of tests was conducted with two feet of Poly packing inside the absorber until July 1 when all packing was removed from the absorber. The majority of TECo packing tests was completed on July 3. The final four tests of the TECo test block were completed on July 11 when the BETE NCM40250M Whirl nozzles were once again installed without packing to obtain SO₂ removal and pressure drop data.

Summary of PHV Test Results

Test conditions and results for the PHV tests performed in June are summarized in Tables 2 and 3, respectively. Also included for comparison purposes are results for the parametric baseline nozzle tests (no DBA) performed in May. Please bear in mind that some of the calculated results in Table 3 are subject to change in subsequent progress reports as further review of raw test data and modifications to data reduction techniques continue throughout the test program. Test IDs which include the letter "A" used the Munters mist eliminator, while those with a "B" used the Koch mist eliminator. The baseline pilot absorber nozzles (Bete FST88XPN) have been used in all tests completed to date. Future tests will repeat the parametric test conditions with different types of nozzles.

The objectives of the PHV tests are to collect SO₂ removal and mist eliminator carryover data as a function of flue gas velocity, liquid flow rate, nozzle type, and VME type at both baseline and gas-film limited (high DBA) slurry chemistry conditions. The methods currently used to measure VME carryover rate along with details of the PHV process configuration (Fig. 2) were described in the April monthly

progress report. SO_2 removal results and VME carryover results for the tests listed in Tables 2 and 3 are discussed in the following subsections. Complete analytical data tables and process data summary reports for the tests completed in June are appended to this report.

SO_2 Removal Efficiency

SO_2 removal results, expressed as the number of transfer units (NTU), are shown as a function of absorber gas velocity in Figure 4. Note that these results are for tests performed with both the Munters and Koch VMEs. Based on the data collected to date, there appears to be no noticeable difference in SO_2 removal efficiency in tests run at the same conditions but with different VMEs. (Recall that early in this test program attempts to install a CEM probe immediately below the mist eliminator to measure removal across the MEs were unsuccessful.)

The baseline removal results show the same general trend discussed in previous progress reports, i.e., at gas velocities above about 11 fps and constant liquid rate, SO_2 removal essentially stabilized, in spite of the decreasing L/G. One obvious discrepancy in the results is that the removal efficiency for PHV-B1 was nearly 4 percentage points lower than in PHV-A1 at the same gas and liquid rates (9800 scfm, 1300 gpm). The difference in SO_2 removal efficiency between the two tests may be due to small differences in limestone loading. The limestone utilization was nearly 96% during PHV-B1 compared to 93% at the end of PHV-A1 and PHV-A1N. While this 3% change in limestone utilization may seem insignificant, the actual limestone loading (g/L solid carbonate) can more than double when utilization decreases from 96% to 93%. Repeat tests are currently planned to confirm the validity of this result. Note that the discrepancy in the results between PHV-A8 and PHV-B8 was discussed in last month's progress report.

Figures 5 and 6 illustrate the effect of flue gas velocity on SO_2 removal efficiency at constant L/G. Figure 5 shows that at both 96 gal/macf and 111 gal/macf, the SO_2 removal efficiency increased with increasing gas velocity. This result would be expected, as the higher turbulence in the absorber caused by the higher gas velocity should increase the gas-liquid contact area, thus, improving SO_2 removal. In both cases, the SO_2 pickup rate increased by approximately 10%, from 4.0 mmol SO_2 /L slurry to 4.4 mmol/L at 111 gal/macf and from 4.6 mmol/L to 5.1 at 96 gal/macf, between the lower and higher gas velocities.

Figure 6 shows the NTU as a function of L/G for tests run at four gas velocities. Once again, this figure illustrates the ability to achieve the same removal efficiency at lower L/G as the gas velocity is increased.

VME Carryover Measurements

As discussed in previous progress reports, two types of VME carryover measurements are made. Both methods assume that all of the VME carryover is collected in the drain from the HME which is approximately 30 feet downstream of the VME outlet (10 vertical feet and 20 horizontal feet). The first method involves taking back-to-back, one-minute, manual measurements over a specified time period (usually 30 min.) using a graduated cylinder and a stopwatch. The other method involves continuously collecting carryover in a 50-gal. tank and recording the tank level once per hour. In both cases, the average total flow rate from the HME is "corrected" for condensation in the intervening ductwork to come up with the "direct" and "tank level" carryover rates reported in Table 3. This is done by multiplying the total flow rate by the average of the ratios of the Mg^{++} and Na^+ concentrations in the carryover to the Mg^{++} and Na^+ concentrations in the reaction tank. Note that this correction factor assumes no significant contribution to carryover from the VME washes. This is believed to be a valid assumption, because the washes only come on for 40 seconds every 30 minutes, and there is essentially no change in the one-minute manual measurements while the washes are on.

Figures 7a and 7b show the average corrected "tank level" and "direct" carryover rates as a function of VME velocity for all tests completed to date. Note that the volumetric carryover rates have been normalized by the VME face area (adjusted for ME supports). In general, the carryover values are in the range that would be expected (10^{-4} gpm/ft²) based on previous EPRI testing of the Munters VME at an air-water test facility. While there is considerable scatter in the data, a general downward trend is apparent as the gas velocity increased from 9 to about 14.5 fps. This trend is consistent with penetration of mist through the VMEs (droplets smaller than 30 to 40 microns, which are not efficiently removed by the VME) as the primary cause of the measured carryover; chevron VMEs become more efficient at collecting smaller droplets as the gas velocity increases. The tests at the highest velocity (about 17 fps) show that the carryover starts to increase slightly. This is also consistent with past testing of the Munters VME where carryover due to re-entrainment (stripping off of mist that has been removed by the chevrons) was observed to begin in the range of 16 to 17 fps, depending on the inlet mist loading.

Both carryover measurement methods appear to indicate that the Munters type mist eliminator is slightly more efficient, although there is significant scatter in the data. The most important conclusion from these test results is that both mist eliminators perform at or below an acceptable level of carryover. (The "acceptable level" used in this test program is 0.0005 gpm/ft²; based on some general assumptions, this level is about half of the NSPS particulate emissions requirement.)

Summary of TECo Packing Test Results

Background

In response to the Clean Air Act Amendments of 1990, Tampa Electric Company (TECo) is considering treating the flue gas from the uncontrolled Big Bend Unit 3 boiler using the existing Big Bend Unit 4 FGD system. To evaluate the feasibility of this compliance option, Tampa Electric initiated a "Tailored Collaboration" (TC) project funded in part by EPRI. Part of Phase I of the TC project involved evaluating alternative packing designs for their absorbers. The objective of the evaluation was to identify a design that would be less susceptible to scaling and pluggage but still provide acceptable SO₂ removal performance. To help accomplish this objective, a short test program of two alternative packing designs was conducted on the 4.0 MW Pilot system at the ECTC.

Absorber Configuration

The pilot absorber configuration during the TECo packing test program is shown in Figure 3. During tests with only one foot of packing, the lower section of packing was removed to maintain a constant spray zone distance above the packing. Two types of packing were tested, Poly and Noell. The Poly packing has a reported surface area of 42.4 ft²/ft³ while the Noell packing has a surface area of 18 ft²/ft³.

For all tests, only header #3 was used to deliver slurry to the packing. This header is equipped with four spray nozzles. The nozzles are angled slightly toward the center of the absorber to provide maximum coverage of the packing. Two types of nozzles were tested. The majority of the tests were conducted with Bete FST96XPN nozzles. These nozzles are rated for 165 gpm at approximately 8 psi and produce a Sauter mean droplet diameter of approximately 1915 microns. A small number of tests were also conducted with flooding nozzles, Bete NCM40250M. These nozzles are rated for 165 gpm at 3 psi and produce a Sauter mean droplet diameter of approximately 4500 microns.

Test Matrix and Conditions

The following test variables were evaluated during the packing test program:

- Packing design (Poly Manufacturing, Noell);
- Packing depth (2, 1, 0 ft);
- Absorber gas flow (8000, 9800, 11,800, 14,000 scfm);
- Absorber slurry flow (650, 540, 430 gpm); and
- Additive (DBA) concentration (0, 5000 ppm).

In addition, a limited number of tests were conducted with two different types of slurry nozzles, as discussed above. Operating conditions and chemistry parameters held constant during the tests are listed below:

- Inlet SO₂ concentration = 2000 ppm;
- Oxidation air sparge rate = 440 scfm;
- Limestone utilization = 90%;
- Slurry solids concentration = 12%;
- Dissolved chloride concentration = 350 mM (12,400 ppm);
- Dissolved magnesium concentration = 100 mM (2400 ppm); and
- Dissolved calcium concentration = 140 mM (5600 ppm).

A total of 87 tests were conducted over an 18-day period. The duration of each test was typically 3 to 6 hours with some tests conducted for longer periods. After changing tests conditions, adjustments to the limestone feed rate were made to maintain constant limestone utilization. An on-line slurry carbonate (limestone) analyzer provided real-time feedback for control of utilization. A minimum of two hours of stable SO₂ removal and pressure drop data were required for each test.

Discussion of Results

Table 4 summarizes the test conditions and results for all of the tests conducted during the TECo test program. The test program can be divided into two major groups: tests conducted under normal operating conditions with limestone providing the primary source of alkalinity in the absorber, and tests conducted with high concentrations of DBA additive to provide the primary source of alkalinity in the absorber. The former group provides an indication of performance in an FGD system operating at moderate to high inlet SO₂ levels without the use of any performance enhancing additives. The latter group provides an indication of the maximum performance achievable with the packing, as might be observed with the use of an additive such as DBA. While both groups of results are useful, the tests conducted with DBA more realistically reflect the true capability of the packing and are more similar to the anticipated operating conditions for the Big Bend Unit 4 scrubbers. Results for both types of tests are described separately below.

SO₂ Removal Results (no DBA).

The SO₂ removal performance of the Poly and Noell packings without DBA are illustrated in Figures 8 and 9. These figures show the number of transfer units (NTU) as a function of absorber gas velocity for tests conducted at a slurry loading of 33 gpm/ft². SO₂ removal efficiency ranged from 64 to 80% for the Poly packing and from 58 to 70% for the Noell packing with one or two feet of packing over the range of gas velocities tested.

The Poly packing results show that as gas velocity increased, SO₂ removal efficiency first decreased and then increased over the range of conditions tested. The minimum SO₂ removal occurred at a flue gas velocity of approximately 11 to 12 fps. For the Noell packing, SO₂ removal efficiency first decreased and then leveled off at approximately 14 fps. In contrast, for tests with no packing (spray only), the SO₂ removal decreased at a constant rate over the entire range of gas velocities tested. These results suggest that the packing may act to increase the holdup or residence time of the slurry in the absorber. Increased residence time would allow more limestone to dissolve in the absorber, thus increasing the SO₂ absorption capacity of the slurry.

The overall SO₂ removal results reported in Table 4 and shown in Figures 8 and 9 include the removal which occurs in the spray, packing, and rain contacting zones in the absorber. In order to determine the SO₂ removal attributable to the packing alone, it is necessary to compare the results of tests with two feet and one foot of packing. The differential SO₂ removal curves shown in Figures 8 and 9 represent the difference in NTU between these two sets of tests. These values are assumed to correspond to the SO₂ removal occurring across each foot of packing. As shown, SO₂ removal ranges from approximately 0.15 to 0.45 NTU per foot of Poly packing and from 0.05 to 0.15 NTU per foot of Noell packing and generally increases at higher absorber gas velocities. The observed increase in NTU may be attributable to increased slurry holdup on the packing as a function of gas velocity as discussed above.

The results in Figures 8 and 9 are for a packing slurry loading of 33 gpm/ft². Poly packing tests were also conducted at lower slurry loadings of 27.5 and 22 gpm/ft². (Tests with variable slurry loading without DBA were not conducted using the Noell packing.) Figure 10 shows how slurry loading affected SO₂ removal for operation with two feet of Poly packing. Unlike operation at the highest slurry loading, there was little to no increase in SO₂ removal at the lower slurry loadings when the absorber gas velocity was increased from 12 to 14 fps. This suggests that there was not a significant increase in slurry holdup on the packing under these operating conditions.

SO₂ Removal Results (with DBA).

The SO₂ removal results for the Poly and Noell packings with DBA additive are presented in Figures 11 and 12. Overall, SO₂ removal averaged approximately 95% with one foot of Poly packing and 98% with two feet of Poly packing. With the Noell packing, there was relatively little difference in SO₂ removal for different packing depths. Approximately 93% removal was measured with one foot of packing and 94% removal measured with two feet of packing. The figures also show that, for operation with either one or two feet of packing, increasing the absorber gas

velocity had only a minor effect on SO_2 removal. As in the tests without DBA, there was a slight decrease in removal as the gas velocity was increased from 8 to 12 fps and a slight increase above 12 fps.

Figures 11 and 12 also show the differential SO_2 removal (NTU) occurring across one foot of packing. As shown, the NTU per foot of Poly packing was relatively constant, only ranging from 0.82 to 0.89, while the NTU per foot of Noell packing gradually increased with increasing gas velocity from approximately 0.10 to 0.20. This suggests that the mass transfer area of the Poly packing did not change appreciably as a function of absorber gas velocity, while the mass transfer area of the Noell packing increased slightly as a function of absorber gas velocity. It should be noted that although the SO_2 removal performance measured for the Noell packing was considerably lower than the Poly packing, the Noell packing has a much lower pressure drop, as is discussed later.

Results are also shown for tests conducted at identical conditions but with no packing in the absorber. For these tests, SO_2 removal was roughly equal to or slightly greater than with one foot of Poly packing or with one or two feet of Noell packing. While this result may seem surprising, there is a reasonable explanation for it. When packing is inserted into the absorber, the slurry spray above the packing is converted to rain below the packing. Because the droplet size (and thus surface area) of the spray is much finer than the rain, the total surface area in these two contacting zones is reduced when the packing is installed. Because the Noell packing is very open and has a relatively low specific surface area, the additional mass transfer area that it provides is not sufficient to overcome the reduction in surface area below the packing. For this reason, installation of one foot of this packing actually reduced the total mass-transfer area in the absorber, and thus reduced SO_2 removal relative to spray only operation.

Tests were also conducted with DBA at lower slurry loadings of 27.5 and 22 gpm/ft^2 . Figures 13 and 14 show how slurry loading affected SO_2 removal for operation with two feet of packing with DBA. As shown, NTU decreased by roughly 0.5 NTU when the slurry loading was decreased from 33 to 27.5 gpm/ft^2 and from 27.5 to 22 gpm/ft^2 . As discussed below, this roughly corresponds to the decrease in NTU during similar tests conducted without packing. These results suggest that while the overall absorber removal decreased at lower slurry loadings, the removal across the packing remained approximately constant.

In addition to tests conducted with different types and depths of packing, several tests were conducted without any packing in the absorber with flooding nozzles instead of the low pressure spiral nozzles. SO_2 removal results for these tests are shown in Figure 14. This figure shows the overall removal with DBA for the spiral spray nozzles at three different slurry loadings and for the flooding nozzles at the highest slurry loading. At the highest slurry loading of 33 gpm/ft^2 , the SO_2 removal

for the spiral nozzles was approximately 94% compared to approximately 87% for the flooding nozzles. This difference is expected given the large difference in the size of slurry droplets produced by the two nozzles (~1900 microns vs ~4500 microns) and its effect on total mass-transfer area in the absorber.

The difference in slurry droplet size may also explain why the spiral nozzles were more sensitive to absorber gas velocity in the packing tests. The lower terminal velocity of the smaller droplets would tend to result in a longer residence time within the absorber, and thus more total surface area, compared to the larger droplets. The diffusion film thickness on the gas-phase side of the smaller droplets may also be much more sensitive to gas velocity compared to the larger droplets.

Figure 15 also shows that the SO₂ removal decreased by about 0.5 NTU for each decrease in slurry loading. This roughly corresponds to the decrease in removal observed with packing installed when the slurry loading was decreased by the same amount. This tends to support the conclusion that the SO₂ removal of the packing did not change as a function of slurry loading over the range tested when operating with DBA.

Pressure Drop Results

Table 4 shows the results of pressure drop measurements made across the absorber during each test. These values represent the difference in pressure measured approximately two feet below the packing to approximately two feet above header #3. As a result, the reported values reflect the pressure drop of the spray header, spray zone above the packing, the packing itself, and a portion of the rain zone below the packing. The reader should be aware that the reported values in Table 4 do not reflect the pressure drop solely across the packing.

To determine the pressure drop across the packing only, a differential analysis was used similar to that performed to determine SO₂ removal performance across the packing. In other words, the difference in measured pressure drop between operation with one foot of packing and two feet of packing was assumed to be the pressure drop for one foot of packing. Figures 16 and 17 present the results of this analysis. These figures show the pressure drop per foot of packing as a function of flue gas velocity and slurry loading. As shown, the pressure drop per foot of Poly packing ranged from 0.5 "H₂O at 8 fps gas velocity to 1.8 "H₂O at 14 fps gas velocity for a slurry loading of 33 gpm/ft². The pressure drop per foot of Noell packing is considerably lower than that measured for the Poly packing under comparable conditions. For example, the pressure drop ranged from 0.1 "H₂O at 8 fps gas velocity to 0.6 "H₂O at 14 fps gas velocity for a slurry loading of 33 gpm/ft². The scatter in the Noell data relative to the Poly packing data can be attributed to the very low pressure drops measured during the tests and the differential-type analysis. Figures 16 and 17 also show pressure drop data for operation at lower slurry loadings. However, these values had to be calculated using a different approach

because pressure drop data with one foot of packing at the lower slurry loadings was not collected. Therefore, the difference in pressure drop between operation with two feet and operation with no packing (spray only) was used to calculate the pressure drop per foot of packing. This approach was compared to the approach described earlier by comparing calculated results for the tests conducted at a slurry loading of 33 gpm/ft². In all comparisons, the alternative approach yielded pressure drop results within 0.15 "H₂O per foot of packing. Still, the reader should be aware that the pressure drop values at the lower slurry loadings are estimates rather than actual measurements. In general, it appears that slightly lower pressure drops resulted as the slurry loading to the packing was reduced.

Figure 18 presents the overall pressure drop for operation with both the spiral and flooding nozzles without packing in the absorber. Overall, pressure drop ranged from 0.25 to 0.70 as a function of gas flow, slurry flow, and nozzle type. The figure shows that pressure drop was greater for the spiral nozzles which produced much smaller slurry droplets and decreased with decreasing slurry flow, as expected.

Summary

Figure 19 provides a comparison of the performance of the two types of packing tested as a function of absorber gas velocity. The figure shows the SO₂ removal performance (NTU) for operation with DBA normalized for pressure drop. As shown, the normalized performance decreases with increasing flue gas velocity. The figure also shows that while the SO₂ removal of the Poly packing was much greater than the Noell packing, the normalized performances of the packing types are much more similar, given the accuracy of the Noell SO₂ removal performance estimates.

Future Tests

Both Koch and Munters will be on site in July to independently measure the VME carryover rate using measurement techniques used by the industry in full-scale installations. Parametric and gas-film limited testing will continue with two additional nozzle types: a low-pressure spiral nozzle and a low-pressure tangential flow nozzle.

Figure 2. Wet FGD Process Flow Diagram for Pilot High Velocity Tests

**Figure 3. Pilot Absorber Configuration for
TECO Packing Tests**

Figure 4. Effect of Absorber Gas Velocity on NTU During Baseline Parametric Tests (No DBA)

Figure 5. Effect of Gas Velocity on NTU at Constant L/G During Baseline Parametric Tests (No DBA)

Figure 6. Effect of Liquid-to-Gas Ratio on NTU During Baseline Parametric Tests (No DBA)

Figure 7a. Effect of VME Gas Velocity on VME Carryover Rate (from Tank Level)

Figure 7b. Effect of VME Gas Velocity on VME Carryover Rate (from Direct Method)

Figure 8. SO₂ Removal for Poly Packing without DBA

Figure 9. SO₂ Removal for Noell Packing without DBA

Figure 10. SO₂ Removal for Poly Packing (2 ft) without DBA as a Function of Slurry Loading

Figure 11. SO₂ Removal for Poly Packing with DBA

Figure 12. SO₂ Removal for Noell Packing with DBA

Figure 13. SO₂ Removal for Poly Packing (2 ft) with DBA as a Function of Slurry Loading

Figure 14. SO₂ Removal for Noell Packing (2 ft) with DBA as a Function of Slurry Loading

Figure 15. SO₂ Removal of Spiral Spray and Flooding Nozzles with DBA

Figure 16. Pressure Drop Results for Poly Packing

Figure 17. Pressure Drop Results for Noell Packing

Figure 18. Pressure Drop for Spiral Spray and Flooding Nozzles

Figure 19. Comparison of Poly Packing and Noell Packing Performance with DBA

Table 2

Summary of High Velocity Operating Conditions

Test ID	Slurry Recirc. Rate (gpm)	Inlet Gas Rate (scfm)	Absorber Gas Velocity (ft/s)	L/G (gal/macf)	FLRT pH	Absorber pH	Inlet O ₂ (%)	Reaction Tank Slurry wt. %	Liquid Calcium (mM)
PHV-A0	1,300	8,250	8.3	132	5.8	5.1	8.00	11.6	144
PHV-A1N*	1,300	9,800	9.9	111	5.8	5.2	8.07	11.6	135
PHV-A1	1,300	9,800	9.9	111	5.8	5.0	7.58	12.1	135
PHV-B1	1,300	9,800	9.9	112	5.8	4.6	7.75	12.4	124
PHV-A3	1,300	11,300	11.4	98	5.8	5.0	7.88	11.3	137
PHV-B3	1,300	11,300	11.5	96	5.8	4.7	7.69	12.0	145
PHV-A5	1,300	13,000	13.2	84	5.8	4.9	8.22	11.9	144
PHV-B5	1,300	13,000	13.1	85	5.8	4.7	9.22	11.7	136
PHV-A7	1,300	14,900	15.1	73	5.8	5.1	7.59	10.7	153
PHV-B7	1,300	14,900	15.0	73	5.8	5.9	8.68	12.1	138
PHV-A2	1,700	9,800	9.9	146	5.8	5.3	7.93	12.9	147
PHV-B2	1,700	9,800	9.9	146	5.8	5.5	8.38	11.7	163
PHV-A4	1,700	11,300	11.4	127	5.8	5.8	8.85	12.5	134
PHV-B4	1,700	11,300	11.5	126	5.8	5.1	7.56	12.1	147
PHV-B6	1,700	13,000	13.1	110	5.8	4.9	8.22	12.5	136
PHV-A8	1,700	14,900	15.1	96	5.8	5.1	8.26	12.5	139
PHV-B8	1,700	14,900	15.1	95	5.8	5.0	7.73	12.3	138

*PHV-A1N was run with lower pressure nozzles on the VME wash headers.

Table 3

Summary of High Velocity Test Results

Test ID	L/G (gal/macf)	Absorber Gas Velocity (ft/s)	SO ₂ Removal (%)	SO ₂ Removal (NTU)	VME ΔP (in. H ₂ O)	Absorber ΔP (in. H ₂ O)	Direct Carryover Rate (gpm/ft ²)	Tank Level Carryover Rate (gpm/ft ²)	Limestone Loading (g/L)	Limestone Utilization (%)
PHV-A0	132	8.3	91.3	2.44	0.00	3.2	0.00039	0.00042	4.8	93
PHV-A1N*	111	9.9	87.0	2.04	0.02	3.7	0.00054	0.00044	9.1	89
PHV-A1	111	9.9	88.1	2.13	0.02	3.9	0.00033	0.00037	5.1	94
PHV-B1	112	9.9	83.7	1.81	0.09	7.3	0.00041	0.00037	3.3	96
PHV-A3	98	11.4	85.2	1.91	0.09	4.7	0.00030	0.00031	4.6	94
PHV-B3	96	11.5	83.6	1.81	0.10	7.5	0.00042	0.00038	4.6	94
PHV-A5	84	13.2	83.4	1.80	0.19	6.3	0.00020	0.00022	5.7	92
PHV-B5	85	13.1	84.5	1.86	0.11	6.0	-	0.00048	6.0	93
PHV-A7	73	15.1	84.6	1.87	0.21	8.0	0.00053	0.00030	15.9	81
PHV-B7	73	15.0	84.6	1.87	0.17	6.9	0.00036	0.00034	7.8	90
PHV-A2	146	9.9	92.6	2.60	0.03	4.6	0.00061	0.00037	6.5	93
PHV-B2	146	9.9	92.6	2.60	0.04	6.1	0.00046	0.00045	-	-
PHV-A4	127	11.4	91.5	2.47	0.10	5.5	0.00034	0.00032	5.9	93
PHV-B4	126	11.5	92.2	2.55	0.07	6.9	0.00046	0.00048	6.9	91
PHV-B6	110	13.1	90.2	2.32	0.12	7.5	0.00045	0.00047	9.3	89
PHV-A8	96	15.1	89.1	2.22	0.22	9.1	0.00029	0.00027	9.0	90
PHV-B8	95	15.1	91.6	2.48	0.17	8.0	0.00035	0.00035	7.9	90

Table 4

TECO Packing Test Conditions and Results Summary

Test ID	Packing Type	Packing Depth (ft)	Nozzle Type	Gas Rate (scfm)	Liquid Rate (gpm)	DBA Conc. (ppm)	Slurry Loading (gpm/ft ²)	Packing ΔP (in. H ₂ O)	Solid Conc. (wt. %)	Solid Carbonate (mmol/g)	Limestone Utilization (%)	Limestone Loading (g/L)	SO ₂ Removal (%)	SO ₂ Removal (NTU)
TECO-1X	Poly	2	Flooding	14,000	650	0	33.1	4.0	12.0	0.54	90.6	0.8	65.4	1.06
TECO-2X	Poly	2	Flooding	11,800	650	0	33.1	2.6	10.9	0.43	92.2	0.6	63.8	1.02
TECO-3X	Poly	2	Flooding	9,800	650	0	33.1	1.7	8.4	0.51	91.0	0.5	65.4	1.06
TECO-4X	Poly	2	Flooding	8,000	650	0	33.1	1.1	8.9	0.72	88.0	0.7	70.7	1.23
TECO-1	Poly	2	Spiral	14,000	650	0	33.1	6.3	13.3	0.73	87.9	1.2	79.3	1.58
TECO-2	Poly	2	Spiral	11,800	650	0	33.1	3.0	12.0	0.53	90.7	0.7	72.4	1.29
TECO-3	Poly	2	Spiral	9,800	650	0	33.1	2.0	11.9	0.51	91.0	0.7	72.1	1.28
TECO-4	Poly	2	Spiral	8,000	650	0	33.1	1.4					76.8	1.46
TECO-2R	Poly	2	Spiral	11,800	650	0	33.1	2.9	12.7	0.82	86.6	1.2	73.2	1.32
TECO-1M	Poly	2	Spiral	14,000	540	0	27.5	3.7	12.0	1.03	83.6	1.5	69.0	1.17
TECO-2M	Poly	2	Spiral	11,800	540	0	27.5	2.6	12.5	0.95	84.8	1.4	68.9	1.17
TECO-3M	Poly	2	Spiral	9,800	540	0	27.5	1.8	12.0	0.85	86.2	1.2	69.9	1.20
TECO-4M	Poly	2	Spiral	8,000	540	0	27.5	1.2	11.4	0.48	91.5	0.6	72.2	1.28
TECO-1L	Poly	2	Spiral	14,000	430	0	21.9	3.0	12.0	0.36	93.2	0.5	54.2	0.78
TECO-2L	Poly	2	Spiral	11,800	430	0	21.9	2.1	11.7	0.23	95.0	0.3	50.8	0.71
TECO-3L	Poly	2	Spiral	9,800	430	0	21.9	1.4	11.7	0.16	96.0	0.2	49.2	0.68
TECO-4L	Poly	2	Spiral	8,000	430	0	21.9	1.0	11.8	0.18	95.7	0.2	54.5	0.79
TECO-1R	Poly	2	Spiral	14,000	650	0	33.1	6.3	12.7	0.56	90.3	0.8	78.6	1.54
TECO-2RR	Poly	2	Spiral	11,800	650	0	33.1	3.0	12.6	0.51	91.0	0.8	70.8	1.23
TECO-1LR	Poly	2	Spiral	14,000	430	0	21.9	3.1	11.9	0.50	91.2	0.7	56.2	0.83
TECO-2LR	Poly	2	Spiral	11,800	430	0	21.9	2.2	11.1	0.50	91.2	0.6	56.1	0.82
TECO-3LR	Poly	2	Spiral	9,800	430	0	21.9	1.4	10.4	0.53	90.7	0.6	59.0	0.89
TECO-4LR	Poly	2	Spiral	8,000	430	0	21.9	1.0	10.5	0.50	91.2	0.6	62.2	0.97
TECO-5	Poly	1	Spiral	14,000	650	0	33.1	4.1	11.8	0.53	90.7	0.7	67.0	1.11
TECO-6	Poly	1	Spiral	11,800	650	0	33.1	2.9	12.1	0.45	91.9	0.6	63.9	1.02
TECO-7	Poly	1	Spiral	9,800	650	0	33.1	2.0	12.7	0.47	91.6	0.7	67.7	1.13
TECO-8	Poly	1	Spiral	8,000	650	0	33.1	1.1	12.7	0.48	91.5	0.7	71.6	1.26
TECO-9	Noell	2	Spiral	14,000	650	0	33.1	2.0	11.9	0.59	89.9	0.8	63.1	1.00
TECO-10	Noell	2	Spiral	11,800	650	0	33.1	1.3	11.8	0.61	89.6	0.8	62.9	0.99
TECO-11	Noell	2	Spiral	9,800	650	0	33.1	1.0	11.4	0.69	88.5	0.9	66.9	1.11
TECO-12	Noell	2	Spiral	8,000	650	0	33.1	0.7	12.2	0.57	90.2	0.8	69.7	1.19

Table 4

TECO Packing Test Conditions and Results Summary

Test ID	Packing Type	Packing Depth (ft)	Nozzle Type	Gas Rate (scfm)	Liquid Rate (gpm)	DBA Conc. (ppm)	Slurry Loading (gpm/ft ²)	Packing ΔP (in. H ₂ O)	Solid Conc. (wt. %)	Solid Carbonate (mmol/g)	Limestone Utilization (%)	Limestone Loading (g/L)	SO ₂ Removal (%)	SO ₂ Removal (NTU)
TECO-13	Noell	1	Spiral	14,000	650	0	33.1	1.5	12.7	0.55	90.5	0.8	58.0	0.87
TECO-14	Noell	1	Spiral	11,800	650	0	33.1	1.1	11.7	0.57	90.2	0.8	60.7	0.93
TECO-15	Noell	1	Spiral	9,800	650	0	33.1	0.8	12.1	0.57	90.1	0.8	64.6	1.04
TECO-16	Noell	1	Spiral	8,000	650	0	33.1	0.6	11.9	0.58	90.0	0.8	68.6	1.16
TECO-17	Noell	2	Spiral	14,000	650	5000	33.1	1.9	11.9	0.38	92.9	0.5	94.4	2.88
TECO-18	Noell	2	Spiral	11,800	650	5000	33.1	1.2	11.7	0.49	91.3	0.7	94.0	2.81
TECO-19	Noell	2	Spiral	9,800	650	5000	33.1	0.9	11.6	0.43	92.2	0.6	94.3	2.86
TECO-20	Noell	2	Spiral	8,000	650	5000	33.1	0.6	10.9	0.44	92.1	0.6	95.5	3.10
TECO-18R	Noell	2	Spiral	11,800	650	5000	33.1	1.8	11.7	0.45	91.9	0.6	94.0	2.81
TECO-17M	Noell	2	Spiral	14,000	540	5000	27.5	1.4	11.9	0.49	91.4	0.7	90.7	2.38
TECO-18M	Noell	2	Spiral	11,800	540	5000	27.5	0.9	11.9	0.50	91.2	0.7	90.2	2.32
TECO-19M	Noell	2	Spiral	9,800	540	5000	27.5	0.6	11.2	0.46	91.7	0.6	90.7	2.38
TECO-20M	Noell	2	Spiral	8,000	540	5000	27.5	0.4	11.5	0.45	91.9	0.6	92.6	2.60
TECO-18MR	Noell	2	Spiral	11,800	540	5000	27.5	1.4	11.9	0.54	90.6	0.8	89.9	2.29
TECO-17L	Noell	2	Spiral	14,000	430	5000	21.9	1.1	12.0	0.64	89.3	0.9	84.6	1.87
TECO-18L	Noell	2	Spiral	11,800	430	5000	21.9	0.7	12.0	0.65	89.1	0.9	84.8	1.88
TECO-19L	Noell	2	Spiral	9,800	430	5000	21.9	0.5	12.3	0.58	90.0	0.8	85.5	1.93
TECO-20L	Noell	2	Spiral	8,000	430	5000	21.9	0.3	12.1	0.52	90.9	0.7	88.5	2.16
TECO-18LR	Noell	2	Spiral	11,800	430	5000	21.9	0.7	12.0	0.52	90.9	0.7	84.9	1.89
TECO-21	Noell	1	Spiral	14,000	650	5000	33.1	1.3	12.4	0.52	90.9	0.8	93.3	2.70
TECO-22	Noell	1	Spiral	11,800	650	5000	33.1	0.9	12.4	0.48	91.5	0.7	93.1	2.67
TECO-23	Noell	1	Spiral	9,800	650	5000	33.1	0.6	12.5	0.50	91.2	0.7	93.8	2.78
TECO-24	Noell	1	Spiral	8,000	650	5000	33.1	0.5	11.8	0.52	90.9	0.7	95.1	3.02
TECO-25	PolyPack	1	Spiral	14,000	650	5000	33.1	2.6	12.2	0.40	92.7	0.6	95.2	3.04
TECO-26	PolyPack	1	Spiral	11,800	650	5000	33.1	1.6	12.5	0.37	93.1	0.5	93.9	2.80
TECO-27	PolyPack	1	Spiral	9,800	650	5000	33.1	1.1	12.4	0.35	93.4	0.5	94.2	2.85
TECO-28	PolyPack	1	Spiral	8,000	650	5000	33.1	0.8	12.0	0.51	91.0	0.7	95.2	3.04
TECO-29	PolyPack	2	Spiral	14,000	650	5000	33.1	4.4	12.4	0.51	91.0	0.7	98.0	3.91
TECO-30	PolyPack	2	Spiral	11,800	650	5000	33.1	2.9	13.0	0.51	91.0	0.8	97.5	3.69
TECO-31	PolyPack	2	Spiral	9,800	650	5000	33.1	2.0	11.8	0.54	90.6	0.8	97.5	3.69
TECO-32	PolyPack	2	Spiral	8,000	650	5000	33.1	1.3	12.2	0.50	91.2	0.7	97.9	3.86

Table 4

TECO Packing Test Conditions and Results Summary

Test ID	Packing Type	Packing Depth (ft)	Nozzle Type	Gas Rate (scfm)	Liquid Rate (gpm)	DBA Conc. (ppm)	Slurry Loading (gpm/ft ²)	Packing ΔP (in. H ₂ O)	Solid Conc. (wt. %)	Solid Carbonate (mmol/g)	Limestone Utilization (%)	Limestone Loading (g/L)	SO ₂ Removal (%)	SO ₂ Removal (NTU)
TECO-29M	PolyPack	2	Spiral	14,000	540	5000	27.5	3.8	13.1	0.49	91.3	0.8	96.0	3.22
TECO-30M	PolyPack	2	Spiral	11,800	540	5000	27.5	2.4	12.4	0.41	92.4	0.6	95.7	3.15
TECO-31M	PolyPack	2	Spiral	9,800	540	5000	27.5	1.6	13.5	0.44	92.0	0.7	95.9	3.19
TECO-32M	PolyPack	2	Spiral	8,000	540	5000	27.5	1.0	12.7	0.31	93.9	0.5	96.5	3.35
TECO-29L	PolyPack	2	Spiral	14,000	430	5000	21.9	3.2	11.9	0.42	92.3	0.6	92.6	2.60
TECO-30L	PolyPack	2	Spiral	11,800	430	5000	21.9	2.1	12.1	0.46	91.8	0.7	92.9	2.65
TECO-31L	PolyPack	2	Spiral	9,800	430	5000	21.9	1.3	12.4	0.62	89.5	0.9	93.3	2.70
TECO-32L	PolyPack	2	Spiral	8,000	430	5000	21.9	0.8	12.2	0.59	89.9	0.9	94.6	2.92
TECO-33	None	0	Spiral	14,000	650	5000	33.1	0.7	12.6	0.49	91.3	0.7	94.1	2.83
TECO-34	None	0	Spiral	11,800	650	5000	33.1	0.6	12.3	0.46	91.7	0.7	93.9	2.80
TECO-35	None	0	Spiral	9,800	650	5000	33.1	0.5	12.5	0.42	92.3	0.6	94.6	2.92
TECO-36	None	0	Spiral	8,000	650	5000	33.1	0.5	12.4	0.46	91.7	0.7	95.6	3.12
TECO-33M	None	0	Spiral	14,000	540	5000	27.5		12.1	0.35	93.3	0.5	90.8	2.39
TECO-34M	None	0	Spiral	11,800	540	5000	27.5	0.5	12.5	0.34	93.4	0.5	91.0	2.41
TECO-35M	None	0	Spiral	9,800	540	5000	27.5	0.5	12.2	0.33	93.6	0.5	91.9	2.51
TECO-36M	None	0	Spiral	8,000	540	5000	27.5	0.5	11.7	0.35	93.3	0.5	93.0	2.66
TECO-33L	None	0	Spiral	14,000	430	5000	21.9	0.5	12.2	0.30	94.0	0.4	84.7	1.88
TECO-34L	None	0	Spiral	11,800	430	5000	21.9	0.5	12.3	0.47	91.6	0.7	86.6	2.01
TECO-35L	None	0	Spiral	9,800	430	5000	21.9	0.4	12.0	0.48	91.5	0.7	87.3	2.06
TECO-36L	None	0	Spiral	8,000	430	5000	21.9	0.4	12.9	0.53	90.7	0.8	88.3	2.15
TECO-34LR	None	0	Spiral	11,800	430	5000	21.9	0.5	12.6	0.45	91.9	0.7	86.7	2.02
TECO-33X	None	0	Flooding	14,000	650	5000	33.1	0.8	12.0	-	-	-	87.3	2.06
TECO-34X	None	0	Flooding	11,800	650	5000	33.1	0.5	12.0	-	-	-	86.9	2.03
TECO-35X	None	0	Flooding	9,800	650	5000	33.1	0.4	12.0	-	-	-	87.4	2.07
TECO-36X	None	0	Flooding	8,000	650	5000	33.1	0.2	12.0	-	-	-	87.6	2.09

APPENDIX A
TEST SCHEDULES

1 9 9 3					
JUL	AUG	SEP	OCT	NOV	DEC
<i>TVA Chloride Removal</i>	<i>Air Toxics</i>		<i>Additive Consumption</i>		<i>System/Vendor Specific</i>
Hydroclone Dewatering	Air Toxics/ Hydroclone Dewatering	NYSEG Outage	Air Toxics/ Hydroclone Dewatering	Unit Down	

1 9 9 4					
JAN	FEB	MAR	APR	MAY	JUN
<i>Unit Down</i>		<i>High-Velocity Tests</i>			
Unit Down		Suncor Limestone Tests	Unit Down	High-Velocity Tests	

1 9 9 4					
JUL	AUG	SEP	OCT	NOV	DEC
<i>Air Toxics</i>					
High-Velocity Tests		Air Toxics			

*Plan at last
Steering Committee Meeting*

Revised Plan

Outage

Pilot Test Schedule

EPRI HIGH SULFUR TEST CENTER PILOT ABSORBER TEST CALENDAR

June 1994 (Updated July 31)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 Pilot High Velocity PHV-B6 13000 scfm L/G = 110 gal/macf	2 Pilot High Velocity PHV-B6	3 Pilot High Velocity PHV-B4 11,300 scfm L/G = 126 gal/macf	4 Pilot High Velocity PHV-B4
5 Pilot High Velocity PHV-B2 9,800 scfm L/G = 146 gal/macf	6 Pilot High Velocity PHV-B2	7 Pilot High Velocity PHV-B3 11,300 scfm L/G = 96 gal/macf	8 Pilot High Velocity PHV-B3	9 Pilot High Velocity PHV-B3	10 Pilot High Velocity PHV-B1 9,800 scfm L/G = 112 gal/macf	11 Pilot High Velocity PHV-B1
12 Pilot High Velocity PHV-B1	13 Pilot High Velocity PHV-B1 Unit Down To Reconfigure Absorber	14 Unit Off-Line	15 Unit Off-Line	16 Tampa Electric Packing Tests	17 Tampa Electric Packing Tests	18 Tampa Electric Packing Tests
19 Tampa Electric Packing Tests	20 Tampa Electric Packing Tests	21 Tampa Electric Packing Tests	22 Tampa Electric Packing Tests	23 Tampa Electric Packing Tests	24 Tampa Electric Packing Tests	25 Tampa Electric Packing Tests
26 Tampa Electric Packing Tests	27 Tampa Electric Packing Tests	28 Tampa Electric Packing Tests	29 Tampa Electric Packing Tests	30 Tampa Electric Packing Tests		

EPRI HIGH SULFUR TEST CENTER PILOT ABSORBER TEST CALENDAR

July 1994 (Updated July 31)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 Tampa Electric Packing Tests	2 Tampa Electric Packing Tests
3 Pilot High Velocity PHV-B24 9,800 scfm L/G = 111 gal/macf 6000 ppm DBA	4 Pilot High Velocity PHV-B25 9,800 scfm L/G = 145 gal/macf 6000 ppm DBA	5 Pilot High Velocity PHV-B23 9,800 scfm L/G = 55 gal/macf 6000 ppm DBA	6 Pilot High Velocity PHV-B26 14,900 scfm L/G = 36 gal/macf 6000 ppm DBA	7 Pilot High Velocity PHV-B27 14,900 scfm L/G = 72 gal/macf 6000 ppm DBA	8 Pilot High Velocity PHV-B28 14,900 scfm L/G = 94 gal/macf 6000 ppm DBA	9 Pilot High Velocity PHV-A23/A24/A25 14,900 scfm L/G = 55/111/145 6000 ppm DBA
10 Pilot High Velocity PHV-A28/A27 14900 scfm L/G = 95/73 6000 ppm DBA	11 Pilot High Velocity PHV-A26 (TECO) 14900 scfm L/G = 36 gal/macf 6000 ppm DBA	12 Pilot High Velocity (TECO) Unit Down To Change Nozzles	13 Pilot High Velocity PHV-A19D 9800 scfm L/G = 145 gal/macf 1000 ppm DBA	14 Pilot High Velocity PHV-18D 9800 scfm L/G = 111 gal/macf 1000 ppm DBA	15 Pilot High Velocity PHV-18D Unit Down To Dump Tanks	16 Pilot High Velocity PHV-A1R 9800 scfm L/G = 111 gal/macf
17 Pilot High Velocity PHV-A1R Koch/Munters Carryover Testing	18 Pilot High Velocity PHV-1X,2X,3X Koch/Munters Carryover Testing	19 Pilot High Velocity PHV-8X,4X,5X,6X Koch/Munters Carryover Testing	20 Pilot High Velocity PHV-1XR VME Change Koch/Munters Carryover Testing	21 Pilot High Velocity PHV-1Y,2Y,3Y, Koch/Munters Carryover Testing	22 Pilot High Velocity PHV-1YR,8Y,4Y,5Y Koch/Munters Carryover Testing	23 Pilot High Velocity PHV-B1R 9800 scfm L/G = 111 gal/macf
24 Pilot High Velocity PHV-B3R 11300 scfm ----- 31 PHV-A22,A21,A20 14900 scfm	25 Pilot High Velocity PHV-5BR 13000 scfm L/G = 83 gal/macf Nozzle Change	26 Pilot High Velocity PHV-B19 9800 scfm L/G = 145 gal/macf Low Pressure Spirals	27 Pilot High Velocity PHV-B18,B17,B20 9800, 14900 scfm L/G = 112,56,36	28 Pilot High Velocity PHV-B21,B22 14900 scfm L/G = 72,94	29 Pilot High Velocity PHV-A17 VME Change 9800 scfm L/G = 56 gal/macf	30 Pilot High Velocity PHV-A18,A19 9800 scfm L/G = 111,145

APPENDIX B
PILOT DATA

Pilot FLRT Liquid Analytical Summary: PHV Test Block

W	Test	Date	FLRT pH	ABS pH	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	ICE DBA (ppm)	ICE Adipic (mM)	ICE Glutaric (mM)	ICE Succinic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
001	PHV-A1N*	Tue 3/29	5.93	5.51	96.72	102.79	40.57	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
005	PHV-A1N*	Wed 3/30	5.83	5.34	150.24	88.37	38.21	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-
008	PHV-A1N*	Thu 3/31	5.84	5.36	164.58	102.22	39.69	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
013	PHV-A1N	Fri 4/01	5.78	5.11	163.23	106.52	39.08	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-
018	PHV-A1N	Sat 4/02	5.69	5.10	125.45	77.59	23.16	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
023	PHV-A1N	Mon 4/04	5.82	5.32	88.92	63.37	11.82	29.49	2.54	0.26	4.74	252.46	2.07	0.00	14.33	-	-	-	-	0.00	0.89	0.14
029	PHV-A1N	Tue 4/05	5.86	5.22	158.63	70.32	20.78	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
035	PHV-A1N	Wed 4/06	5.77	5.06	140.47	75.01	20.58	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
	PHV-A1N	Averages	5.78	5.16	135.34	78.56	23.08	29.49	2.54	0.26	4.74	252.46	2.07	0.02	14.33	-	-	-	-	0.00	0.89	0.14
039	PHV-A0	Thu 4/07	5.81	5.22	149.70	77.98	19.24	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-
045	PHV-A0	Fri 4/08	5.82	5.10	140.54	82.19	19.54	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-
050	PHV-A0	Sat 4/09	5.80	5.00	140.53	82.74	14.39	40.39	0.69	0.11	24.10	383.66	2.07	0.26	14.35	-	-	-	-	0.59	1.01	0.18
	PHV-A0	Averages	5.81	5.11	143.59	80.97	17.72	40.39	0.69	0.11	24.10	383.66	2.07	0.13	14.35	-	-	-	-	0.59	1.01	0.18
056	PHV-A1	Sun 4/10	5.79	5.00	144.89	92.15	18.45	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-
061	PHV-A1	Mon 4/11	5.78	4.94	131.98	95.38	19.16	40.45	0.42	0.05	33.42	397.91	2.34	0.18	14.78	-	-	-	-	0.38	0.95	0.18
067	PHV-A1	Tue 4/12	5.76	5.10	139.06	92.44	17.70	-	-	-	-	-	-	0.21	-	-	-	-	-	-	-	-
073	PHV-A1	Wed 4/13	5.74	5.00	129.61	96.15	19.17	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-
079	PHV-A1	Thu 4/14	5.82	5.01	131.26	97.26	16.93	-	-	-	-	-	-	0.08	-	-	-	-	-	-	-	-
	PHV-A1	Averages	5.78	5.01	135.36	94.68	18.28	40.45	0.42	0.05	33.42	397.91	2.34	0.14	14.78	-	-	-	-	0.38	0.95	0.18
085	PHV-A2	Fri 4/15	5.84	5.30	142.56	91.52	15.56	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-
104	PHV-A2	Sat 4/16	5.84	5.28	121.41	92.07	15.49	-	-	-	-	-	-	0.17	-	-	-	-	-	-	-	-
110	PHV-A2	Sun 4/17	5.83	5.22	151.52	96.98	17.20	-	-	-	-	-	-	0.16	-	-	-	-	-	-	-	-
115	PHV-A2	Mon 4/18	5.80	5.19	173.69	102.52	17.00	44.45	0.88	0.00	52.16	484.99	-	0.17	12.76	-	-	-	-	0.41	0.92	2.34
	PHV-A2	Averages	5.83	5.23	147.30	95.77	16.31	44.45	0.88	0.00	52.16	484.99	-	0.16	12.76	-	-	-	-	-	-	-
121	PHV-A7	Tue 4/19	5.77	5.19	178.33	113.16	20.31	-	-	-	-	-	-	0.13	-	-	-	-	-	-	-	-
127	PHV-A7	Wed 4/20	5.83	5.11	138.71	84.64	13.18	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
133	PHV-A7	Thu 4/21	5.81	5.07	147.86	93.49	13.85	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-
139	PHV-A7	Fri 4/22	5.84	5.05	147.48	95.76	12.85	36.84	0.81	0.00	58.10	408.83	2.26	0.12	13.98	-	-	-	-	0.28	0.96	0.23
	PHV-A7	Averages	5.81	5.11	153.10	96.76	15.05	36.84	0.81	0.00	58.10	408.83	2.26	0.15	13.98	-	-	-	-	0.28	0.96	0.23
145	PHV-A8	Sat 4/23	5.80	5.17	137.91	98.94	15.22	-	-	-	-	-	-	0.07	-	-	-	-	-	-	-	-
150	PHV-A8	Sun 4/24	5.75	5.06	142.55	99.08	12.70	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
155	PHV-A8	Mon 4/25	5.82	5.14	140.68	101.00	12.33	40.98	0.60	0.00	57.56	432.89	2.12	0.19	14.98	-	-	-	-	-	-	-
161	PHV-A8	Tue 4/26	5.81	5.17	133.04	104.80	13.03	-	-	-	-	-	-	0.12	-	-	-	-	-	0.43	0.98	0.19
	PHV-A8	Averages	5.80	5.14	138.55	100.96	13.32	40.98	0.60	0.00	57.56	432.89	2.12	0.13	14.98	-	-	-	-	0.43	0.98	0.19
166	PHV-A3	Wed 4/27	5.81	5.15	140.10	105.45	11.67	-	-	-	-	-	-	0.26	-	-	-	-	-	-	-	-
173	PHV-A3	Thu 4/28	5.84	5.00	136.96	105.29	12.29	-	-	-	-	-	-	0.29	-	-	-	-	-	-	-	-
179	PHV-A3	Fri 4/29	5.82	4.98	135.38	104.65	11.45	33.88	0.53	0.00	64.48	392.88	2.20	0.22	14.73	-	-	-	-	0.48	0.94	0.19
	PHV-A3	Averages	5.82	5.04	137.48	105.13	11.80	33.88	0.53	0.00	64.48	392.88	2.20	0.26	14.73	-	-	-	-	0.48	0.94	0.19
185	PHV-A4	Sat 4/30	5.80	5.31	124.27	99.88	10.93	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
190	PHV-A4	Sun 5/01	5.82	5.22	144.18	99.22	10.93	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
195	PHV-A4	Mon 5/02	5.81	5.18	132.36	103.37	11.70	30.29	0.34	0.00	63.50	385.64	2.22	0.11	14.58	-	-	-	-	0.24	0.93	0.19
	PHV-A4	Averages	5.81	5.24	133.60	100.82	11.19	30.29	0.34	0.00	63.50	385.64	2.22	0.13	14.58	-	-	-	-	0.24	0.93	0.19

Pilot FLRT Liquid Analytical Summary: PHV Test Block

W	Test	Date	FLRT pH	ABS pH	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	ICE DBA (ppm)	ICE Adipic (mM)	ICE Glutaric (mM)	ICE Succinic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
202	PHV-A5	Tue 5/03	5.82	4.89	143.02	100.17	10.70	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
208	PHV-A5	Wed 5/04	5.82	4.90	130.68	101.28	11.27	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-
214	PHV-A5	Thu 5/05	5.83	4.93	158.79	108.03	11.39	35.63	0.43	0.00	68.28	443.47	2.42	0.16	13.23	-	-	-	-	0.37	0.91	0.25
	PHV-A5	Averages	5.82	4.91	144.16	103.16	11.12	35.63	0.43	0.00	68.28	443.47	2.42	0.12	13.23	-	-	-	-	0.37	0.91	0.25
220	PHV-A12*	Fri 5/06	5.60	5.42	174.65	106.41	10.83	-	-	-	-	-	-	0.21	-	3065	3.25	12.27	8.23	-	-	-
226	PHV-A12	Sat 5/07	5.70	5.16	157.36	108.16	12.00	-	-	-	-	-	-	0.04	-	3079	4.88	10.92	7.84	-	-	-
231	PHV-A12	Sun 5/08	5.75	5.46	163.01	105.51	10.45	-	-	-	-	-	-	0.27	-	2845	7.84	7.59	5.92	-	-	-
236	PHV-A12	Mon 5/09	5.80	5.61	147.43	101.09	10.76	32.60	0.80	0.00	65.02	360.19	2.96	0.48	16.02	2785	9.34	6.18	5.13	1.06	1.06	0.25
	PHV-A12	Averages	5.75	5.41	155.93	104.92	11.07	32.60	0.80	0.00	65.02	360.19	2.96	0.26	16.02	2903	7.35	8.23	6.30	1.06	1.06	0.25
241	PHV-A9	Tue 5/10	5.80	5.22	151.01	100.84	10.12	32.54	0.82	0.00	66.80	352.70	2.65	0.58	16.27	2867	11.54	5.46	3.91	1.29	1.09	0.23
	PHV-A9	Averages	5.80	5.22	151.01	100.84	10.12	32.54	0.82	0.00	66.80	352.70	2.65	0.58	16.27	2867	11.54	5.46	3.91	1.29	1.09	0.23
247	PHV-A10	Wed 5/11	5.78	5.67	135.82	100.64	10.98	31.90	0.77	0.00	67.85	343.87	3.24	0.95	12.81	3041	13.35	4.84	3.84	1.99	0.82	0.24
	PHV-A10	Averages	5.78	5.67	135.82	100.64	10.98	31.90	0.77	0.00	67.85	343.87	3.24	0.95	12.81	3041	13.35	4.84	3.84	1.99	0.82	0.24
253	PHV-A13	Thu 5/12	5.78	5.52	138.10	96.03	8.71	29.53	0.56	0.00	65.57	311.32	2.75	0.55	15.94	3077	14.17	4.31	3.72	1.15	1.01	0.20
	PHV-A13	Fri 5/13	5.76	5.73	130.01	93.50	7.61	-	-	-	-	-	-	0.43	-	3124	15.55	3.52	3.30	-	-	-
	PHV-A13	Averages	5.77	5.63	134.06	94.77	8.16	29.53	0.56	0.00	65.57	311.32	2.75	0.49	15.94	3101	14.86	3.92	3.31	1.15	1.01	0.20
265	PHV-A14	Sat 5/14	5.76	5.75	126.23	90.78	5.33	-	-	-	-	-	-	0.45	-	3468	19.00	2.88	2.66	-	-	-
	PHV-A14	Averages	5.76	5.75	126.23	90.78	5.33	-	-	-	-	-	-	0.45	-	3468	19.00	2.88	2.66	-	-	-
270	PHV-A9W	Sun 5/15	5.83	5.82	121.54	93.08	7.79	24.56	0.52	0.00	63.66	299.94	2.76	0.48	16.95	3322	18.56	2.51	2.38	1.01	1.05	0.23
275	PHV-A9W	Mon 5/16	5.82	5.75	117.60	83.37	5.97	-	-	-	-	-	-	0.53	-	3141	17.15	2.67	2.41	-	-	-
281	PHV-A9W	Tue 5/17	5.82	5.76	125.73	94.09	10.60	22.78	1.19	0.00	63.33	314.08	2.79	0.39	16.68	3847	20.38	1.20	6.04	0.82	1.04	0.23
	PHV-A9W	Averages	5.82	5.78	121.62	90.18	8.12	23.67	0.86	0.00	63.50	307.01	2.78	0.47	16.82	3436	18.70	2.13	3.61	0.92	1.05	0.23
292	PHV-A11	Wed 5/18	5.78	5.63	125.81	89.08	9.06	26.25	1.58	0.00	62.60	297.50	2.50	1.08	16.72	4136	18.90	5.16	5.89	2.25	1.09	0.18
	PHV-A11	Averages	5.78	5.63	125.81	89.08	9.06	26.25	1.58	0.00	62.60	297.50	2.50	1.08	16.72	4136	18.90	5.16	5.89	2.25	1.09	0.18
305	PHV-A15	Thu 5/19	5.80	5.72	128.18	83.37	8.89	24.61	1.18	0.00	55.10	276.62	2.51	0.36	15.91	3091	14.38	3.90	4.04	0.78	1.08	0.20
	PHV-A15	Averages	5.80	5.72	128.18	83.37	8.89	24.61	1.18	0.00	55.10	276.62	2.51	0.36	15.91	3091	14.38	3.90	4.04	0.78	1.08	0.20
313	PHV-A16	Fri 5/20	5.86	5.67	112.78	79.60	8.67	29.08	1.17	0.00	57.08	284.29	2.71	0.37	15.95	2829	11.92	4.23	4.49	0.80	1.03	0.25
	PHV-A16	Averages	5.86	5.67	112.78	79.60	8.67	29.08	1.17	0.00	57.08	284.29	2.71	0.37	15.95	2829	11.92	4.23	4.49	0.80	1.03	0.25
318	PHV-B7	Sun 5/22	5.80	4.75	129.43	82.25	6.03	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
323	PHV-B7	Mon 5/23	5.87	4.97	142.01	86.50	10.00	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
329	PHV-B7	Tue 5/24	5.85	4.97	142.31	92.87	10.65	26.97	0.47	0.00	24.25	386.45	1.68	0.09	13.75	-	-	-	-	0.21	0.94	0.17
	PHV-B7	Averages	5.84	4.90	137.92	87.21	8.89	26.97	0.47	0.00	24.25	386.45	1.68	0.03	13.75	-	-	-	-	0.21	0.94	0.17
336	PHV-B8	Wed 5/25	5.89	4.96	138.63	96.95	10.30	-	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-
342	PHV-B8	Thu 5/26	5.75	5.11	143.03	104.74	11.02	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-
347	PHV-B8	Fri 5/27	5.80	5.05	132.50	105.40	12.38	33.84	0.34	0.00	42.44	408.85	2.84	0.07	15.46	-	-	-	-	0.15	0.93	0.23
	PHV-B8	Averages	5.81	5.04	138.05	102.36	11.23	33.84	0.34	0.00	42.44	408.85	2.84	0.09	15.46	-	-	-	-	0.15	0.93	0.23
353	PHV-B5	Sat 5/28	5.76	4.78	134.10	109.36	13.15	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-
358	PHV-B5	Sun 5/29	5.79	4.67	137.72	116.97	14.24	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-
363	PHV-B5	Mon 5/30	5.79	4.75	135.23	120.39	14.58	38.72	0.33	0.00	57.01	448.71	2.21	0.00	15.46	-	-	-	-	0.00	0.93	0.17
	PHV-B5	Averages	5.78	4.73	135.68	115.57	13.99	38.72	0.33	0.00	57.01	448.71	2.21	0.01	15.46	-	-	-	-	0.00	0.93	0.17

**Pilot FLRT Liquid Analytical Summary:
PHV Test Block**

W	Test	Date	FLRT pH	ABS pH	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	ICB DBA (ppm)	ICB Adipic (mM)	ICB Glutaric (mM)	ICB Succinic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
368	PHV-B6	Tue 5/31	5.83	-	134.72	125.59	14.70	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-
374	PHV-B6	Wed 6/01	5.82	4.90	132.12	129.80	11.96	37.59	0.27	0.00	65.20	482.24	2.58	0.14	16.08	-	-	-	-	0.29	0.93	0.22
381	PHV-B6	Thu 6/02	5.81	5.04	140.96	130.11	14.95	-	-	-	-	-	-	0.18	-	-	-	-	-	-	-	-
	PHV-B6	Averages	5.82	4.97	135.93	128.50	13.87	37.59	0.27	0.00	65.20	482.24	2.58	0.11	16.08	-	-	-	-	0.29	0.93	0.22
387	PHV-B4	Fri 6/03	5.79	5.13	139.27	130.18	16.03	41.61	0.12	0.00	67.16	503.75	2.05	0.20	15.20	-	-	-	-	0.41	0.90	0.16
393	PHV-B4	Sat 6/04	5.88	5.28	154.69	130.01	15.24	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-
	PHV-B4	Averages	5.84	5.21	146.98	130.10	15.64	41.61	0.12	0.00	67.16	503.75	2.05	0.11	15.20	-	-	-	-	0.41	0.90	0.16
398	PHV-B2	Sun 6/05	5.78	5.04	163.27	136.44	16.29	-	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-
403	PHV-B2	Mon 6/06	5.80	5.07	162.41	133.26	13.32	-	-	-	-	-	-	0.16	-	-	-	-	-	-	-	-
	PHV-B2	Averages	5.79	5.05	162.84	134.85	14.81	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-
408	PHV-B3	Wed 6/08	5.91	5.07	157.52	134.76	15.12	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-
414	PHV-B3	Thu 6/09	5.78	4.80	139.87	126.94	14.12	-	-	-	-	-	-	0.20	-	-	-	-	-	-	-	-
420	PHV-B3	Fri 6/10	5.76	4.87	138.00	123.25	13.38	35.74	0.19	0.00	69.22	433.98	1.94	0.09	15.44	-	-	-	-	0.19	0.93	0.14
	PHV-B3	Averages	5.82	4.91	145.13	128.32	14.21	35.74	0.19	0.00	69.22	433.98	1.94	0.12	15.44	-	-	-	-	0.19	0.93	0.14
426	PHV-B1	Sat 6/11	5.79	4.86	124.35	116.69	12.65	-	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-
431	PHV-B1	Sun 6/12	5.70	4.73	111.63	66.20	6.75	-	-	-	-	-	-	0.28	-	-	-	-	-	-	-	-
436	PHV-B1	Mon 6/13	5.80	4.88	136.32	111.91	12.78	33.44	0.16	0.00	63.20	375.82	1.97	0.30	14.94	-	-	-	-	0.64	0.94	0.16
	PHV-B1	Averages	5.76	4.82	124.10	98.27	10.73	33.44	0.16	0.00	63.20	375.82	1.97	0.29	14.94	-	-	-	-	0.64	0.94	0.16

Pilot VME Wash Water Analytical Summary: PHV Test Block

HME Collection (VME Carryover)

Test	Date	VME Wash pH	Wt% Solids	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS	VME Carryover Wt% Solids	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)
PHV-A1N* Tue 3/29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N* Wed 3/30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N* Thu 3/31		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N Fri 4/01		7.65	0.01	20.37	12.61	5.26	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N Sat 4/02		7.26	0.01	41.91	21.70	2.90	-	-	-	-	-	-	-	0.00	40.32	29.96	8.28
PHV-A1N Mon 4/04		7.32	0.01	33.46	20.55	5.51	82.81	1.50	0.00	5.67	0.00	0.35	4.97	0.00	22.80	19.15	4.90
PHV-A1N Tue 4/05		7.23	0.01	51.47	22.04	6.75	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N Wed 4/06		7.26	-	45.77	24.04	7.29	-	-	-	-	-	-	-	-	-	-	-
PHV-A1N Averages		7.34	0.01	38.60	20.19	5.54	82.81	1.50	0.00	5.67	0.00	0.35	4.97	0.00	31.56	24.56	6.59
PHV-A0 Thu 4/07		7.12	0.01	68.40	34.35	8.84	166.13	1.26	0.01	6.78	0.05	0.47	3.56	0.00	34.46	22.47	6.05
PHV-A0 Fri 4/08		7.18	-	64.09	36.87	9.20	-	-	-	-	-	-	-	-	-	-	-
PHV-A0 Sat 4/09		7.09	0.01	63.64	35.67	5.47	174.01	1.20	0.09	7.05	0.30	0.47	3.00	0.00	32.57	23.05	3.12
PHV-A0 Averages		7.13	0.01	63.38	35.63	7.84	170.07	1.23	0.03	6.92	0.17	0.47	3.28	0.00	33.32	22.76	4.59
PHV-A1 Sun 4/10		7.06	-	65.59	39.76	7.86	-	-	-	-	-	-	-	-	25.86	21.09	3.81
PHV-A1 Mon 4/11		7.06	0.01	60.95	43.02	9.12	177.71	1.33	0.07	7.53	0.22	0.46	2.90	0.00	28.82	27.52	5.62
PHV-A1 Tue 4/12		7.13	-	64.25	41.67	8.30	-	-	-	-	-	-	-	-	22.63	18.82	3.70
PHV-A1 Wed 4/13		6.99	-	59.05	42.77	8.58	-	-	-	-	-	-	-	-	30.53	30.00	5.73
PHV-A1 Thu 4/14		7.14	-	60.35	43.42	7.75	-	-	-	-	-	-	-	-	20.68	19.14	3.22
PHV-A1 Averages		7.08	0.01	62.04	42.13	8.32	177.71	1.33	0.07	7.53	0.22	0.46	2.90	0.00	25.70	23.31	4.42
PHV-A2 Fri 4/15		7.09	-	67.04	41.16	7.19	-	-	-	-	-	-	-	-	34.41	25.71	4.21
PHV-A2 Sat 4/16		7.02	-	57.74	42.76	7.44	-	-	-	-	-	-	-	-	22.78	22.18	3.72
PHV-A2 Sun 4/17		6.98	-	73.91	47.22	9.89	-	-	-	-	-	-	-	-	24.83	19.99	3.45
PHV-A2 Mon 4/18		7.01	0.01	77.89	45.10	7.50	211.94	*	0.07	7.22	0.23	0.48	0.30	0.01	46.97	35.86	5.57
PHV-A2 Averages		7.03	0.01	69.15	44.06	8.01	211.94	-	0.07	7.22	0.23	0.48	0.30	0.01	32.25	25.94	4.24
PHV-A7 Tue 4/19		6.92	-	88.64	55.67	12.07	-	-	-	-	-	-	-	-	19.28	17.05	3.15
PHV-A7 Wed 4/20		6.96	-	67.08	39.27	6.27	-	-	-	-	-	-	-	-	36.63	35.74	5.55
PHV-A7 Thu 4/21		7.02	-	67.87	40.78	6.23	-	-	-	-	-	-	-	-	16.42	12.70	2.80
PHV-A7 Fri 4/22		6.97	0.03	68.96	41.43	5.28	193.56	1.17	0.03	8.63	0.10	0.56	2.23	0.00	14.34	16.41	1.47
PHV-A7 Averages		6.97	0.03	73.14	44.29	7.46	193.56	1.17	0.03	8.63	0.10	0.56	2.23	0.00	21.67	20.48	3.24
PHV-A8 Sat 4/23		6.96	-	63.71	43.68	6.43	-	-	-	-	-	-	-	-	16.57	19.73	2.90
PHV-A8 Sun 4/24		6.97	-	67.80	45.51	6.07	-	-	-	-	-	-	-	-	11.42	8.87	1.19
PHV-A8 Mon 4/25		6.98	0.07	63.20	43.84	5.52	183.53	1.17	0.06	8.12	0.19	0.50	2.15	0.07	18.45	21.01	2.67
PHV-A8 Tue 4/26		6.99	-	59.14	45.24	5.77	-	-	-	-	-	-	-	-	15.48	20.46	2.70
PHV-A8 Averages		6.98	0.07	63.46	44.57	5.95	183.53	1.17	0.06	8.12	0.19	0.50	2.15	0.07	15.48	17.52	2.37
PHV-A3 Wed 4/27		6.97	-	65.78	47.67	5.30	-	-	-	-	-	-	-	-	20.87	18.95	1.91
PHV-A3 Thu 4/28		6.99	-	62.83	46.90	5.64	-	-	-	-	-	-	-	-	15.59	15.26	1.79
PHV-A3 Fri 4/29		6.97	0.02	62.77	47.42	5.60	176.66	1.40	0.24	8.00	0.74	0.48	2.46	0.01	21.52	22.48	2.32
PHV-A3 Averages		6.98	0.02	63.79	47.33	5.51	176.66	1.40	0.24	8.00	0.74	0.48	2.46	0.01	19.33	18.90	2.01
PHV-A4 Sat 4/30		7.00	-	60.37	46.91	5.62	-	-	-	-	-	-	-	-	19.30	21.31	2.40
PHV-A4 Sun 5/01		6.98	-	66.67	43.72	4.82	-	-	-	-	-	-	-	-	22.49	21.07	2.23
PHV-A4 Mon 5/02		6.98	0.01	62.77	47.49	5.09	172.30	1.36	0.04	8.13	0.12	0.49	2.46	0.00	17.13	20.28	2.41
PHV-A4 Averages		6.99	0.01	63.27	46.04	5.18	172.30	1.36	0.04	8.13	0.12	0.49	2.46	0.00	19.64	20.89	2.35

Pilot VME Wash Water Analytical Summary: PHV Test Block

HME Collection (VME Carryover)

Test	Date	VME Wash pH	Wt% Solids	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS	VME Carryover Wt% Solids	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)
PHV-A5	Tue 5/03	7.03	-	64.88	43.62	4.67	-	-	-	-	-	-	-	-	12.85	14.02	1.08
PHV-A5	Wed 5/04	6.97	-	27.77	43.16	5.17	-	-	-	-	-	-	-	-	13.51	16.14	1.38
PHV-A5	Thu 5/05	6.97	0.01	72.17	47.30	5.01	193.52	1.42	0.00	7.90	0.00	0.51	2.73	0.00	14.93	15.98	1.41
PHV-A5	Averages	6.99	0.01	54.94	44.69	4.95	193.52	1.42	0.00	7.90	0.00	0.51	2.73	0.00	13.76	15.38	1.29
PHV-A12*	Fri 5/06	6.21	-	77.28	45.47	4.44	-	-	-	-	-	-	-	-	17.92	14.72	1.02
PHV-A12	Sat 5/07	6.56	-	73.62	48.42	5.56	-	-	-	-	-	-	-	-	20.00	16.03	1.82
PHV-A12	Sun 5/08	6.65	-	75.99	47.44	4.62	-	-	-	-	-	-	-	-	22.04	17.50	1.40
PHV-A12	Mon 5/09	6.69	0.02	69.27	46.18	5.16	162.45	1.37	0.07	8.85	0.21	0.55	1.23	0.00	21.87	18.00	1.96
PHV-A12	Averages	6.63	0.02	72.96	47.35	5.11	162.45	1.37	0.07	8.85	0.21	0.55	1.23	0.00	21.30	17.18	1.73
PHV-A9	Tue 5/10	6.63	-	70.97	46.09	4.81	161.80	1.54	0.23	8.85	0.69	0.56	1.20	-	23.29	19.65	2.08
PHV-A9	Averages	6.63	-	70.97	46.09	4.81	161.80	1.54	0.23	8.85	0.69	0.56	1.20	-	23.29	19.65	2.08
PHV-A10	Wed 5/11	6.68	0.01	63.25	45.32	4.93	153.21	1.43	0.37	8.88	1.09	0.53	1.18	-	19.73	19.15	2.07
PHV-A10	Averages	6.68	0.01	63.25	45.32	4.93	153.21	1.43	0.37	8.88	1.09	0.53	1.18	-	19.73	19.15	2.07
PHV-A13	Thu 5/12	6.67	-	62.41	41.75	3.47	147.25	1.28	0.17	8.74	0.51	0.54	1.04	-	20.39	17.88	0.94
PHV-A13	Fri 5/13	6.65	-	57.69	43.17	5.03	-	-	-	-	-	-	-	-	18.15	17.96	1.85
PHV-A13	Averages	6.66	-	60.05	42.46	4.25	147.25	1.28	0.17	8.74	0.51	0.54	1.04	-	19.27	17.92	1.40
PHV-A14	Sat 5/14	6.63	-	56.43	38.35	0.46	-	-	-	-	-	-	-	-	12.51	12.31	0.00
PHV-A14	Averages	6.63	-	56.43	38.35	0.46	-	-	-	-	-	-	-	-	12.51	12.31	0.00
PHV-A9W	Sun 5/15	6.70	-	55.99	41.18	3.05	134.01	1.43	0.18	9.02	0.52	0.53	1.18	-	13.92	14.78	1.04
PHV-A9W	Mon 5/16	6.79	-	56.18	37.84	2.04	-	-	-	-	-	-	-	-	13.88	12.64	0.00
PHV-A9W	Tue 5/17	6.68	-	57.24	41.65	4.76	138.62	1.34	0.06	9.14	0.17	0.54	1.06	0.01	14.31	14.88	1.56
PHV-A9W	Averages	6.72	-	56.47	40.22	3.28	136.32	1.39	0.12	9.08	0.35	0.54	1.12	0.01	14.04	14.10	0.87
PHV-A11	Wed 5/18	6.63	-	57.86	39.45	4.25	132.47	1.02	0.41	9.00	1.20	0.56	0.74	0.01	16.06	11.60	1.54
PHV-A11	Averages	6.63	-	57.86	39.45	4.25	132.47	1.02	0.41	9.00	1.20	0.56	0.74	0.01	16.06	11.60	1.54
PHV-A15	Thu 5/19	6.73	-	59.19	35.40	4.06	121.38	1.21	0.11	8.31	0.34	0.54	1.19	-	10.70	3.39	0.82
PHV-A15	Averages	6.73	-	59.19	35.40	4.06	121.38	1.21	0.11	8.31	0.34	0.54	1.19	-	10.70	3.39	0.82
PHV-A16	Fri 5/20	6.67	0.02	53.91	36.98	4.48	128.19	1.34	0.10	8.25	0.29	0.51	1.05	-	18.30	12.12	0.90
PHV-A16	Averages	6.67	0.02	53.91	36.98	4.48	128.19	1.34	0.10	8.25	0.29	0.51	1.05	-	18.30	12.12	0.90
PHV-B7	Sun 5/22	7.15	-	62.53	37.44	2.76	-	-	-	-	-	-	-	-	24.87	18.75	0.78
PHV-B7	Mon 5/23	7.19	-	66.86	39.29	4.55	-	-	-	-	-	-	-	-	22.94	17.19	1.56
PHV-B7	Tue 5/24	7.19	-	64.99	41.38	5.01	173.35	1.03	0.01	7.13	0.03	0.46	3.25	0.00	20.13	16.54	1.96
PHV-B7	Averages	7.18	-	64.79	39.37	4.11	173.35	1.03	0.01	7.13	0.03	0.46	3.25	0.00	22.65	17.49	1.43
PHV-B8	Wed 5/25	7.12	-	64.35	42.25	4.34	-	-	-	-	-	-	-	-	22.39	19.71	1.40
PHV-B8	Thu 5/26	6.85	-	67.09	47.12	4.87	-	-	-	-	-	-	-	-	24.16	22.41	1.68
PHV-B8	Fri 5/27	7.02	0.02	61.35	47.30	5.82	178.42	1.25	0.00	7.69	0.00	0.46	2.46	0.00	21.48	21.30	2.50
PHV-B8	Averages	7.00	0.02	64.26	45.56	5.01	178.42	1.25	0.00	7.69	0.00	0.46	2.46	0.00	22.68	21.14	1.86
PHV-B5	Sat 5/28	6.85	-	60.79	48.53	6.50	-	-	-	-	-	-	-	-	29.01	30.39	3.62
PHV-B5	Sun 5/29	6.94	-	61.02	49.79	6.84	-	-	-	-	-	-	-	-	26.63	30.00	3.59
PHV-B5	Mon 5/30	6.98	-	54.60	46.05	5.90	170.17	1.35	0.00	7.26	0.00	0.41	2.24	-	25.68	30.20	3.61
PHV-B5	Averages	6.92	-	58.80	48.12	6.41	170.17	1.35	0.00	7.26	0.00	0.41	2.24	-	27.11	30.20	3.61

**Pilot VME Wash Water Analytical Summary:
PHV Test Block**

**HME Collection
(VME Carryover)**

Test	Date	VME Wash	Wt%	L-Ca++	L-Mg++	L-Na+	L-Cl-	L-CO3=	L-SO3=	L-SO4=	CaSO3	CaSO4	CaCO3	VME Carryover	L-Ca++	L-Mg++	L-Na+
		pH	Solids	(mM)	(mM)	(mM)	(mM)	(mM)	(mM)	(mM)	RS	RS	RS	Wt% Solids	(mM)	(mM)	(mM)
PHV-B6	Tue 5/31	7.02	-	49.42	43.72	5.54	-	-	-	-	-	-	-	-	24.29	30.31	3.46
PHV-B6	Wed 6/01	7.03	-	42.42	39.48	3.73	139.46	1.04	0.03	3.46	0.08	0.19	1.75	-	19.11	26.04	1.85
PHV-B6	Thu 6/02	6.94	-	66.70	59.50	7.24	-	-	-	-	-	-	-	-	23.77	30.93	3.80
PHV-B6	Averages	7.00	-	52.85	47.57	5.50	139.46	1.04	0.03	3.46	0.08	0.19	1.75	-	22.39	29.09	3.04
PHV-B4	Fri 6/03	6.89	0.01	65.33	59.63	7.63	221.98	1.17	0.06	4.05	0.18	0.23	1.65	-	28.41	35.87	4.24
PHV-B4	Sat 6/04	6.93	-	71.42	58.36	7.11	-	-	-	-	-	-	-	-	26.99	33.04	4.02
PHV-B4	Averages	6.91	0.01	68.38	59.00	7.37	221.98	1.17	0.06	4.05	0.18	0.23	1.65	-	27.70	34.46	4.13
PHV-B2	Sun 6/05	7.03	-	75.71	61.32	7.38	-	-	-	-	-	-	-	-	35.97	41.69	5.25
PHV-B2	Mon 6/06	6.98	-	72.24	56.82	5.72	-	-	-	-	-	-	-	-	30.93	37.40	3.22
PHV-B2	Averages	7.01	-	73.98	59.07	6.55	-	-	-	-	-	-	-	-	33.45	39.55	4.24
PHV-B3	Wed 6/08	6.96	-	71.92	59.96	7.02	-	-	-	-	-	-	-	-	27.22	23.76	4.44
PHV-B3	Thu 6/09	6.88	-	64.12	54.76	6.40	-	-	-	-	-	-	-	-	22.30	34.77	3.84
PHV-B3	Fri 6/10	6.97	-	63.94	55.02	6.27	190.08	1.17	0.07	8.39	0.20	0.48	2.00	-	19.71	34.74	3.83
PHV-B3	Averages	6.94	-	66.66	56.58	6.56	190.08	1.17	0.07	8.39	0.20	0.48	2.00	-	23.08	31.09	4.04
PHV-B1	Sat 6/11	6.99	-	57.87	50.97	5.84	-	-	-	-	-	-	-	-	18.56	33.00	3.53
PHV-B1	Sun 6/12	7.01	-	51.29	47.57	5.41	-	-	-	-	-	-	-	-	13.32	9.44	1.45
PHV-B1	Mon 6/13	7.03	-	62.42	48.99	5.94	177.71	1.91	0.15	8.09	0.46	0.48	3.84	-	18.01	28.65	3.26
PHV-B1	Averages	7.01	-	57.19	49.18	5.73	177.71	1.91	0.15	8.09	0.46	0.48	3.84	-	16.63	23.70	2.75

June 1994

Pilot FLRT Analytical Summary:

PHV Test Block

Test	Date	FLRT Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Wt Solids Closure (%)	Mol Solids Closure (%)	Solids Ox. (%)	Util. (%)	IR Ox. (%)	Util. (%)	CP Wt%	Thickener Unit Area (sqft/tpd)	Initial Wt%	Final Settled Wt%	Form Filtration Rate lb/hr*sqft	Filter Cake Wt%
PHV-A1N* Tue 3/29		12.62	-	-	-	-	-	-	-	-	-	-	-	-	86.95	-	-	-	-	-
PHV-A1N* Wed 3/30		15.12	-	-	-	-	-	-	-	-	-	-	-	-	84.57	-	-	-	-	-
PHV-A1N* Thu 3/31		10.91	-	-	-	-	-	-	-	-	-	-	-	-	82.42	-	-	-	-	-
PHV-A1N Fri 4/01		10.87	-	-	-	-	-	-	-	-	-	-	100.0	96.8	81.62	-	-	-	-	-
PHV-A1N Sat 4/02		11.53	-	-	-	-	-	-	-	-	-	-	100.0	98.2	81.98	-	-	-	-	-
PHV-A1N Mon 4/04		12.32	6.23	0.06	0.00	5.12	0.95	1.60	1.8	0.0	100.0	84.6	-	-	81.89	1.26	12.34	70.39	812	81.52
PHV-A1N Tue 4/05		11.80	-	-	-	-	-	-	-	-	-	-	100.0	97.6	82.48	-	-	-	-	-
PHV-A1N Wed 4/06		11.58	6.26	0.06	0.00	5.82	0.43	1.11	0.6	5.7	100.0	93.2	100.0	97.3	79.94	-	-	-	-	-
PHV-A1N Averages		11.62	6.25	0.06	0.00	5.47	0.69	1.36	1.2	2.9	100.0	88.9	100.0	97.5	81.58	1.26	12.34	70.39	812	81.52
PHV-A0 Thu 4/07		9.64	6.29	0.06	0.00	5.78	0.48	1.12	0.6	5.7	99.9	92.3	100.0	97.9	83.69	-	-	-	-	-
PHV-A0 Fri 4/08		12.59	-	-	-	-	-	-	-	-	-	-	100.0	98.4	80.03	0.75	12.70	69.30	1123	83.39
PHV-A0 Sat 4/09		12.55	5.84	0.04	0.01	5.23	0.33	0.70	2.7	-4.7	99.8	94.2	-	-	82.48	0.77	12.67	67.24	1009	82.60
PHV-A0 Averages		11.59	6.07	0.05	0.01	5.51	0.41	0.91	1.7	0.5	99.9	93.3	100.0	98.2	82.07	0.76	12.69	68.27	1066	83.00
PHV-A1 Sun 4/10		12.12	-	-	-	-	-	-	-	-	-	-	-	-	83.23	-	-	-	-	-
PHV-A1 Mon 4/11		11.81	5.88	0.04	0.01	5.19	0.36	0.60	3.1	-5.0	99.8	93.7	-	-	81.76	1.02	11.98	66.89	1047	82.79
PHV-A1 Tue 4/12		12.26	-	-	-	-	-	-	-	-	-	-	-	-	82.49	-	-	-	-	-
PHV-A1 Wed 4/13		11.71	-	-	-	-	-	-	-	-	-	-	-	-	81.74	-	-	-	-	-
PHV-A1 Thu 4/14		12.40	6.26	0.04	0.02	5.89	0.41	0.59	-0.2	6.2	99.6	93.4	-	-	87.76	-	-	-	-	-
PHV-A1 Averages		12.06	6.07	0.04	0.02	5.54	0.39	0.60	1.5	0.6	99.7	93.6	-	-	83.40	1.02	11.98	66.89	1047	82.79
PHV-A2 Fri 4/15		11.89	6.20	0.04	0.02	5.79	0.50	0.67	-0.5	5.2	99.7	92.1	-	-	85.20	-	-	-	-	-
PHV-A2 Sat 4/16		11.87	-	-	-	-	-	-	-	-	-	-	-	-	81.90	-	-	-	-	-
PHV-A2 Sun 4/17		12.25	-	-	-	-	-	-	-	-	-	-	-	-	81.63	-	-	-	-	-
PHV-A2 Mon 4/18		15.62	6.07	0.04	0.00	5.92	0.38	0.80	-1.5	5.7	100.0	93.9	100.0	97.8	82.29	0.70	15.62	81.95	861	84.71
PHV-A2 Averages		12.91	6.14	0.04	0.01	5.86	0.44	0.74	-1.0	5.4	99.9	93.0	100.0	97.8	82.76	0.70	15.62	81.95	861	84.71
PHV-A7 Tue 4/19		12.34	6.55	0.05	0.02	5.19	1.64	0.64	-1.9	5.5	99.7	75.6	-	-	83.55	-	-	-	-	-
PHV-A7 Wed 4/20		8.79	-	-	-	-	-	-	-	-	-	-	-	-	82.26	-	-	-	-	-
PHV-A7 Thu 4/21		11.10	-	-	-	-	-	-	-	-	-	-	-	-	82.61	-	-	-	-	-
PHV-A7 Fri 4/22		10.44	6.20	0.04	0.01	5.59	0.87	1.00	-1.8	5.1	99.8	86.3	-	-	82.51	1.25	10.44	62.70	1028	81.78
PHV-A7 Averages		10.67	6.38	0.04	0.01	5.39	1.26	0.82	-1.8	5.3	99.7	80.9	-	-	82.73	1.25	10.44	62.70	1028	81.78
PHV-A8 Sat 4/23		12.29	-	-	-	-	-	-	-	-	-	-	-	-	83.19	-	-	-	-	-
PHV-A8 Sun 4/24		12.74	-	-	-	-	-	-	-	-	-	-	-	-	82.91	-	-	-	-	-
PHV-A8 Mon 4/25		12.63	6.13	0.03	0.00	5.79	0.65	0.98	-2.2	6.0	100.0	89.7	-	-	81.89	1.18	12.63	66.86	808	82.61
PHV-A8 Tue 4/26		12.16	-	-	-	-	-	-	-	-	-	-	-	-	82.23	-	-	-	-	-
PHV-A8 Averages		12.46	6.13	0.03	0.00	5.79	0.65	0.98	-2.2	6.0	100.0	89.7	-	-	82.56	1.18	12.63	66.86	808	82.61
PHV-A3 Wed 4/27		11.40	6.02	0.04	0.00	5.85	0.38	0.60	-1.4	4.3	100.0	93.8	-	-	86.31	-	-	-	-	-
PHV-A3 Thu 4/28		11.06	-	-	-	-	-	-	-	-	-	-	-	-	82.93	-	-	-	-	-
PHV-A3 Fri 4/29		11.42	5.97	0.03	0.02	5.76	0.37	0.60	-1.2	3.0	99.7	93.9	-	-	82.42	0.84	11.42	64.81	1086	82.07
PHV-A3 Averages		11.29	6.00	0.03	0.01	5.81	0.38	0.60	-1.3	3.7	99.8	93.9	-	-	83.89	0.84	11.42	64.81	1086	82.07
PHV-A4 Sat 4/30		12.66	5.99	0.05	0.02	5.79	0.41	0.40	-1.5	3.6	99.7	93.3	-	-	85.38	-	-	-	-	-
PHV-A4 Sun 5/01		12.19	-	-	-	-	-	-	-	-	-	-	-	-	77.65	-	-	-	-	-
PHV-A4 Mon 5/02		12.53	5.95	0.05	0.00	5.78	0.45	0.50	-1.9	3.5	100.0	92.6	100.0	97.8	83.24	0.88	12.53	68.11	1284	84.34
PHV-A4 Averages		12.46	5.97	0.05	0.01	5.79	0.43	0.45	-1.7	3.5	99.8	93.0	100.0	97.8	82.09	0.88	12.53	68.11	1284	84.34

Pilot FLRT Solid Analytical Summary:

PHV Test Block

Test	Date	FLRT Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Wt Solids Closure (%)	Mol Solids Closure (%)	Solids Ox. (%)	Util. (%)	IR Ox. (%)	Util. (%)	CP Wt%	Thickener Unit Area (sqft/tpd)	Initial Wt%	Final Settled Wt%	Form Filtration Rate (lb/hr*sqft)	Filter Cake Wt%
PHV-A5	Tue 5/03	11.97	-	-	-	-	-	-	-	-	-	-	-	-	82.69	-	-	-	-	-
PHV-A5	Wed 5/04	12.00	-	-	-	-	-	-	-	-	-	-	-	-	83.09	-	-	-	-	-
PHV-A5	Thu 5/05	11.63	6.32	0.04	0.00	6.63	0.45	0.63	-5.4	16.3	100.0	93.3	100.0	96.8	87.13	0.96	11.63	71.19	1234	83.24
PHV-A5	Averages	11.87	6.32	0.04	0.00	6.63	0.45	0.63	-5.4	16.3	100.0	93.3	-	-	84.30	0.96	11.63	71.19	1234	83.24
PHV-A12*	Fri 5/06	12.13	-	-	-	-	-	-	-	-	-	-	-	-	82.96	-	-	-	-	-
PHV-A12	Sat 5/07	12.37	6.78	0.07	0.00	6.03	1.44	0.56	-4.3	16.2	100.0	79.9	100.0	92.3	83.51	-	-	-	-	-
PHV-A12	Sun 5/08	12.74	-	-	-	-	-	-	-	-	-	-	-	-	83.84	-	-	-	-	-
PHV-A12	Mon 5/09	13.33	7.23	0.07	0.01	4.67	2.63	0.52	-0.1	7.2	99.8	64.0	100.0	80.2	84.14	1.80	13.33	65.37	484	76.25
PHV-A12	Averages	12.81	7.01	0.07	0.01	5.35	2.04	0.54	-2.2	11.7	99.9	71.9	-	-	83.83	1.80	13.33	65.37	484	76.25
PHV-A9	Tue 5/10	12.67	6.41	0.04	0.01	5.42	1.21	0.60	-1.5	5.3	99.8	81.5	100.0	93.6	82.77	1.17	12.67	66.77	550	79.56
PHV-A9	Averages	12.67	6.41	0.04	0.01	5.42	1.21	0.60	-1.5	5.3	99.8	81.5	100.0	93.6	82.77	1.17	12.67	66.77	550	79.56
PHV-A10	Wed 5/11	12.23	6.57	0.04	0.00	5.12	1.65	0.90	-1.2	4.8	100.0	75.3	100.0	89.0	83.44	1.93	12.23	65.92	553	79.31
PHV-A10	Averages	12.23	6.57	0.04	0.00	5.12	1.65	0.90	-1.2	4.8	100.0	75.3	100.0	89.0	83.44	1.93	12.23	65.92	553	79.31
PHV-A13	Thu 5/12	13.59	6.20	0.03	0.01	5.57	0.84	0.70	-1.5	4.3	99.8	86.7	100.0	92.9	82.86	1.29	13.59	67.88	897	84.49
PHV-A13	Fri 5/13	13.18	-	-	-	-	-	-	-	-	-	-	-	-	82.90	-	-	-	-	-
PHV-A13	Averages	13.39	6.20	0.03	0.01	5.57	0.84	0.70	-1.5	4.3	99.8	86.7	100.0	92.9	82.88	1.29	13.59	67.88	897	84.49
PHV-A14	Sat 5/14	14.24	-	-	-	-	-	-	-	-	-	-	-	-	83.37	-	-	-	-	-
PHV-A14	Averages	14.24	-	-	-	-	-	-	-	-	-	-	-	-	83.37	-	-	-	-	-
PHV-A9W	Sun 5/15	13.64	6.60	0.06	0.02	4.81	1.30	0.60	4.1	-1.3	99.6	79.6	100.0	92.2	81.36	1.34	13.64	68.98	796	83.19
PHV-A9W	Mon 5/16	11.41	-	-	-	-	-	-	-	-	-	-	-	-	82.25	-	-	-	-	-
PHV-A9W	Tue 5/17	12.37	6.50	0.06	0.00	4.66	1.50	0.70	3.1	-2.6	100.0	76.4	100.0	88.9	82.05	1.29	12.38	68.34	260	70.21
PHV-A9W	Averages	12.47	6.55	0.06	0.01	4.74	1.40	0.65	3.6	-2.0	99.8	78.0	100.0	90.6	81.89	1.32	13.01	68.66	328	76.70
PHV-A11	Wed 5/18	12.46	6.77	0.05	0.01	4.39	2.01	0.80	3.1	-1.8	99.8	69.6	100.0	86.7	83.12	1.61	12.46	64.24	1029	83.65
PHV-A11	Averages	12.46	6.77	0.05	0.01	4.39	2.01	0.80	3.1	-1.8	99.8	69.6	100.0	86.7	83.12	1.61	12.46	64.24	1029	83.65
PHV-A15	Thu 5/19	11.19	6.43	0.05	0.00	4.66	1.65	0.80	1.3	-1.9	100.0	74.2	100.0	93.7	82.72	1.59	11.19	65.22	1770	83.36
PHV-A15	Averages	11.19	6.43	0.05	0.00	4.66	1.65	0.80	1.3	-1.9	100.0	74.2	100.0	93.7	82.72	1.59	11.19	65.22	1770	83.36
PHV-A16	Fri 5/20	13.35	6.82	0.06	0.00	4.18	2.44	0.70	1.9	-2.0	100.0	63.8	100.0	80.9	82.64	1.47	13.35	64.91	246	68.22
PHV-A16	Averages	13.35	6.82	0.06	0.00	4.18	2.44	0.70	1.9	-2.0	100.0	63.8	100.0	80.9	82.64	1.47	13.35	64.91	246	68.22
PHV-B7	Sun 5/22	13.26	-	-	-	-	-	-	-	-	-	-	-	-	84.03	-	-	-	-	-
PHV-B7	Mon 5/23	11.56	-	-	-	-	-	-	-	-	-	-	-	-	87.47	-	-	-	-	-
PHV-B7	Tue 5/24	11.61	5.95	0.04	0.00	5.17	0.62	1.10	1.7	-3.0	100.0	89.5	100.0	90.5	80.82	0.98	11.61	65.96	1423	82.80
PHV-B7	Averages	12.14	5.95	0.04	0.00	5.17	0.62	1.10	1.7	-3.0	100.0	89.5	100.0	90.5	84.11	0.98	11.61	65.96	1423	82.80
PHV-B8	Wed 5/25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHV-B8	Thu 5/26	12.45	-	-	-	-	-	-	-	-	-	-	-	-	81.38	-	-	-	-	-
PHV-B8	Fri 5/27	12.15	6.11	0.04	0.01	5.67	0.60	0.90	-1.0	4.0	99.8	90.3	-	-	83.00	0.97	12.15	66.00	1211	82.49
PHV-B8	Averages	12.30	6.11	0.04	0.01	5.67	0.60	0.90	-1.0	4.0	99.8	90.3	-	-	82.19	0.97	12.15	66.00	1211	82.49
PHV-B5	Sat 5/28	11.28	-	-	-	-	-	-	-	-	-	-	-	-	82.09	-	-	-	-	-
PHV-B5	Sun 5/29	11.89	-	-	-	-	-	-	-	-	-	-	-	-	83.01	-	-	-	-	-
PHV-B5	Mon 5/30	12.00	6.09	0.04	0.00	5.85	0.46	0.80	-1.5	5.3	100.0	92.6	-	-	81.54	0.91	12.00	67.51	1460	83.07
PHV-B5	Averages	11.72	6.09	0.04	0.00	5.85	0.46	0.80	-1.5	5.3	100.0	92.6	-	-	82.21	0.91	12.00	67.51	1460	83.07

Pilot FLRT Solid Analytical Summary: PHV Test Block

Test	Date	FLRT Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Wt Solids Closure (%)	Mol Solids Closure (%)	Solids Ox. (%)	Util. (%)	IR Ox. (%)	Util. (%)	CP Wt%	Thickener Unit Area (sqft/tpd)	Initial Wt%	Final Settled Wt%	Form Filtration Rate lb/hr*sqft	Filter Cake Wt%
PHV-B6	Tue 5/31	12.65	-	-	-	-	-	-	-	-	-	-	-	-	83.16	-	-	-	-	-
PHV-B6	Wed 6/01	12.41	6.14	0.03	0.01	5.70	0.69	0.70	-1.8	4.9	99.8	89.0	100.0	97.1	82.98	0.82	12.41	68.83	1870	84.11
PHV-B6	Thu 6/02	12.28	-	-	-	-	-	-	-	-	-	-	-	-	81.46	-	-	-	-	-
PHV-B6	Averages	12.45	6.14	0.03	0.01	5.70	0.69	0.70	-1.8	4.9	99.8	89.0	100.0	97.1	82.33	0.82	12.41	68.83	1870	84.11
PHV-B4	Fri 6/03	12.45	5.85	0.04	0.00	5.41	0.51	1.10	-0.3	-0.9	100.0	91.4	-	-	82.03	1.11	12.45	67.74	972	84.38
PHV-B4	Sat 6/04	11.79	-	-	-	-	-	-	-	-	-	-	-	-	81.59	-	-	-	-	-
PHV-B4	Averages	12.12	5.85	0.04	0.00	5.41	0.51	1.10	-0.3	-0.9	100.0	91.4	-	-	81.81	1.11	12.45	67.74	972	84.38
PHV-B2	Sun 6/05	11.75	-	-	-	-	-	-	-	-	-	-	-	-	81.01	-	-	-	-	-
PHV-B2	Mon 6/06	11.69	-	-	-	-	-	-	-	-	-	-	-	-	81.50	-	-	-	-	-
PHV-B2	Averages	11.72	-	-	-	-	-	-	-	-	-	-	-	-	81.26	-	-	-	-	-
PHV-B3	Wed 6/08	11.23	-	-	-	-	-	-	-	-	-	-	-	-	82.69	-	-	-	-	-
PHV-B3	Thu 6/09	12.28	-	-	-	-	-	-	-	-	-	-	-	-	83.50	-	-	-	-	-
PHV-B3	Fri 6/10	12.50	5.87	0.04	0.00	5.52	0.34	1.27	0.4	-0.2	100.0	94.2	-	-	82.59	-	-	-	-	-
PHV-B3	Averages	12.00	5.87	0.04	0.00	5.52	0.34	1.27	0.4	-0.2	100.0	94.2	-	-	82.93	-	-	-	-	-
PHV-B1	Sat 6/11	12.42	-	-	-	-	-	-	-	-	-	-	-	-	80.05	-	-	-	-	-
PHV-B1	Sun 6/12	12.27	-	-	-	-	-	-	-	-	-	-	-	-	79.98	-	-	-	-	-
PHV-B1	Mon 6/13	12.63	5.72	0.04	0.00	5.50	0.24	0.80	0.2	-2.1	100.0	95.8	-	-	82.75	-	-	-	-	-
PHV-B1	Averages	12.44	5.72	0.04	0.00	5.50	0.24	0.80	0.2	-2.1	100.0	95.8	-	-	80.93	-	-	-	-	-

PHV-B6 Process Summary Report
(5/31/94 18:00:00 to 6/02/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.2	91.4	89.5	0.6	27
L/G Ratio (gal/macf)	110	111	109	0	27
Reaction Tank pH	5.80	5.81	5.79	0.00	27
Absorber pH	4.88	5.05	4.68	0.14	27
Flue Gas Flow Rate (scfm)	12997	13001	12958	9	27
Header 1 Flow (gpm)	650	650	650	0	27
Header 3 Flow (gpm)	650	650	650	0	27
Header 5 Flow (gpm)	400	400	400	0	27
Blowdown to Sump Rate (gpm)	0.14	0.15	0.14	0.00	27
Centrifuge Feed Rate (gpm)	8.84	9.50	8.26	0.40	27
Facility Inlet SO2 Conc. (ppm)	1126	1206	1021	62	27
Inlet SO2 Concentration (ppm)	2000	2005	1994	3	27
Outlet SO2 Concentration (ppm)	183	196	160	11	27
Inlet O2 Concentration (%)	8.22	8.73	7.39	0.38	27
Outlet O2 Concentration (%)	7.87	8.32	7.11	0.35	27
Absorber Gas Velocity (ft/sec)	13.14	13.22	13.06	0.05	27
Inlet Gas Temperature (F)	319	328	309	6	27
Outlet Gas Temperature (F)	125	127	123	1	27
SO2 Absorbed (mmole/L)	4.37	4.43	4.32	0.03	27
Solids Residence Time (hrs)	9.6	9.7	9.5	0.1	27
Slurry Residence Time (min)	3.36	3.36	3.36	0.00	27
Absorber Pressure Drop (in H2O)	7.46	7.72	7.24	0.15	27
Spray Zone Pressure Drop (in H2O)	3.15	3.20	3.11	0.02	27
VME Pressure Drop (in H2O)	0.12	0.19	0.11	0.01	27
Oxidation Air to Rxn Tank (acfm)	440	441	439	0	27
NYSEG Load (MW)	610	694	523	73	27

PHV-B4 Process Summary Report
(6/03/94 16:00:00 to 6/04/94 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.2	92.9	91.3	0.4	22
L/G Ratio (gal/macf)	126	127	126	0	22
Reaction Tank pH	5.80	5.83	5.76	0.01	22
Absorber pH	5.08	5.17	4.94	0.05	22
Flue Gas Flow Rate (scfm)	11300	11300	11300	0	22
Header 1 Flow (gpm)	650	650	650	0	22
Header 3 Flow (gpm)	650	650	650	0	22
Header 5 Flow (gpm)	400	400	400	0	22
Blowdown to Sump Rate (gpm)	0.13	0.14	0.13	0.00	22
Centrifuge Feed Rate (gpm)	8.46	9.00	8.00	0.29	22
Facility Inlet SO2 Conc. (ppm)	1209	1239	1108	30	22
Inlet SO2 Concentration (ppm)	2000	2003	1994	3	22
Outlet SO2 Concentration (ppm)	145	163	132	8	22
Inlet O2 Concentration (%)	7.56	8.61	7.25	0.31	22
Outlet O2 Concentration (%)	7.25	8.23	6.96	0.30	22
Absorber Gas Velocity (ft/sec)	11.45	11.50	11.38	0.04	22
Inlet Gas Temperature (F)	328	335	316	6	22
Outlet Gas Temperature (F)	126	127	124	1	22
SO2 Absorbed (mmole/L)	3.88	3.91	3.84	0.02	22
Solids Residence Time (hrs)	10.6	10.7	10.5	0.1	22
Slurry Residence Time (min)	3.36	3.36	3.36	0.00	22
Absorber Pressure Drop (in H2O)	6.92	7.07	6.74	0.09	22
Spray Zone Pressure Drop (in H2O)	2.71	2.74	2.68	0.02	22
VME Pressure Drop (in H2O)	0.07	0.10	0.07	0.01	22
Oxidation Air to Rxn Tank (acfm)	440	441	439	0	22
NYSEG Load (MW)	650	696	498	58	22

PHV-B2 Process Summary Report
(6/04/94 18:00:00 to 6/06/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.6	93.0	92.1	0.2	41
L/G Ratio (gal/macf)	146	146	145	0	41
Reaction Tank pH	5.80	5.80	5.80	0.00	41
Absorber pH	5.45	5.74	5.06	0.26	41
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	41
Header 1 Flow (gpm)	650	650	650	0	41
Header 3 Flow (gpm)	650	650	650	0	41
Header 5 Flow (gpm)	400	400	400	0	41
Blowdown to Sump Rate (gpm)	0.21	0.30	0.17	0.05	41
Centrifuge Feed Rate (gpm)	7.16	7.59	7.00	0.23	41
Facility Inlet SO2 Conc. (ppm)	1123	1235	893	95	41
Inlet SO2 Concentration (ppm)	2000	2006	1995	3	41
Outlet SO2 Concentration (ppm)	139	148	130	4	41
Inlet O2 Concentration (%)	8.38	9.99	7.62	0.69	41
Outlet O2 Concentration (%)	8.02	9.38	7.33	0.60	41
Absorber Gas Velocity (ft/sec)	9.91	9.93	9.89	0.01	41
Inlet Gas Temperature (F)	315	319	313	2	41
Outlet Gas Temperature (F)	124	125	122	1	41
SO2 Absorbed (mmole/L)	3.38	3.40	3.36	0.01	41
Solids Residence Time (hrs)	11.8	11.8	11.7	0.0	41
Slurry Residence Time (min)	3.36	3.36	3.36	0.00	41
Absorber Pressure Drop (in H2O)	6.09	6.60	5.69	0.27	41
Spray Zone Pressure Drop (in H2O)	2.24	2.38	0.55	0.37	41
VME Pressure Drop (in H2O)	0.04	0.09	0.03	0.01	41
Oxidation Air to Rxn Tank (acfm)	440	441	439	0	41
NYSEG Load (MW)	570	695	305	111	41

PHV-B3 Process Summary Report
(6/08/94 10:00:00 to 6/10/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	83.6	85.0	82.3	0.5	47
L/G Ratio (gal/macf)	96	97	96	0	47
Reaction Tank pH	5.80	5.80	5.79	0.00	47
Absorber pH	4.72	4.93	4.54	0.11	47
Flue Gas Flow Rate (scfm)	11300	11301	11283	3	47
Header 1 Flow (gpm)	650	650	650	0	47
Header 3 Flow (gpm)	650	650	650	0	47
Header 5 Flow (gpm)	0	0	0	0	47
Blowdown to Sump Rate (gpm)	0.36	0.42	0.23	0.04	47
Centrifuge Feed Rate (gpm)	6.55	7.08	6.20	0.20	47
Facility Inlet SO2 Conc. (ppm)	1207	1392	983	98	47
Inlet SO2 Concentration (ppm)	2000	2017	1992	4	47
Outlet SO2 Concentration (ppm)	306	331	281	10	47
Inlet O2 Concentration (%)	7.69	9.59	6.51	0.68	47
Outlet O2 Concentration (%)	7.38	9.06	6.30	0.60	47
Absorber Gas Velocity (ft/sec)	11.45	11.52	11.35	0.05	47
Inlet Gas Temperature (F)	325	334	313	6	47
Outlet Gas Temperature (F)	125	127	122	1	47
SO2 Absorbed (mmole/L)	4.60	4.67	4.53	0.03	47
Solids Residence Time (hrs)	11.8	11.9	11.6	0.1	47
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	47
Absorber Pressure Drop (in H2O)	7.51	8.24	6.83	0.39	47
Spray Zone Pressure Drop (in H2O)	2.31	2.35	2.26	0.02	47
VME Pressure Drop (in H2O)	0.10	0.13	0.09	0.01	47
Oxidation Air to Rxn Tank (acfm)	433	445	387	14	47
NYSEG Load (MW)	612	688	386	80	47

PHV-B1 Process Summary Report
(6/10/94 18:00:00 to 6/13/94 8:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	83.7	84.6	82.9	0.3	62
L/G Ratio (gal/macf)	111	111	111	0	62
Reaction Tank pH	5.80	5.81	5.79	0.00	62
Absorber pH	4.64	4.83	4.46	0.11	62
Flue Gas Flow Rate (scfm)	9800	9810	9800	1	62
Header 1 Flow (gpm)	650	650	650	0	62
Header 3 Flow (gpm)	650	650	650	0	62
Header 5 Flow (gpm)	0	0	0	0	62
Blowdown to Sump Rate (gpm)	0.33	0.37	0.08	0.09	62
Centrifuge Feed Rate (gpm)	6.79	7.50	6.19	0.25	62
Facility Inlet SO2 Conc. (ppm)	1159	1308	1028	89	62
Inlet SO2 Concentration (ppm)	2000	2004	1994	2	62
Outlet SO2 Concentration (ppm)	306	320	289	6	62
Inlet O2 Concentration (%)	7.75	8.36	7.35	0.24	62
Outlet O2 Concentration (%)	7.46	8.03	7.07	0.23	62
Absorber Gas Velocity (ft/sec)	9.94	9.96	9.91	0.02	62
Inlet Gas Temperature (F)	321	327	316	3	62
Outlet Gas Temperature (F)	125	127	124	1	62
SO2 Absorbed (mmole/L)	3.99	4.03	3.96	0.02	62
Solids Residence Time (hrs)	14.2	14.4	14.1	0.1	62
Slurry Residence Time (min)	4.39	4.39	4.39	0.00	62
Absorber Pressure Drop (in H2O)	7.28	8.01	6.60	0.38	62
Spray Zone Pressure Drop (in H2O)	2.01	2.05	1.99	0.01	62
VME Pressure Drop (in H2O)	0.09	0.64	0.06	0.08	62
Oxidation Air to Rxn Tank (acfm)	441	469	429	6	62
NYSEG Load (MW)	671	696	601	24	62

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

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Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-1X	Thu-6/16	18:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1X	Thu-6/16	21:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1X	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2X	Fri-6/17	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2X	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3X	Fri-6/17	04:20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3X	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4X	Fri-6/17	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4X	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1	Sat-6/18	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2	Sat-6/18	05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3	Sat-6/18	08:03	5.97	52.8	142.95	115.54	13.00	37.02	0.17	0.00	59.05	425.07	1.88	0.14	13.98	-	-	-	-	0.34	0.89	0.28
TECO-3	Averages		5.97	52.8	142.95	115.54	13.00	37.02	0.17	0.00	59.05	425.07	1.88	0.14	13.98	-	-	-	-	0.34	0.89	0.28
TECO-2R	Sat-6/18	19:55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2R	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1M	Sun-6/19	01:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2M	Sun-6/19	06:10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3M	Sun-6/19	08:18	6.06	52.4	158.63	119.15	13.48	40.71	0.09	0.00	60.68	439.97	1.92	0.13	14.47	-	-	-	-	0.35	0.96	0.41
TECO-3M	Sun-6/19	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3M	Averages		6.06	52.4	158.63	119.15	13.48	40.71	0.09	0.00	60.68	439.97	1.92	0.13	14.47	-	-	-	-	0.35	0.96	0.41
TECO-4M	Sun-6/19	17:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1L	Sun-6/19	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2L	Mon-6/20	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3L	Mon-6/20	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

June 1994

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

June 1994

Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-4L	Mon-6/20	08:00	5.85	48.6	154.52	118.22	14.69	42.62	0.11	0.00	61.83	461.04	1.42	0.30	13.15	-	-	-	-	0.70	0.86	0.15
TECO-4L	Averages		5.85	48.6	154.52	118.22	14.69	42.62	0.11	0.00	61.83	461.04	1.42	0.30	13.15	-	-	-	-	0.70	0.86	0.15
TECO-1R	Mon-6/20	14:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1R	Mon-6/20	16:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1R	Mon-6/20	17:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1R	Mon-6/20	17:57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1R	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2RR	Mon-6/20	18:59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2RR	Mon-6/20	19:56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2RR	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1LR	Mon-6/20	21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1LR	Mon-6/20	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1LR	Mon-6/20	23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-1LR	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2LR	Tue-6/21	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2LR	Tue-6/21	00:55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2LR	Tue-6/21	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-2LR	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3LR	Tue-6/21	03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3LR	Tue-6/21	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3LR	Tue-6/21	05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-3LR	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4LR	Tue-6/21	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4LR	Tue-6/21	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4LR	Tue-6/21	07:03	6.07	51.3	162.38	110.12	13.20	32.17	0.11	0.00	59.11	477.40	1.48	0.09	13.89	-	-	-	-	0.25	0.95	0.64
TECO-4LR	Tue-6/21	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-4LR	Averages		6.07	51.3	162.38	110.12	13.20	32.17	0.11	0.00	59.11	477.40	1.48	0.09	13.89	-	-	-	-	0.25	0.95	0.64
TECO-5	Tue-6/21	15:00	6.00	50.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	15:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	19:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Averages		6.00	50.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-6	Tue-6/21	23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-6	Wed-6/22	01:15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-6	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-7	Wed-6/22	03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-7	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	FLRT pH	Temp (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-8	Wed-6/22	05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-8	Wed-6/22	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-8	Wed-6/22	07:31	6.03	50.4	148.11	102.87	13.04	30.26	0.20	0.00	53.74	444.87	1.71	0.16	13.25	-	-	-	-	0.42	0.89	0.33
TECO-8	Averages		6.03	50.4	148.11	102.87	13.04	30.26	0.20	0.00	53.74	444.87	1.71	0.16	13.25	-	-	-	-	0.42	0.89	0.33
TECO-9	Wed-6/22	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Wed-6/22	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Wed-6/22	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Wed-6/22	19:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Wed-6/22	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Wed-6/22	21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-9	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-10	Wed-6/22	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-10	Wed-6/22	23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-10	Thu-6/23	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-10	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-11	Thu-6/23	01:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-11	Thu-6/23	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-11	Thu-6/23	03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-11	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-12	Thu-6/23	05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-12	Thu-6/23	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-12	Thu-6/23	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-12	Thu-6/23	07:45	6.08	49.9	159.90	102.24	12.71	29.86	0.11	0.00	54.81	442.22	1.63	0.20	13.43	-	-	-	-	0.56	0.94	0.39
TECO-12	Thu-6/23	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-12	Averages		6.08	49.9	159.90	102.24	12.71	29.86	0.11	0.00	54.81	442.22	1.63	0.20	13.43	-	-	-	-	0.56	0.94	0.39
TECO-13	Thu-6/23	14:35	5.92	48.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	14:56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	19:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Thu-6/23	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-13	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-14	Thu-6/23	21:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-14	Thu-6/23	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-14	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

June 1994

Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-15	Thu-6/23	23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-15	Fri-6/24	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-15	Fri-6/24	01:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-15	Fri-6/24	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-15	Fri-6/24	03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-15	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-16	Fri-6/24	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-16	Fri-6/24	05:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-16	Fri-6/24	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-16	Fri-6/24	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-16	Fri-6/24	07:10	6.11	49.6	151.69	97.63	11.90	29.35	0.12	0.01	50.24	433.20	1.70	0.00	13.54	-	-	-	-	0.01	0.94	0.43
TECO-16	Averages		6.11	49.6	151.69	97.63	11.90	29.35	0.12	0.01	50.24	433.20	1.70	0.00	13.54	-	-	-	-	0.01	0.94	0.43
TECO-17	Fri-6/24	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Fri-6/24	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Fri-6/24	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Fri-6/24	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Fri-6/24	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Fri-6/24	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18	Sat-6/25	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18	Sat-6/25	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19	Sat-6/25	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19	Sat-6/25	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20	Sat-6/25	06:55	5.79	49.8	161.97	94.54	11.69	28.86	0.42	0.00	51.82	377.89	2.05	0.27	17.80	4948	6.49	3.18	25.77	0.62	1.24	0.18
TECO-20	Sat-6/25	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20	Sat-6/25	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20	Averages		5.79	49.8	161.97	94.54	11.69	28.86	0.42	0.00	51.82	377.89	2.05	0.27	17.80	4948	6.49	3.18	25.77	0.62	1.24	0.18
TECO-18R	Sat-6/25	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18R	Sat-6/25	12:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18R	Sat-6/25	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18R	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17M	Sat-6/25	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17M	Sat-6/25	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18M	Sat-6/25	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18M	Sat-6/25	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	FLRT pH	Temp (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-19M	Sun-6/26	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19M	Sun-6/26	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20M	Sun-6/26	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20M	Sun-6/26	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18MR	Sun-6/26	06:25	5.58	49.4	150.17	90.05	10.55	22.89	0.48	0.00	50.53	349.06	2.69	0.16	17.76	3810	5.70	0.00	21.49	0.30	1.23	0.11
TECO-18MR	Sun-6/26	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18MR	Sun-6/26	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18MR	Averages		5.58	49.4	150.17	90.05	10.55	22.89	0.48	0.00	50.53	349.06	2.69	0.16	17.76	3810	5.70	0.00	21.49	0.30	1.23	0.11
TECO-17L	Sun-6/26	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17L	Sun-6/26	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-17L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18L	Sun-6/26	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18L	Sun-6/26	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19L	Sun-6/26	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19L	Sun-6/26	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-19L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20L	Mon-6/27	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20L	Mon-6/27	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-20L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18LR	Mon-6/27	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18LR	Mon-6/27	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18LR	Mon-6/27	07:48	5.78	50.4	137.66	90.24	10.54	18.79	0.35	0.00	51.05	331.11	2.56	0.21	18.31	3981	5.92	0.00	22.48	0.45	1.24	0.19
TECO-18LR	Mon-6/27	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18LR	Mon-6/27	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-18LR	Averages		5.78	50.4	137.66	90.24	10.54	18.79	0.35	0.00	51.05	331.11	2.56	0.21	18.31	3981	5.92	0.00	22.48	0.45	1.24	0.19
TECO-21	Mon-6/27	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-21	Mon-6/27	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-21	Mon-6/27	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-21	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-22	Mon-6/27	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-22	Tue-6/28	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-22	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-23	Tue-6/28	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-23	Tue-6/28	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-23	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TBCO-24	Tue-6/28	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-24	Tue-6/28	07:45	5.84	49.8	135.73	82.09	9.27	24.74	0.33	0.00	47.70	296.42	2.81	0.09	16.78	3232	0.00	0.00	22.14	0.20	1.15	0.27
TBCO-24	Tue-6/28	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-24	Averages		5.84	49.8	135.73	82.09	9.27	24.74	0.33	0.00	47.70	296.42	2.81	0.09	16.78	3232	0.00	0.00	22.14	0.20	1.15	0.27
TBCO-25	Tue-6/28	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-25	Tue-6/28	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-25	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-26	Tue-6/28	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-26	Wed-6/29	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-26	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-27	Wed-6/29	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-27	Wed-6/29	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-27	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-28	Wed-6/29	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-28	Wed-6/29	07:23	5.91	50.4	126.47	76.48	8.48	18.77	0.36	0.00	45.90	278.51	2.35	0.28	17.08	3526	0.00	0.00	24.15	0.66	1.15	0.27
TBCO-28	Wed-6/29	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-28	Averages		5.91	50.4	126.47	76.48	8.48	18.77	0.36	0.00	45.90	278.51	2.35	0.28	17.08	3526	0.00	0.00	24.15	0.66	1.15	0.27
TBCO-29	Wed-6/29	15:30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-29	Wed-6/29	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-29	Wed-6/29	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-29	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30	Wed-6/29	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30	Thu-6/30	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-31	Thu-6/30	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-31	Thu-6/30	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-31	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-32	Thu-6/30	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-32	Thu-6/30	07:45	5.72	50.0	139.69	80.28	9.01	27.98	0.51	0.00	48.64	270.19	2.55	0.39	18.18	7053	5.44	2.79	41.39	0.80	1.23	0.16
TBCO-32	Thu-6/30	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-32	Averages		5.72	50.0	139.69	80.28	9.01	27.98	0.51	0.00	48.64	270.19	2.55	0.39	18.18	7053	5.44	2.79	41.39	0.80	1.23	0.16
TBCO-29M	Thu-6/30	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-29M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30M	Thu-6/30	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30M	Thu-6/30	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-30M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

June 1994

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-31M	Thu-6/30	14:55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31M	Thu-6/30	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-32M	Thu-6/30	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-32M	Thu-6/30	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-32M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-29L	Thu-6/30	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-29L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-30L	Fri-7/01	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-30L	Fri-7/01	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-30L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31L	Fri-7/01	03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31L	Fri-7/01	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-32L	Fri-7/01	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-32L	Fri-7/01	08:05	5.86	49.2	132.71	82.39	8.98	26.69	0.49	0.00	55.03	274.23	2.22	0.16	17.65	5964	4.93	2.42	34.68	0.36	1.17	0.22
TECO-32L	Averages		5.86	49.2	132.71	82.39	8.98	26.69	0.49	0.00	55.03	274.23	2.22	0.16	17.65	5964	4.93	2.42	34.68	0.36	1.17	0.22
TECO-33	Fri-7/01	14:55	5.91	41.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33	Fri-7/01	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33	Fri-7/01	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33	Fri-7/01	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33	Averages		5.91	41.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34	Fri-7/01	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35	Sat-7/02	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35	Sat-7/02	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-36	Sat-7/02	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-36	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33M	Sat-7/02	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33M	Sat-7/02	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34M	Sat-7/02	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Liquid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

June 1994

Test	Date	Time	FLRT pH	Temp. (C)	L-Ca++ (mM)	L-Mg++ (mM)	L-Na+ (mM)	L-K+ (ppm)	L-Al (ppm)	L-Fe (ppm)	L-Mn (ppm)	L-Cl- (mM)	L-CO3= (mM)	L-SO3= (mM)	L-SO4= (mM)	DBA (ppm)	Succinic (mM)	Glutaric (mM)	Adipic (mM)	CaSO3 RS	CaSO4 RS	CaCO3 RS
TECO-35M	Sat-7/02	10:31	5.55	51.9	135.17	80.99	9.72	31.92	0.67	0.00	54.75	305.36	2.34	0.44	17.43	5980	4.31	2.48	35.23	0.74	1.17	0.07
TECO-35M	Sat-7/02	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35M	Sat-7/02	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35M	Averages		5.55	51.9	135.17	80.99	9.72	31.92	0.67	0.00	54.75	305.36	2.34	0.44	17.43	5980	4.31	2.48	35.23	0.74	1.17	0.07
TECO-36M	Sat-7/02	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-36M	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33L	Sat-7/02	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33L	Sat-7/02	20:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34L	Sat-7/02	22:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35L	Sun-7/03	00:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35L	Sun-7/03	02:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-35L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-36L	Sun-7/03	04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-36L	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34LR	Sun-7/03	06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34LR	Sun-7/03	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-34LR	Averages		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-1X	Thu-6/16	18:15	9.47	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	6.69	-
TECO-1X	Thu-6/16	21:05	14.57	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	8.70	-
TECO-1X	Averages		12.02	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	7.70	-
TECO-2X	Fri-6/17	00:01	10.92	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.07	-
TECO-2X	Averages		10.92	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.07	-
TECO-3X	Fri-6/17	04:20	8.41	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	4.56	-
TECO-3X	Averages		8.41	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	4.56	-
TECO-4X	Fri-6/17	07:00	8.87	-	-	-	-	0.72	-	-	-	-	-	88.0	-	-	6.81	81.03
TECO-4X	Averages		8.87	-	-	-	-	0.72	-	-	-	-	-	88.0	-	-	6.81	81.03
TECO-1	Sat-6/18	00:01	13.33	-	-	-	-	0.73	-	-	-	-	-	87.9	-	-	10.68	-
TECO-1	Averages		13.33	-	-	-	-	0.73	-	-	-	-	-	87.9	-	-	10.68	-
TECO-2	Sat-6/18	05:00	11.97	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.90	-
TECO-2	Averages		11.97	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.90	-
TECO-3	Sat-6/18	08:03	11.94	5.85	0.03	0.00	5.26	0.51	9.0	0.9	5.0	100.0	91.2	91.0	-	-	6.62	84.82
TECO-3	Averages		11.94	5.85	0.03	0.00	5.26	0.51	9.0	0.9	5.0	100.0	91.2	91.0	-	-	6.62	84.82
TECO-2R	Sat-6/18	19:55	12.72	-	-	-	-	0.82	-	-	-	-	-	86.6	-	-	11.40	-
TECO-2R	Averages		12.72	-	-	-	-	0.82	-	-	-	-	-	86.6	-	-	11.40	-
TECO-1M	Sun-6/19	01:05	11.95	-	-	-	-	1.03	-	-	-	-	-	83.6	-	-	13.38	-
TECO-1M	Averages		11.95	-	-	-	-	1.03	-	-	-	-	-	83.6	-	-	13.38	-
TECO-2M	Sun-6/19	06:10	12.45	-	-	-	-	0.95	-	-	-	-	-	84.8	-	-	12.90	-
TECO-2M	Averages		12.45	-	-	-	-	0.95	-	-	-	-	-	84.8	-	-	12.90	-
TECO-3M	Sun-6/19	08:18	11.44	6.01	0.04	0.00	5.18	0.85	1.2	0.2	-1.1	100.0	85.9	86.2	-	-	10.54	82.73
TECO-3M	Sun-6/19	11:00	12.46	-	-	-	-	0.85	-	-	-	-	-	86.2	-	-	11.56	-
TECO-3M	Averages		11.95	6.01	0.04	0.00	5.18	0.85	1.2	0.2	-1.1	100.0	85.9	86.2	-	-	11.05	82.73
TECO-4M	Sun-6/19	17:05	11.41	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	5.94	-
TECO-4M	Averages		11.41	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	5.94	-
TECO-1L	Sun-6/19	20:00	11.99	-	-	-	-	0.36	-	-	-	-	-	93.2	-	-	4.70	-
TECO-1L	Averages		11.99	-	-	-	-	0.36	-	-	-	-	-	93.2	-	-	4.70	-
TECO-2L	Mon-6/20	00:01	11.67	-	-	-	-	0.23	-	-	-	-	-	95.0	-	-	2.91	-
TECO-2L	Averages		11.67	-	-	-	-	0.23	-	-	-	-	-	95.0	-	-	2.91	-
TECO-3L	Mon-6/20	04:00	11.69	-	-	-	-	0.16	-	-	-	-	-	96.0	-	-	2.03	-
TECO-3L	Averages		11.69	-	-	-	-	0.16	-	-	-	-	-	96.0	-	-	2.03	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Util. (%)	S-CO3 Util. (%)	Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-4L	Mon-6/20	08:00	11.75	5.79	0.03	0.00	5.77	0.18	1.0	-1.1	1.5	100.0	96.9	95.7	-	-	2.30	84.67
TECO-4L	Averages		11.75	5.79	0.03	0.00	5.77	0.18	1.0	-1.1	1.5	100.0	96.9	95.7	-	-	2.30	84.67
TECO-1R	Mon-6/20	14:15	13.95	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	5.38	-
TECO-1R	Mon-6/20	16:15	12.75	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.80	-
TECO-1R	Mon-6/20	17:15	11.85	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.21	-
TECO-1R	Mon-6/20	17:57	12.31	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.51	-
TECO-1R	Averages		12.72	-	-	-	-	0.51	-	-	-	-	-	91.1	-	-	6.98	-
TECO-2RR	Mon-6/20	18:59	12.50	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.23	-
TECO-2RR	Mon-6/20	19:56	12.60	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.74	-
TECO-2RR	Averages		12.55	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.99	-
TECO-1LR	Mon-6/20	21:00	11.87	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.45	-
TECO-1LR	Mon-6/20	22:00	12.04	-	-	-	-	0.52	-	-	-	-	-	90.9	-	-	6.81	-
TECO-1LR	Mon-6/20	23:00	11.83	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.30	-
TECO-1LR	Averages		11.91	-	-	-	-	0.50	-	-	-	-	-	91.1	-	-	6.52	-
TECO-2LR	Tue-6/21	00:01	11.38	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.04	-
TECO-2LR	Tue-6/21	00:55	11.10	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.12	-
TECO-2LR	Tue-6/21	02:00	10.70	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	5.77	-
TECO-2LR	Averages		11.06	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	5.98	-
TECO-3LR	Tue-6/21	03:00	10.73	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	5.56	-
TECO-3LR	Tue-6/21	04:00	10.42	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	5.95	-
TECO-3LR	Tue-6/21	05:00	10.01	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	5.70	-
TECO-3LR	Averages		10.39	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	5.73	-
TECO-4LR	Tue-6/21	06:00	10.07	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	5.84	-
TECO-4LR	Tue-6/21	07:00	10.15	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	5.24	-
TECO-4LR	Tue-6/21	07:03	10.19	6.09	0.05	0.00	5.52	0.47	1.0	1.2	1.2	100.0	92.3	91.6	100.0	91.8	5.15	83.99
TECO-4LR	Tue-6/21	08:00	11.62	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.18	-
TECO-4LR	Averages		10.51	6.09	0.05	0.00	5.52	0.50	1.0	1.2	1.2	100.0	92.3	91.2	100.0	91.8	5.60	83.99
TECO-5	Tue-6/21	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	15:01	15.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-5	Tue-6/21	17:00	11.17	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.23	-
TECO-5	Tue-6/21	19:00	11.61	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.29	-
TECO-5	Tue-6/21	21:00	12.55	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.26	-
TECO-5	Averages		11.78	-	-	-	-	0.43	-	-	-	-	-	92.1	-	-	5.59	-
TECO-6	Tue-6/21	23:00	12.07	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.04	-
TECO-6	Wed-6/22	01:15	16.79	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	8.10	-
TECO-6	Averages		14.43	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	7.07	-
TECO-7	Wed-6/22	03:00	12.72	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.53	-
TECO-7	Averages		12.72	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.53	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Solids Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TBCO-8	Wed-6/22	05:00	12.61	-	-	-	-	0.44	-	-	-	-	-	92.0	-	-	6.06	-
TBCO-8	Wed-6/22	07:00	12.94	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.66	-
TBCO-8	Wed-6/22	07:31	12.66	5.95	0.04	0.00	5.51	0.49	0.9	-0.1	0.5	100.0	91.8	91.3	100.0	87.6	6.78	84.01
TBCO-8	Averages		12.74	5.95	0.04	0.00	5.51	0.47	0.9	-0.1	0.5	100.0	91.8	91.6	-	-	6.50	84.01
TBCO-9	Wed-6/22	16:00	20.00	-	-	-	-	0.61	-	-	-	-	-	89.6	-	-	13.99	-
TBCO-9	Wed-6/22	17:00	11.94	-	-	-	-	0.37	-	-	-	-	-	93.0	-	-	4.80	-
TBCO-9	Wed-6/22	18:00	11.94	-	-	-	-	0.37	-	-	-	-	-	93.0	-	-	4.80	-
TBCO-9	Wed-6/22	19:00	11.97	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.90	-
TBCO-9	Wed-6/22	20:00	11.89	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	7.50	-
TBCO-9	Wed-6/22	21:00	11.98	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	8.60	-
TBCO-9	Averages		11.94	-	-	-	-	0.50	-	-	-	-	-	91.1	-	-	6.52	-
TBCO-10	Wed-6/22	22:00	11.76	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	7.66	-
TBCO-10	Wed-6/22	23:00	11.92	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	7.78	-
TBCO-10	Thu-6/23	00:01	11.80	-	-	-	-	0.63	-	-	-	-	-	89.3	-	-	8.08	-
TBCO-10	Averages		11.83	-	-	-	-	0.61	-	-	-	-	-	89.6	-	-	7.84	-
TBCO-11	Thu-6/23	01:00	11.47	-	-	-	-	0.67	-	-	-	-	-	88.8	-	-	8.33	-
TBCO-11	Thu-6/23	02:00	11.48	-	-	-	-	0.73	-	-	-	-	-	87.9	-	-	9.09	-
TBCO-11	Thu-6/23	03:00	11.29	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	8.07	-
TBCO-11	Averages		11.41	-	-	-	-	0.69	-	-	-	-	-	88.5	-	-	8.50	-
TBCO-12	Thu-6/23	05:00	11.39	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	7.41	-
TBCO-12	Thu-6/23	06:00	11.05	-	-	-	-	0.64	-	-	-	-	-	89.2	-	-	7.65	-
TBCO-12	Thu-6/23	07:00	11.16	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	7.00	-
TBCO-12	Thu-6/23	07:45	11.94	6.09	0.04	0.00	5.52	0.61	0.8	0.0	1.9	100.0	90.0	89.6	100.0	88.8	7.92	85.37
TBCO-12	Thu-6/23	08:00	13.36	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.77	-
TBCO-12	Averages		12.15	6.09	0.04	0.00	5.52	0.57	0.8	0.0	1.9	100.0	90.0	90.1	-	-	7.56	85.37
TBCO-13	Thu-6/23	14:35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TBCO-13	Thu-6/23	14:56	11.90	-	-	-	-	0.39	-	-	-	-	-	92.7	-	-	5.05	-
TBCO-13	Thu-6/23	16:00	12.36	-	-	-	-	0.38	-	-	-	-	-	92.9	-	-	5.12	-
TBCO-13	Thu-6/23	17:00	13.06	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.58	-
TBCO-13	Thu-6/23	18:00	13.53	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	7.58	-
TBCO-13	Thu-6/23	19:00	13.47	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	8.43	-
TBCO-13	Thu-6/23	20:00	11.75	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.15	-
TBCO-13	Averages		12.68	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	6.65	-
TBCO-14	Thu-6/23	21:00	11.88	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.23	-
TBCO-14	Thu-6/23	22:00	11.60	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.17	-
TBCO-14	Averages		11.74	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.20	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-15	Thu-6/23	23:00	12.08	-	-	-	-	0.55	-	-	-	-	-	90.5	-	-	7.23	-
TECO-15	Fri-6/24	00:01	11.93	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	7.00	-
TECO-15	Fri-6/24	01:00	12.17	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	7.69	-
TECO-15	Fri-6/24	02:00	12.08	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	7.89	-
TECO-15	Fri-6/24	03:00	12.14	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.53	-
TECO-15	Averages		12.08	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.47	-
TECO-16	Fri-6/24	04:00	12.10	-	-	-	-	0.59	-	-	-	-	-	89.9	-	-	7.77	-
TECO-16	Fri-6/24	05:00	11.55	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	8.27	-
TECO-16	Fri-6/24	06:00	11.88	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	7.49	-
TECO-16	Fri-6/24	07:00	11.85	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.21	-
TECO-16	Fri-6/24	07:10	12.22	6.17	0.05	0.02	5.43	0.50	0.7	2.2	0.4	99.6	91.8	91.2	100.0	92.9	6.66	83.62
TECO-16	Averages		11.92	6.17	0.05	0.02	5.43	0.58	0.7	2.2	0.4	99.6	91.8	90.1	100.0	92.9	7.48	83.62
TECO-17	Fri-6/24	14:00	12.42	-	-	-	-	0.29	-	-	-	-	-	94.1	-	-	3.93	-
TECO-17	Fri-6/24	16:00	11.97	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	5.99	-
TECO-17	Fri-6/24	17:00	11.69	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.33	-
TECO-17	Fri-6/24	18:00	11.75	-	-	-	-	0.31	-	-	-	-	-	93.9	-	-	3.96	-
TECO-17	Fri-6/24	20:00	11.61	-	-	-	-	0.33	-	-	-	-	-	93.6	-	-	4.16	-
TECO-17	Fri-6/24	22:00	11.80	-	-	-	-	0.44	-	-	-	-	-	92.0	-	-	5.64	-
TECO-17	Averages		11.87	-	-	-	-	0.38	-	-	-	-	-	92.9	-	-	4.83	-
TECO-18	Sat-6/25	00:01	11.34	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.51	-
TECO-18	Sat-6/25	02:00	11.99	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	5.87	-
TECO-18	Averages		11.67	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.19	-
TECO-19	Sat-6/25	04:00	11.65	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.32	-
TECO-19	Sat-6/25	06:00	11.60	-	-	-	-	0.36	-	-	-	-	-	93.2	-	-	4.53	-
TECO-19	Averages		11.63	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.43	-
TECO-20	Sat-6/25	06:55	10.85	6.03	0.03	0.02	5.49	0.44	0.5	0.9	0.0	99.6	92.7	92.0	-	-	5.16	82.90
TECO-20	Sat-6/25	08:00	10.89	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	5.53	-
TECO-20	Sat-6/25	10:00	10.84	-	-	-	-	0.40	-	-	-	-	-	92.6	-	-	4.68	-
TECO-20	Averages		10.86	6.03	0.03	0.02	5.49	0.44	0.5	0.9	0.0	99.6	92.7	92.1	-	-	5.12	82.90
TECO-18R	Sat-6/25	12:00	11.60	-	-	-	-	0.36	-	-	-	-	-	93.2	-	-	4.53	-
TECO-18R	Sat-6/25	12:30	12.05	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	5.90	-
TECO-18R	Sat-6/25	14:00	11.57	-	-	-	-	0.55	-	-	-	-	-	90.5	-	-	6.90	-
TECO-18R	Averages		11.74	-	-	-	-	0.45	-	-	-	-	-	91.8	-	-	5.78	-
TECO-17M	Sat-6/25	16:00	12.02	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	5.88	-
TECO-17M	Sat-6/25	18:00	11.79	-	-	-	-	0.52	-	-	-	-	-	90.9	-	-	6.66	-
TECO-17M	Averages		11.91	-	-	-	-	0.49	-	-	-	-	-	91.4	-	-	6.27	-
TECO-18M	Sat-6/25	20:00	11.84	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	6.18	-
TECO-18M	Sat-6/25	22:00	11.90	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.60	-
TECO-18M	Averages		11.87	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.39	-

June 1994

**Pilot FLRT Solid Analytical Summary:
ECTC Tampa Electric Co. Packing Tests**

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Solids Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-19M	Sun-6/26	00:01	11.13	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	5.42	-
TECO-19M	Sun-6/26	02:00	11.35	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	5.78	-
TECO-19M	Averages		11.24	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	5.60	-
TECO-20M	Sun-6/26	04:00	11.01	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.07	-
TECO-20M	Sun-6/26	06:00	11.89	-	-	-	-	0.39	-	-	-	-	-	92.7	-	-	5.04	-
TECO-20M	Averages		11.45	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	5.56	-
TECO-18MR	Sun-6/26	06:25	11.85	5.67	0.04	0.00	5.53	0.30	0.6	-1.0	-1.8	100.0	94.8	94.0	-	-	3.86	84.44
TECO-18MR	Sun-6/26	08:00	12.02	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.02	-
TECO-18MR	Sun-6/26	10:00	11.86	-	-	-	-	0.62	-	-	-	-	-	89.5	-	-	7.99	-
TECO-18MR	Averages		11.91	5.67	0.04	0.00	5.53	0.46	0.6	-1.0	-1.8	100.0	94.8	91.7	-	-	5.96	84.44
TECO-17L	Sun-6/26	12:00	14.78	-	-	-	-	0.62	-	-	-	-	-	89.5	-	-	10.15	-
TECO-17L	Sun-6/26	14:00	14.94	-	-	-	-	0.65	-	-	-	-	-	89.0	-	-	10.77	-
TECO-17L	Averages		14.86	-	-	-	-	0.64	-	-	-	-	-	89.3	-	-	10.46	-
TECO-18L	Sun-6/26	16:00	11.89	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	8.53	-
TECO-18L	Sun-6/26	18:00	12.13	-	-	-	-	0.63	-	-	-	-	-	89.3	-	-	8.32	-
TECO-18L	Averages		12.01	-	-	-	-	0.65	-	-	-	-	-	89.1	-	-	8.43	-
TECO-19L	Sun-6/26	20:00	12.11	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.38	-
TECO-19L	Sun-6/26	22:00	12.40	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	8.11	-
TECO-19L	Averages		12.26	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	7.75	-
TECO-20L	Mon-6/27	00:01	11.83	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.43	-
TECO-20L	Mon-6/27	02:00	12.31	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	7.25	-
TECO-20L	Averages		12.07	-	-	-	-	0.52	-	-	-	-	-	90.9	-	-	6.84	-
TECO-18LR	Mon-6/27	04:00	12.09	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.58	-
TECO-18LR	Mon-6/27	06:00	11.89	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.43	-
TECO-18LR	Mon-6/27	07:48	12.03	5.83	0.04	0.00	5.29	0.56	0.7	0.2	-2.6	100.0	90.4	90.3	100.0	90.0	7.33	84.60
TECO-18LR	Mon-6/27	08:00	12.14	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.40	-
TECO-18LR	Mon-6/27	10:00	11.81	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	6.93	-
TECO-18LR	Averages		11.99	5.83	0.04	0.00	5.29	0.52	0.7	0.2	-2.6	100.0	90.4	90.9	100.0	90.0	6.73	84.60
TECO-21	Mon-6/27	16:00	11.39	-	-	-	-	0.55	-	-	-	-	-	90.5	-	-	6.79	-
TECO-21	Mon-6/27	18:00	12.73	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.40	-
TECO-21	Mon-6/27	20:00	13.04	-	-	-	-	0.58	-	-	-	-	-	90.0	-	-	8.28	-
TECO-21	Averages		12.22	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.34	-
TECO-22	Mon-6/27	22:00	12.23	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.79	-
TECO-22	Tue-6/28	00:01	12.59	-	-	-	-	0.44	-	-	-	-	-	92.0	-	-	6.05	-
TECO-22	Averages		12.41	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	6.42	-
TECO-23	Tue-6/28	02:00	12.75	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.99	-
TECO-23	Tue-6/28	04:00	12.30	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.64	-
TECO-23	Averages		12.53	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.82	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Solids Util. (%)	S-CO3 Util. (%)	Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-24	Tue-6/28	06:00	12.52	-	-	-	-	0.67	-	-	-	-	-	88.8	-	-	9.16	-
TECO-24	Tue-6/28	07:45	11.14	6.01	0.04	0.00	5.43	0.46	0.6	1.3	-0.8	100.0	92.3	91.7	-	-	5.54	83.05
TECO-24	Tue-6/28	08:00	11.82	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.52	-
TECO-24	Averages		11.83	6.01	0.04	0.00	5.43	0.52	0.6	1.3	-0.8	100.0	92.3	90.9	-	-	6.74	83.05
TECO-25	Tue-6/28	18:00	12.00	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.48	-
TECO-25	Tue-6/28	20:00	12.39	-	-	-	-	0.37	-	-	-	-	-	93.0	-	-	5.00	-
TECO-25	Averages		12.20	-	-	-	-	0.40	-	-	-	-	-	92.7	-	-	5.24	-
TECO-26	Tue-6/28	22:00	12.42	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.69	-
TECO-26	Wed-6/29	00:01	12.48	-	-	-	-	0.31	-	-	-	-	-	93.9	-	-	4.22	-
TECO-26	Averages		12.45	-	-	-	-	0.37	-	-	-	-	-	93.1	-	-	4.96	-
TECO-27	Wed-6/29	02:00	12.39	-	-	-	-	0.34	-	-	-	-	-	93.4	-	-	4.59	-
TECO-27	Wed-6/29	04:00	12.32	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.70	-
TECO-27	Averages		12.36	-	-	-	-	0.35	-	-	-	-	-	93.4	-	-	4.65	-
TECO-28	Wed-6/29	06:00	12.06	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.43	-
TECO-28	Wed-6/29	07:23	11.75	6.16	0.04	0.00	5.42	0.53	0.6	2.0	0.1	100.0	91.3	90.7	-	-	6.76	82.87
TECO-28	Wed-6/29	08:00	12.08	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.71	-
TECO-28	Averages		11.96	6.16	0.04	0.00	5.42	0.51	0.6	2.0	0.1	100.0	91.3	91.0	-	-	6.63	82.87
TECO-29	Wed-6/29	15:30	11.96	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.89	-
TECO-29	Wed-6/29	18:00	14.47	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	8.16	-
TECO-29	Wed-6/29	20:00	12.74	-	-	-	-	0.50	-	-	-	-	-	91.2	-	-	6.96	-
TECO-29	Averages		12.35	-	-	-	-	0.51	-	-	-	-	-	91.0	-	-	6.93	-
TECO-30	Wed-6/29	22:00	14.03	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	7.42	-
TECO-30	Thu-6/30	00:01	11.91	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.86	-
TECO-30	Averages		12.97	-	-	-	-	0.51	-	-	-	-	-	91.1	-	-	7.14	-
TECO-31	Thu-6/30	02:00	11.95	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	6.89	-
TECO-31	Thu-6/30	04:00	11.67	-	-	-	-	0.54	-	-	-	-	-	90.6	-	-	6.84	-
TECO-31	Averages		11.81	-	-	-	-	0.54	-	-	-	-	-	90.7	-	-	6.86	-
TECO-32	Thu-6/30	06:00	12.02	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	6.28	-
TECO-32	Thu-6/30	07:45	12.26	5.79	0.04	0.00	5.53	0.53	0.6	-1.9	0.1	100.0	91.1	90.7	100.0	93.0	7.08	82.43
TECO-32	Thu-6/30	08:00	12.22	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	6.52	-
TECO-32	Averages		12.17	5.79	0.04	0.00	5.53	0.50	0.6	-1.9	0.1	100.0	91.1	91.2	100.0	93.0	6.63	82.43
TECO-29M	Thu-6/30	10:00	13.09	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	7.03	-
TECO-29M	Averages		13.09	-	-	-	-	0.49	-	-	-	-	-	91.3	-	-	7.03	-
TECO-30M	Thu-6/30	12:00	12.61	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	5.92	-
TECO-30M	Thu-6/30	14:00	12.27	-	-	-	-	0.39	-	-	-	-	-	92.7	-	-	5.21	-
TECO-30M	Averages		12.44	-	-	-	-	0.41	-	-	-	-	-	92.4	-	-	5.57	-

June 1994

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Solids Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-31M	Thu-6/30	14:55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-31M	Thu-6/30	16:00	13.46	-	-	-	-	0.44	-	-	-	-	-	92.0	-	-	6.50	-
TECO-31M	Averages		13.46	-	-	-	-	0.44	-	-	-	-	-	92.0	-	-	6.50	-
TECO-32M	Thu-6/30	18:00	12.44	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.75	-
TECO-32M	Thu-6/30	20:00	12.93	-	-	-	-	0.26	-	-	-	-	-	94.6	-	-	3.68	-
TECO-32M	Averages		12.69	-	-	-	-	0.31	-	-	-	-	-	93.9	-	-	4.21	-
TECO-29L	Thu-6/30	22:00	11.86	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.41	-
TECO-29L	Averages		11.86	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.41	-
TECO-30L	Fri-7/01	00:01	12.14	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.63	-
TECO-30L	Fri-7/01	02:00	12.13	-	-	-	-	0.56	-	-	-	-	-	90.3	-	-	7.40	-
TECO-30L	Averages		12.14	-	-	-	-	0.46	-	-	-	-	-	91.8	-	-	6.01	-
TECO-31L	Fri-7/01	03:00	12.60	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.84	-
TECO-31L	Fri-7/01	04:00	12.17	-	-	-	-	0.66	-	-	-	-	-	88.9	-	-	8.75	-
TECO-31L	Averages		12.39	-	-	-	-	0.62	-	-	-	-	-	89.5	-	-	8.29	-
TECO-32L	Fri-7/01	06:00	12.12	-	-	-	-	0.57	-	-	-	-	-	90.2	-	-	7.52	-
TECO-32L	Fri-7/01	08:05	12.35	6.01	0.05	0.00	5.51	0.61	0.9	-0.5	1.5	100.0	90.0	89.6	100.0	84.1	8.21	80.72
TECO-32L	Averages		12.24	6.01	0.05	0.00	5.51	0.59	0.9	-0.5	1.5	100.0	90.0	89.9	100.0	84.1	7.87	80.72
TECO-33	Fri-7/01	14:55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TECO-33	Fri-7/01	16:00	15.41	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	8.23	-
TECO-33	Fri-7/01	18:00	16.25	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	8.72	-
TECO-33	Fri-7/01	20:00	12.55	-	-	-	-	0.52	-	-	-	-	-	90.9	-	-	7.12	-
TECO-33	Averages		14.74	-	-	-	-	0.49	-	-	-	-	-	91.26	-	-	8.02	-
TECO-34	Fri-7/01	22:00	12.26	-	-	-	-	0.46	-	-	-	-	-	91.8	-	-	6.10	-
TECO-34	Averages		12.26	-	-	-	-	0.46	-	-	-	-	-	91.8	-	-	6.10	-
TECO-35	Sat-7/02	00:01	12.70	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.38	-
TECO-35	Sat-7/02	02:00	12.37	-	-	-	-	0.38	-	-	-	-	-	92.9	-	-	5.13	-
TECO-35	Averages		12.54	-	-	-	-	0.42	-	-	-	-	-	92.3	-	-	5.75	-
TECO-36	Sat-7/02	04:00	12.43	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.24	-
TECO-36	Averages		12.43	-	-	-	-	0.46	-	-	-	-	-	91.7	-	-	6.24	-
TECO-33M	Sat-7/02	06:00	13.03	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	6.14	-
TECO-33M	Sat-7/02	08:00	12.14	-	-	-	-	0.26	-	-	-	-	-	94.6	-	-	3.44	-
TECO-33M	Averages		12.14	-	-	-	-	0.26	-	-	-	-	-	94.6	-	-	3.44	-
TECO-34M	Sat-7/02	10:00	12.48	-	-	-	-	0.34	-	-	-	-	-	93.4	-	-	4.63	-
TECO-34M	Averages		12.48	-	-	-	-	0.34	-	-	-	-	-	93.4	-	-	4.63	-

Pilot FLRT Solid Analytical Summary: ECTC Tampa Electric Co. Packing Tests

June 1994

Test	Date	Time	Wt% Solids	Ca (mmol/g)	Mg (mmol/g)	SO3 (mmol/g)	SO4 (mmol/g)	CO3 (mmol/g)	Inerts (wt%)	Molar Closure (%)	Weight Closure (%)	Solids Ox. (%)	Solids Util. (%)	S-CO3 Util. (%)	IR Ox. (%)	IR Util. (%)	Limestone Loading (g/L)	Centrifuge Product (Wt%)
TECO-35M	Sat-7/02	10:31	12.40	5.78	0.04	0.00	5.66	0.35	0.9	-1.6	1.0	100.0	94.1	93.3	-	-	4.73	80.67
TECO-35M	Sat-7/02	12:00	12.31	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.70	-
TECO-35M	Sat-7/02	14:00	11.90	-	-	-	-	0.29	-	-	-	-	-	94.1	-	-	3.75	-
TECO-35M	Averages		12.20	5.78	0.04	0.00	5.66	0.33	0.9	-1.6	1.0	100.0	94.1	93.6	-	-	4.39	80.67
TECO-36M	Sat-7/02	16:00	11.68	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.44	-
TECO-36M	Averages		11.68	-	-	-	-	0.35	-	-	-	-	-	93.3	-	-	4.44	-
TECO-33L	Sat-7/02	18:00	11.56	-	-	-	-	0.31	-	-	-	-	-	93.9	-	-	3.89	-
TECO-33L	Sat-7/02	20:00	12.15	-	-	-	-	0.30	-	-	-	-	-	94.0	-	-	3.97	-
TECO-33L	Averages		12.15	-	-	-	-	0.30	-	-	-	-	-	94.0	-	-	3.97	-
TECO-34L	Sat-7/02	22:00	12.32	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.31	-
TECO-34L	Averages		12.32	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.31	-
TECO-35L	Sun-7/03	00:01	13.14	-	-	-	-	0.60	-	-	-	-	-	89.7	-	-	8.64	-
TECO-35L	Sun-7/03	02:00	13.49	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	7.11	-
TECO-35L	Averages		13.49	-	-	-	-	0.48	-	-	-	-	-	91.5	-	-	7.11	-
TECO-36L	Sun-7/03	04:00	12.90	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.48	-
TECO-36L	Averages		12.90	-	-	-	-	0.53	-	-	-	-	-	90.7	-	-	7.48	-
TECO-34LR	Sun-7/03	06:00	13.19	-	-	-	-	0.43	-	-	-	-	-	92.2	-	-	6.22	-
TECO-34LR	Sun-7/03	08:00	11.92	-	-	-	-	0.47	-	-	-	-	-	91.6	-	-	6.09	-
TECO-34LR	Averages		12.56	-	-	-	-	0.45	-	-	-	-	-	91.9	-	-	6.15	-

TECO-1X Process Summary Report (Polypak packing depth: 2 ft.)
(6/16/94 19:00:00 to 6/16/94 21:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	65.4	65.6	65.2	0.2	2
L/G Ratio (gal/macf)	38	38	38	0	2
Reaction Tank pH	5.84	5.86	5.83	0.02	2
Absorber pH	7.05	7.07	7.02	0.03	2
Flue Gas Flow Rate (scfm)	14001	14002	14001	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.23	0.29	0.17	0.06	2
Centrifuge Feed Rate (gpm)	10.0	10.0	10.0	0.0	2
Facility Inlet SO2 Conc. (ppm)	1057	1062	1053	4	2
Inlet SO2 Concentration (ppm)	2001	2001	2000	0	2
Outlet SO2 Concentration (ppm)	642	647	638	4	2
Inlet O2 Concentration (%)	6.49	6.53	6.46	0.03	2
Outlet O2 Concentration (%)	6.24	6.27	6.21	0.03	2
Absorber Gas Velocity (ft/sec)	14.35	14.36	14.34	0.01	2
Inlet Gas Temperature (F)	365	367	363	2	2
Outlet Gas Temperature (F)	134	134	134	0	2
SO2 Absorbed (mmole/L)	8.92	8.95	8.90	0.03	2
Solids Residence Time (hrs)	11.9	11.9	11.8	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	12.51	12.55	12.48	0.04	2
VME Pressure Drop (in H2O)	0.14	0.14	0.14	0.00	0
Oxidation Air to Rxn Tank (acfm)	440	443	438	2	2
NYSEG Load (MW)	692	693	692	0	2

TECO-2X Process Summary Report (Polypak packing depth: 2 ft.)
(6/16/94 22:00:00 to 6/16/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	63.8	64.2	63.4	0.4	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.84	5.84	5.84	0.00	2
Absorber pH	6.99	6.99	6.99	0.00	2
Flue Gas Flow Rate (scfm)	11801	11801	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.20	0.26	0.15	0.05	2
Centrifuge Feed Rate (gpm)	6.5	6.5	6.5	0.0	2
Facility Inlet SO2 Conc. (ppm)	1073	1080	1065	8	2
Inlet SO2 Concentration (ppm)	2000	2003	1996	3	2
Outlet SO2 Concentration (ppm)	677	686	669	9	2
Inlet O2 Concentration (%)	6.54	6.56	6.51	0.02	2
Outlet O2 Concentration (%)	6.35	6.38	6.33	0.02	2
Absorber Gas Velocity (ft/sec)	11.98	12.00	11.97	0.01	2
Inlet Gas Temperature (F)	333	335	332	2	2
Outlet Gas Temperature (F)	131	131	130	0	2
SO2 Absorbed (mmole/L)	7.33	7.37	7.30	0.03	2
Solids Residence Time (hrs)	14.4	14.5	14.4	0.1	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	8.63	8.64	8.61	0.02	2
Spray Zone Pressure Drop (in H2O)	2.69	2.71	2.68	0.02	2
VME Pressure Drop (in H2O)	0.07	0.07	0.07	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	2
NYSEG Load (MW)	695	695	695	0	2

TECO-3X Process Summary Report (Polypak packing depth: 2 ft.)
(6/17/94 01:00:00 to 6/17/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	65.4	65.7	65.1	0.2	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	5.94	5.96	5.91	0.02	3
Absorber pH	6.99	6.99	6.99	0.00	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.15	0.16	0.15	0.00	3
Centrifuge Feed Rate (gpm)	6.2	6.5	6.0	0.3	3
Facility Inlet SO2 Conc. (ppm)	1062	1066	1055	5	3
Inlet SO2 Concentration (ppm)	2000	2000	2000	0	3
Outlet SO2 Concentration (ppm)	651	657	646	4	3
Inlet O2 Concentration (%)	7.00	7.05	6.93	0.05	3
Outlet O2 Concentration (%)	6.82	6.86	6.75	0.05	3
Absorber Gas Velocity (ft/sec)	9.90	9.90	9.89	0.00	3
Inlet Gas Temperature (F)	314	314	313	0	3
Outlet Gas Temperature (F)	128	128	128	0	3
SO2 Absorbed (mmole/L)	6.24	6.27	6.22	0.02	3
Solids Residence Time (hrs)	16.9	17.0	16.9	0.1	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	5.82	5.84	5.81	0.01	3
Spray Zone Pressure Drop (in H2O)	1.73	1.74	1.73	0.00	3
VME Pressure Drop (in H2O)	0.02	0.02	0.02	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	643	656	635	9	3

TECO-4X Process Summary Report (Polypak packing depth: 2 ft.)
(6/17/94 05:00:00 to 6/17/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	70.7	71.1	70.3	0.3	3
L/G Ratio (gal/macf)	68	68	68	0	3
Reaction Tank pH	6.05	6.06	6.04	0.01	3
Absorber pH	7.01	7.01	7.01	0.00	3
Flue Gas Flow Rate (scfm)	8000	8001	7998	1	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.17	0.17	0.16	0.00	3
Centrifuge Feed Rate (gpm)	5.0	5.0	5.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	1081	1092	1072	8	3
Inlet SO2 Concentration (ppm)	1999	2001	1998	1	3
Outlet SO2 Concentration (ppm)	551	559	543	6	3
Inlet O2 Concentration (%)	7.13	7.21	7.00	0.09	3
Outlet O2 Concentration (%)	6.95	7.00	6.84	0.08	3
Absorber Gas Velocity (ft/sec)	8.10	8.10	8.10	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	127	127	127	0	3
SO2 Absorbed (mmole/L)	5.51	5.53	5.47	0.02	3
Solids Residence Time (hrs)	19.2	19.3	19.1	0.1	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.96	3.98	3.95	0.01	3
Spray Zone Pressure Drop (in H2O)	1.11	1.11	1.11	0.00	3
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	667	680	655	10	3

TECO-1 Process Summary Report (Polypak packing depth: 2 ft.)
(6/17/94 19:00:00 to 6/17/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	79.3	80.0	78.0	0.8	4
L/G Ratio (gal/macf)	39	39	39	0	4
Reaction Tank pH	5.89	5.90	5.88	0.01	4
Absorber pH	7.12	7.16	7.07	0.04	4
Flue Gas Flow Rate (scfm)	14005	14026	13993	11	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	650	650	650	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.17	0.25	0.02	0.06	4
Centrifuge Feed Rate (gpm)	9.0	9.0	9.0	0.0	4
Facility Inlet SO2 Conc. (ppm)	1086	1094	1081	4	4
Inlet SO2 Concentration (ppm)	2000	2004	1998	2	4
Outlet SO2 Concentration (ppm)	400	458	372	31	4
Inlet O2 Concentration (%)	6.58	6.61	6.55	0.02	4
Outlet O2 Concentration (%)	6.33	6.35	6.28	0.03	4
Absorber Gas Velocity (ft/sec)	14.25	14.26	14.24	0.01	4
Inlet Gas Temperature (F)	357	358	357	0	4
Outlet Gas Temperature (F)	133	133	132	0	4
SO2 Absorbed (mmole/L)	10.81	10.95	10.64	0.11	4
Solids Residence Time (hrs)	9.8	9.9	9.7	0.1	4
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	4
Absorber Pressure Drop (in H2O)	13.93	13.98	13.88	0.04	4
VME Pressure Drop (in H2O)	0.14	0.15	0.14	0.00	0
Oxidation Air to Rxn Tank (acfm)	440	442	440	1	4
NYSEG Load (MW)	699	701	698	1	4

TECO-2 Process Summary Report (Polypak packing depth: 2 ft.)
(6/18/94 01:00:00 to 6/18/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	72.4	73.9	70.8	1.2	4
L/G Ratio (gal/macf)	46	46	46	0	4
Reaction Tank pH	5.94	5.95	5.93	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	11800	11801	11800	0	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	650	650	650	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.19	0.23	0.17	0.02	4
Centrifuge Feed Rate (gpm)	5.5	6.0	5.0	0.6	4
Facility Inlet SO2 Conc. (ppm)	1127	1159	1097	23	4
Inlet SO2 Concentration (ppm)	2002	2005	1999	2	4
Outlet SO2 Concentration (ppm)	518	549	488	23	4
Inlet O2 Concentration (%)	6.81	6.85	6.76	0.03	4
Outlet O2 Concentration (%)	6.60	6.64	6.56	0.03	4
Absorber Gas Velocity (ft/sec)	11.92	11.93	11.92	0.01	4
Inlet Gas Temperature (F)	331	332	330	1	4
Outlet Gas Temperature (F)	129	129	129	0	4
SO2 Absorbed (mmole/L)	8.32	8.50	8.15	0.13	4
Solids Residence Time (hrs)	12.7	13.0	12.4	0.2	4
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	4
Absorber Pressure Drop (in H2O)	8.40	8.50	8.32	0.07	4
Spray Zone Pressure Drop (in H2O)	2.89	2.90	2.88	0.01	4
VME Pressure Drop (in H2O)	0.08	0.08	0.07	0.00	4
Oxidation Air to Rxn Tank (acfm)	439	442	435	2	4
NYSEG Load (MW)	690	700	682	7	4

TECO-3 Process Summary Report (Polypak packing depth: 2 ft.)
(6/18/94 06:00:00 to 6/18/94 10:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	72.1	72.3	71.7	0.2	4
L/G Ratio (gal/macf)	56	56	56	0	4
Reaction Tank pH	5.95	5.96	5.94	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	9801	9802	9800	1	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	650	650	650	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.18	0.20	0.17	0.01	4
Centrifuge Feed Rate (gpm)	5.0	5.3	4.9	0.2	4
Facility Inlet SO2 Conc. (ppm)	1230	1253	1197	20	4
Inlet SO2 Concentration (ppm)	1999	2002	1995	3	4
Outlet SO2 Concentration (ppm)	524	531	520	5	4
Inlet O2 Concentration (%)	6.84	7.04	6.74	0.12	4
Outlet O2 Concentration (%)	6.65	6.82	6.56	0.10	4
Absorber Gas Velocity (ft/sec)	9.86	9.86	9.86	0.00	4
Inlet Gas Temperature (F)	319	319	319	0	4
Outlet Gas Temperature (F)	128	128	128	0	4
SO2 Absorbed (mmole/L)	6.88	6.91	6.85	0.02	4
Solids Residence Time (hrs)	15.4	15.4	15.3	0.0	4
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	4
Absorber Pressure Drop (in H2O)	5.97	6.05	5.90	0.05	4
Spray Zone Pressure Drop (in H2O)	2.00	2.01	2.00	0.01	4
VME Pressure Drop (in H2O)	0.03	0.03	0.02	0.00	4
Oxidation Air to Rxn Tank (acfm)	440	442	439	1	4
NYSEG Load (MW)	687	688	685	1	4

TECO-4 Process Summary Report (Polypak packing depth: 2 ft.)
(6/18/94 11:00:00 to 6/18/94 15:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	76.8	76.9	76.7	0.1	4
L/G Ratio (gal/macf)	68	69	68	0	4
Reaction Tank pH	6.03	6.04	6.01	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	8001	8004	7996	3	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	650	650	650	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.19	0.24	0.17	0.03	4
Centrifuge Feed Rate (gpm)	4.9	4.9	4.9	0.0	4
Facility Inlet SO2 Conc. (ppm)	1132	1153	1090	26	4
Inlet SO2 Concentration (ppm)	1997	2000	1992	3	4
Outlet SO2 Concentration (ppm)	437	440	436	1	4
Inlet O2 Concentration (%)	7.66	7.71	7.62	0.03	4
Outlet O2 Concentration (%)	7.44	7.46	7.43	0.01	4
Absorber Gas Velocity (ft/sec)	8.06	8.07	8.04	0.01	4
Inlet Gas Temperature (F)	300	305	297	3	4
Outlet Gas Temperature (F)	125	126	125	0	4
SO2 Absorbed (mmole/L)	5.98	5.99	5.96	0.01	4
Solids Residence Time (hrs)	17.7	17.7	17.7	0.0	4
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	4
Absorber Pressure Drop (in H2O)	4.10	4.16	4.05	0.05	4
Spray Zone Pressure Drop (in H2O)	1.38	1.38	1.37	0.00	4
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	4
Oxidation Air to Rxn Tank (acfm)	441	449	437	5	4
NYSEG Load (MW)	701	701	700	1	4

TECO-2R Process Summary Report (Polypak packing depth: 2 ft.)
(6/18/94 16:00:00 to 6/18/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	73.2	74.2	72.3	0.8	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	6.03	6.04	6.01	0.01	3
Absorber pH	7.16	7.16	7.16	0.00	3
Flue Gas Flow Rate (scfm)	11800	11800	11799	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.30	0.31	0.28	0.01	3
Centrifuge Feed Rate (gpm)	7.4	8.1	6.1	1.1	3
Facility Inlet SO2 Conc. (ppm)	1080	1093	1072	9	3
Inlet SO2 Concentration (ppm)	2000	2004	1997	2	3
Outlet SO2 Concentration (ppm)	503	520	485	15	3
Inlet O2 Concentration (%)	6.78	6.95	6.62	0.16	3
Outlet O2 Concentration (%)	6.59	6.77	6.43	0.16	3
Absorber Gas Velocity (ft/sec)	11.90	11.91	11.90	0.01	3
Inlet Gas Temperature (F)	320	323	316	3	3
Outlet Gas Temperature (F)	128	128	127	1	3
SO2 Absorbed (mmole/L)	8.41	8.52	8.31	0.09	3
Solids Residence Time (hrs)	12.7	13.0	12.4	0.2	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	8.99	9.10	8.85	0.10	3
Spray Zone Pressure Drop (in H2O)	2.91	2.93	2.90	0.01	3
VME Pressure Drop (in H2O)	0.08	0.08	0.08	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	442	438	1	3
NYSEG Load (MW)	697	700	694	2	3

TECO-1M Process Summary Report (Polypak packing depth: 2 ft.)
(6/18/94 21:00:00 to 6/19/94 01:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	69.0	69.2	68.9	0.1	4
L/G Ratio (gal/macf)	32	32	32	0	4
Reaction Tank pH	6.04	6.05	6.03	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	14000	14001	14000	0	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	540	540	540	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.15	0.16	0.14	0.01	4
Centrifuge Feed Rate (gpm)	8.0	8.0	8.0	0.0	4
Facility Inlet SO2 Conc. (ppm)	1073	1080	1068	5	4
Inlet SO2 Concentration (ppm)	2000	2002	1998	2	4
Outlet SO2 Concentration (ppm)	576	580	573	3	4
Inlet O2 Concentration (%)	6.34	6.35	6.33	0.01	4
Outlet O2 Concentration (%)	6.14	6.15	6.13	0.01	4
Absorber Gas Velocity (ft/sec)	14.24	14.25	14.24	0.01	4
Inlet Gas Temperature (F)	353	353	352	0	4
Outlet Gas Temperature (F)	131	131	131	0	4
SO2 Absorbed (mmole/L)	11.33	11.37	11.31	0.02	4
Solids Residence Time (hrs)	11.2	11.3	11.2	0.0	4
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	4
Absorber Pressure Drop (in H2O)	12.42	12.53	12.31	0.08	4
Spray Zone Pressure Drop (in H2O)	3.67	3.70	3.66	0.01	4
VME Pressure Drop (in H2O)	0.16	0.16	0.15	0.00	4
Oxidation Air to Rxn Tank (acfm)	440	443	438	2	4
NYSEG Load (MW)	696	700	687	5	4

TECO-2M Process Summary Report (Polypak packing depth: 2 ft.)
(6/19/94 2:00:00 to 6/19/94 6:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	68.9	69.1	68.7	0.2	4
L/G Ratio (gal/macf)	38	38	38	0	4
Reaction Tank pH	6.05	6.06	6.04	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	540	540	540	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.16	0.16	0.15	0.00	4
Centrifuge Feed Rate (gpm)	5.6	6.0	5.0	0.5	4
Facility Inlet SO2 Conc. (ppm)	1068	1072	1062	4	4
Inlet SO2 Concentration (ppm)	2000	2001	1998	1	4
Outlet SO2 Concentration (ppm)	582	586	578	3	4
Inlet O2 Concentration (%)	6.76	6.82	6.70	0.04	4
Outlet O2 Concentration (%)	6.56	6.62	6.49	0.05	4
Absorber Gas Velocity (ft/sec)	11.94	11.97	11.92	0.02	4
Inlet Gas Temperature (F)	330	331	328	1	4
Outlet Gas Temperature (F)	129	130	128	1	4
SO2 Absorbed (mmole/L)	9.53	9.55	9.50	0.02	4
Solids Residence Time (hrs)	13.4	13.4	13.3	0.0	4
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	4
Absorber Pressure Drop (in H2O)	9.15	9.25	9.04	0.08	4
Spray Zone Pressure Drop (in H2O)	2.50	2.51	2.49	0.01	4
VME Pressure Drop (in H2O)	0.08	0.08	0.08	0.00	4
Oxidation Air to Rxn Tank (acfm)	440	442	439	1	4
NYSEG Load (MW)	686	688	680	3	4

TECO-3M Process Summary Report (Polypak packing depth: 2 ft.)
(6/19/94 07:00:00 to 6/19/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	69.9	70.1	69.6	0.2	4
L/G Ratio (gal/macf)	46	47	46	0	4
Reaction Tank pH	6.06	6.06	6.05	0.00	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	540	540	540	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.18	0.26	0.15	0.05	4
Centrifuge Feed Rate (gpm)	5.2	5.6	4.6	0.4	4
Facility Inlet SO2 Conc. (ppm)	1065	1074	1059	6	4
Inlet SO2 Concentration (ppm)	1999	2002	1997	2	4
Outlet SO2 Concentration (ppm)	565	572	562	4	4
Inlet O2 Concentration (%)	6.70	6.72	6.67	0.02	4
Outlet O2 Concentration (%)	6.54	6.55	6.52	0.01	4
Absorber Gas Velocity (ft/sec)	9.86	9.87	9.86	0.00	4
Inlet Gas Temperature (F)	317	318	317	0	4
Outlet Gas Temperature (F)	127	127	127	0	4
SO2 Absorbed (mmole/L)	8.03	8.05	8.00	0.02	4
Solids Residence Time (hrs)	15.9	15.9	15.8	0.0	4
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	4
Absorber Pressure Drop (in H2O)	6.52	6.63	6.42	0.08	4
Spray Zone Pressure Drop (in H2O)	1.69	1.69	1.68	0.00	4
VME Pressure Drop (in H2O)	0.03	0.03	0.03	0.00	4
Oxidation Air to Rxn Tank (acfm)	439	440	438	1	4
NYSEG Load (MW)	693	698	685	5	4

TECO-4M Process Summary Report (Polypak packing depth: 2 ft.)
(6/19/94 12:00:00 to 6/19/94 16:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	72.2	73.2	71.4	0.7	4
L/G Ratio (gal/macf)	57	57	57	0	4
Reaction Tank pH	6.06	6.07	6.05	0.01	4
Absorber pH	7.16	7.16	7.16	0.00	4
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	540	540	540	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.25	0.29	0.19	0.04	4
Centrifuge Feed Rate (gpm)	4.1	5.1	2.7	1.1	4
Facility Inlet SO2 Conc. (ppm)	1073	1076	1068	3	4
Inlet SO2 Concentration (ppm)	2002	2005	1998	3	4
Outlet SO2 Concentration (ppm)	524	539	504	13	4
Inlet O2 Concentration (%)	6.86	6.87	6.82	0.02	4
Outlet O2 Concentration (%)	6.71	6.73	6.66	0.03	4
Absorber Gas Velocity (ft/sec)	8.02	8.02	8.01	0.01	4
Inlet Gas Temperature (F)	307	307	307	0	4
Outlet Gas Temperature (F)	125	126	124	1	4
SO2 Absorbed (mmole/L)	6.78	6.86	6.72	0.05	4
Solids Residence Time (hrs)	18.8	19.0	18.6	0.1	4
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	4
Absorber Pressure Drop (in H2O)	4.48	4.52	4.44	0.04	4
Spray Zone Pressure Drop (in H2O)	1.13	1.13	1.13	0.00	4
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	4
Oxidation Air to Rxn Tank (acfm)	440	444	435	3	4
NYSEG Load (MW)	698	698	697	1	4

TECO-1L Process Summary Report (Polypak packing depth: 2 ft.)
(6/19/94 17:00:00 to 6/19/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	54.2	54.4	54.0	0.2	2
L/G Ratio (gal/macf)	26	26	25	0	2
Reaction Tank pH	5.99	6.00	5.98	0.01	2
Absorber pH	7.16	7.16	7.16	0.00	2
Flue Gas Flow Rate (scfm)	14003	14005	14001	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.29	0.29	0.28	0.00	2
Centrifuge Feed Rate (gpm)	4.0	4.3	3.8	0.2	2
Facility Inlet SO2 Conc. (ppm)	1070	1074	1068	3	2
Inlet SO2 Concentration (ppm)	2002	2004	2001	1	2
Outlet SO2 Concentration (ppm)	854	857	851	3	2
Inlet O2 Concentration (%)	7.18	7.36	6.89	0.21	2
Outlet O2 Concentration (%)	6.91	7.06	6.64	0.19	2
Absorber Gas Velocity (ft/sec)	14.29	14.36	14.21	0.06	2
Inlet Gas Temperature (F)	345	351	339	5	2
Outlet Gas Temperature (F)	129	130	128	1	2
SO2 Absorbed (mmole/L)	11.19	11.23	11.15	0.04	2
Solids Residence Time (hrs)	14.3	14.3	14.2	0.1	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	12.96	13.04	12.85	0.08	2
Spray Zone Pressure Drop (in H2O)	3.04	3.06	3.03	0.01	2
VME Pressure Drop (in H2O)	0.16	0.16	0.16	0.00	2
Oxidation Air to Rxn Tank (acfm)	443	444	440	2	2
NYSEG Load (MW)	692	700	679	9	2

TECO-2L Process Summary Report (Polypak packing depth: 2 ft.)
(6/19/94 21:00:00 to 6/19/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	50.8	51.3	50.4	0.3	3
LAG Ratio (gal/macf)	31	31	30	0	3
Reaction Tank pH	5.87	5.88	5.86	0.01	3
Absorber pH	7.16	7.16	7.16	0.00	3
Flue Gas Flow Rate (scfm)	11780	11801	11740	28	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	432	436	430	3	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.16	0.19	0.14	0.02	3
Centrifuge Feed Rate (gpm)	3.4	4.0	3.0	0.5	3
Facility Inlet SO2 Conc. (ppm)	1041	1054	1017	17	3
Inlet SO2 Concentration (ppm)	1999	2000	1998	1	3
Outlet SO2 Concentration (ppm)	922	929	912	7	3
Inlet O2 Concentration (%)	7.51	7.71	7.36	0.15	3
Outlet O2 Concentration (%)	7.28	7.49	7.15	0.15	3
Absorber Gas Velocity (ft/sec)	11.96	11.99	11.90	0.04	3
Inlet Gas Temperature (F)	323	325	322	1	3
Outlet Gas Temperature (F)	127	127	126	0	3
SO2 Absorbed (mmole/L)	8.77	8.90	8.64	0.10	3
Solids Residence Time (hrs)	18.2	18.2	18.0	0.1	3
Slurry Residence Time (min)	13.22	13.28	13.10	0.09	3
Absorber Pressure Drop (in H2O)	9.35	9.36	9.33	0.01	3
Spray Zone Pressure Drop (in H2O)	2.07	2.08	2.06	0.01	3
VME Pressure Drop (in H2O)	0.09	0.09	0.09	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	661	689	630	24	3

TECO-3L Process Summary Report (Polypak packing depth: 2 ft.)
(6/20/94 01:00:00 to 6/20/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	49.2	50.2	48.3	0.8	3
LAG Ratio (gal/macf)	37	37	37	0	3
Reaction Tank pH	5.73	5.76	5.69	0.03	3
Absorber pH	7.16	7.16	7.16	0.00	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.17	0.20	0.15	0.02	3
Centrifuge Feed Rate (gpm)	2.5	3.0	2.1	0.4	3
Facility Inlet SO2 Conc. (ppm)	966	996	916	35	3
Inlet SO2 Concentration (ppm)	1997	1999	1996	1	3
Outlet SO2 Concentration (ppm)	957	975	939	15	3
Inlet O2 Concentration (%)	8.72	9.21	8.38	0.36	3
Outlet O2 Concentration (%)	8.44	8.86	8.13	0.31	3
Absorber Gas Velocity (ft/sec)	9.85	9.87	9.84	0.01	3
Inlet Gas Temperature (F)	296	299	292	3	3
Outlet Gas Temperature (F)	123	123	122	0	3
SO2 Absorbed (mmole/L)	7.09	7.23	6.96	0.11	3
Solids Residence Time (hrs)	22.5	23.0	22.1	0.4	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	6.53	6.58	6.49	0.04	3
Spray Zone Pressure Drop (in H2O)	1.38	1.38	1.37	0.00	3
VME Pressure Drop (in H2O)	0.03	0.03	0.03	0.00	3
Oxidation Air to Rxn Tank (acfm)	441	441	440	1	3
NYSEG Load (MW)	551	582	496	39	3

TECO-4L Process Summary Report (Polypak packing depth: 2 ft.)
(6/20/94 05:00:00 to 6/20/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	54.5	55.7	53.2	1.0	3
L/G Ratio (gal/macf)	45	46	45	0	3
Reaction Tank pH	5.78	5.82	5.73	0.03	3
Absorber pH	7.16	7.16	7.16	0.00	3
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.24	0.25	0.22	0.01	3
Centrifuge Feed Rate (gpm)	2.0	2.0	2.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	886	888	885	1	3
Inlet SO2 Concentration (ppm)	2001	2003	1999	2	3
Outlet SO2 Concentration (ppm)	860	883	840	18	3
Inlet O2 Concentration (%)	9.64	9.65	9.64	0.00	3
Outlet O2 Concentration (%)	9.20	9.22	9.19	0.01	3
Absorber Gas Velocity (ft/sec)	8.03	8.04	8.02	0.01	3
Inlet Gas Temperature (F)	290	293	288	2	3
Outlet Gas Temperature (F)	120	121	120	0	3
SO2 Absorbed (mmole/L)	6.43	6.57	6.27	0.12	3
Solids Residence Time (hrs)	0.0	0.0	0.0	0.0	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	4.38	4.40	4.35	0.02	3
Spray Zone Pressure Drop (in H2O)	0.90	0.90	0.89	0.00	3
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	330	342	317	10	3

TECO-1R Process Summary Report (Polypak packing depth: 2 ft.)
(6/20/94 16:00:00 to 6/20/94 18:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	78.6	79.0	78.2	0.4	2
L/G Ratio (gal/macf)	39	39	39	0	2
Reaction Tank pH	5.96	5.96	5.95	0.01	2
Absorber pH	4.53	4.54	4.52	0.01	2
Flue Gas Flow Rate (scfm)	14054	14054	14054	0	1
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.26	0.26	0.25	0.01	2
Centrifuge Feed Rate (gpm)	8.6	9.0	8.2	0.4	2
Facility Inlet SO2 Conc. (ppm)	1061	1065	1057	4	2
Inlet SO2 Concentration (ppm)	1996	2000	1991	4	2
Outlet SO2 Concentration (ppm)	397	403	391	6	2
Inlet O2 Concentration (%)	6.57	6.58	6.56	0.01	2
Outlet O2 Concentration (%)	6.36	6.40	6.32	0.04	2
Absorber Gas Velocity (ft/sec)	7.13	14.25	0.00	7.13	2
Inlet Gas Temperature (F)	353	353	353	0	2
Outlet Gas Temperature (F)	130	131	128	1	2
SO2 Absorbed (mmole/L)	5.40	10.81	0.00	5.40	2
Solids Residence Time (hrs)	9.9	9.9	9.8	0.1	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	16.63	16.77	16.48	0.14	2
Spray Zone Pressure Drop (in H2O)	BV	BV	BV	BV	0
VME Pressure Drop (in H2O)	0.17	0.17	0.17	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	440	437	1	2
NYSEG Load (MW)	685	686	684	1	2

TECO-2RR Process Summary Report (Polypak packing depth: 2 ft.)
(6/20/94 18:00:00 to 6/20/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	70.8	70.9	70.8	0.1	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.98	5.99	5.97	0.01	2
Absorber pH	4.57	4.59	4.54	0.02	2
Flue Gas Flow Rate (scfm)	11803	11806	11800	3	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.15	0.15	0.14	0.00	2
Centrifuge Feed Rate (gpm)	7.3	7.6	7.0	0.4	2
Facility Inlet SO2 Conc. (ppm)	1013	1034	991	22	2
Inlet SO2 Concentration (ppm)	1999	2003	1994	5	2
Outlet SO2 Concentration (ppm)	545	545	544	0	2
Inlet O2 Concentration (%)	6.97	7.22	6.73	0.25	2
Outlet O2 Concentration (%)	6.75	6.97	6.52	0.22	2
Absorber Gas Velocity (ft/sec)	11.92	11.93	11.92	0.01	2
Inlet Gas Temperature (F)	335	335	335	0	2
Outlet Gas Temperature (F)	129	129	128	1	2
SO2 Absorbed (mmole/L)	8.14	8.17	8.11	0.03	2
Solids Residence Time (hrs)	13.0	13.0	13.0	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	10.31	10.37	10.26	0.06	2
Spray Zone Pressure Drop (in H2O)	2.89	2.91	2.87	0.02	2
VME Pressure Drop (in H2O)	0.09	0.09	0.09	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	441	441	0	2
NYSEG Load (MW)	636	670	602	34	2

TECO-1LR Process Summary Report (Polypak packing depth: 2 ft.)
(6/20/94 21:00:00 to 6/20/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	56.2	56.3	56.1	0.1	2
L/G Ratio (gal/macf)	26	26	26	0	2
Reaction Tank pH	6.00	6.01	5.99	0.01	2
Absorber pH	4.47	4.47	4.46	0.00	2
Flue Gas Flow Rate (scfm)	14001	14001	14000	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.15	0.15	0.15	0.00	2
Centrifuge Feed Rate (gpm)	8.1	8.1	8.1	0.0	2
Facility Inlet SO2 Conc. (ppm)	1035	1038	1031	4	2
Inlet SO2 Concentration (ppm)	1999	2002	1996	3	2
Outlet SO2 Concentration (ppm)	816	818	813	2	2
Inlet O2 Concentration (%)	6.71	6.78	6.64	0.07	2
Outlet O2 Concentration (%)	6.47	6.54	6.40	0.07	2
Absorber Gas Velocity (ft/sec)	14.18	14.19	14.18	0.00	2
Inlet Gas Temperature (F)	347	347	347	0	2
Outlet Gas Temperature (F)	129	129	129	0	2
SO2 Absorbed (mmole/L)	11.58	11.58	11.58	0.00	2
Solids Residence Time (hrs)	13.8	13.8	13.8	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	13.33	13.35	13.31	0.02	2
Spray Zone Pressure Drop (in H2O)	3.04	3.05	3.04	0.00	2
VME Pressure Drop (in H2O)	0.16	0.17	0.16	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	441	440	1	2
NYSEG Load (MW)	651	659	643	8	2

TECO-2LR Process Summary Report (Polypak packing depth: 2 ft.)
(6/21/94 00:00:00 to 6/21/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	56.1	56.3	55.9	0.2	2
L/G Ratio (gal/macf)	31	31	31	0	2
Reaction Tank pH	5.97	5.97	5.96	0.00	2
Absorber pH	4.48	4.48	4.48	0.00	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.15	0.15	0.15	0.00	2
Centrifuge Feed Rate (gpm)	5.8	7.0	4.5	1.8	2
Facility Inlet SO2 Conc. (ppm)	1010	1028	993	17	2
Inlet SO2 Concentration (ppm)	2002	2005	1998	4	2
Outlet SO2 Concentration (ppm)	821	826	816	5	2
Inlet O2 Concentration (%)	7.18	7.39	6.97	0.21	2
Outlet O2 Concentration (%)	6.95	7.14	6.76	0.19	2
Absorber Gas Velocity (ft/sec)	11.89	11.89	11.88	0.00	2
Inlet Gas Temperature (F)	332	333	331	1	2
Outlet Gas Temperature (F)	128	128	128	0	2
SO2 Absorbed (mmole/L)	9.76	9.77	9.74	0.02	2
Solids Residence Time (hrs)	16.4	16.4	16.4	0.0	2
Slurry Residence Time (min)	13.28	13.29	13.28	0.00	2
Absorber Pressure Drop (in H2O)	9.56	9.59	9.53	0.03	2
Spray Zone Pressure Drop (in H2O)	2.07	2.07	2.06	0.00	2
VME Pressure Drop (in H2O)	0.09	0.10	0.09	0.00	2
Oxidation Air to Rxn Tank (acfm)	442	445	439	3	2
NYSEG Load (MW)	629	662	595	34	2

TECO-3LR Process Summary Report (Polypak packing depth: 2 ft.)
(6/21/94 03:00:00 to 6/21/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	59.0	59.0	58.9	0.0	2
L/G Ratio (gal/macf)	37	37	37	0	2
Reaction Tank pH	6.03	6.03	6.03	0.00	2
Absorber pH	4.62	4.62	4.62	0.00	2
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.15	0.15	0.15	0.00	2
Centrifuge Feed Rate (gpm)	3.8	4.0	3.5	0.4	2
Facility Inlet SO2 Conc. (ppm)	1031	1034	1029	3	2
Inlet SO2 Concentration (ppm)	1999	2000	1998	1	2
Outlet SO2 Concentration (ppm)	771	771	771	0	2
Inlet O2 Concentration (%)	6.91	6.94	6.89	0.02	2
Outlet O2 Concentration (%)	6.75	6.77	6.73	0.02	2
Absorber Gas Velocity (ft/sec)	9.85	9.85	9.85	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	8.50	8.51	8.49	0.01	2
Solids Residence Time (hrs)	18.8	18.8	18.8	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	6.67	6.71	6.63	0.04	2
Spray Zone Pressure Drop (in H2O)	1.40	1.40	1.40	0.00	2
VME Pressure Drop (in H2O)	0.03	0.03	0.03	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	443	436	3	2
NYSEG Load (MW)	686	689	683	3	2

TECO-4LR Process Summary Report (Polypak packing depth: 2 ft.)
(6/21/94 06:00:00 to 6/21/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	62.2	62.5	61.9	0.3	2
L/G Ratio (gal/macf)	45	45	45	0	2
Reaction Tank pH	6.06	6.06	6.06	0.00	2
Absorber pH	4.62	4.64	4.61	0.02	2
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.15	0.15	0.15	0.00	2
Centrifuge Feed Rate (gpm)	1.1	1.2	1.0	0.1	2
Facility Inlet SO2 Conc. (ppm)	987	990	984	3	2
Inlet SO2 Concentration (ppm)	2000	2002	1998	2	2
Outlet SO2 Concentration (ppm)	710	716	705	6	2
Inlet O2 Concentration (%)	7.63	7.67	7.59	0.04	2
Outlet O2 Concentration (%)	7.42	7.46	7.39	0.04	2
Absorber Gas Velocity (ft/sec)	8.07	8.07	8.07	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	125	125	125	0	2
SO2 Absorbed (mmole/L)	7.32	7.35	7.30	0.03	2
Solids Residence Time (hrs)	21.8	21.9	21.8	0.1	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	4.47	4.49	4.46	0.01	2
Spray Zone Pressure Drop (in H2O)	0.92	0.93	0.92	0.00	2
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	2
Oxidation Air to Rxn Tank (acfm)	438	440	436	2	2
NYSEG Load (MW)	627	629	626	2	2

TECO-5 Process Summary Report (Polypak packing depth: 1ft.)
(6/21/94 20:00:00 to 6/21/94 22:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	67.0	67.1	66.9	0.1	2
L/G Ratio (gal/macf)	39	39	39	0	2
Reaction Tank pH	5.94	5.95	5.94	0.01	2
Absorber pH	5.21	5.26	5.16	0.05	2
Flue Gas Flow Rate (scfm)	14001	14002	14000	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.34	0.34	0.34	0.00	2
Centrifuge Feed Rate (gpm)	5.53	6.78	4.88	1.08	2
Facility Inlet SO2 Conc. (ppm)	1015	1016	1015	1	2
Inlet SO2 Concentration (ppm)	2000	2003	1997	3	2
Outlet SO2 Concentration (ppm)	613	616	610	3	2
Inlet O2 Concentration (%)	6.79	6.80	6.79	0.01	2
Outlet O2 Concentration (%)	6.55	6.56	6.54	0.01	2
Absorber Gas Velocity (ft/sec)	14.23	14.24	14.22	0.01	2
Inlet Gas Temperature (F)	355	356	354	1	2
Outlet Gas Temperature (F)	129	129	129	0	2
SO2 Absorbed (mmole/L)	9.13	9.14	9.13	0.00	2
Solids Residence Time (hrs)	11.6	11.6	11.6	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	14.09	14.12	14.06	0.03	2
Spray Zone Pressure Drop (in H2O)	3.25	3.31	3.19	0.06	2
VME Pressure Drop (in H2O)	0.17	0.17	0.17	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	441	440	0	2
NYSEG Load (MW)	688	689	686	1	2

TECO-6 Process Summary Report (Polypak packing depth: 1ft.)
(6/21/94 23:00:00 to 6/22/94 01:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	63.9	63.9	63.9	0.0	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.92	5.92	5.91	0.00	2
Absorber pH	4.76	4.76	4.76	0.00	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.34	0.34	0.34	0.00	2
Centrifuge Feed Rate (gpm)	4.68	4.97	4.10	0.50	2
Facility Inlet SO2 Conc. (ppm)	1018	1020	1016	2	2
Inlet SO2 Concentration (ppm)	2000	2000	2000	0	2
Outlet SO2 Concentration (ppm)	675	675	675	0	2
Inlet O2 Concentration (%)	6.96	6.98	6.95	0.02	2
Outlet O2 Concentration (%)	6.75	6.77	6.73	0.02	2
Absorber Gas Velocity (ft/sec)	11.90	11.91	11.90	0.01	2
Inlet Gas Temperature (F)	334	335	333	1	2
Outlet Gas Temperature (F)	127	128	127	0	2
SO2 Absorbed (mmole/L)	7.34	7.34	7.34	0.00	2
Solids Residence Time (hrs)	14.4	14.4	14.4	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	9.96	10.02	9.91	0.06	2
Spray Zone Pressure Drop (in H2O)	1.96	1.97	1.95	0.01	2
VME Pressure Drop (in H2O)	0.10	0.10	0.09	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	440	0	2
NYSEG Load (MW)	658	659	658	0	2

TECO-7 Process Summary Report (Polypak packing depth: 1ft.)
(6/22/94 02:00:00 to 6/22/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	67.7	67.8	67.6	0.1	2
L/G Ratio (gal/macf)	56	56	56	0	2
Reaction Tank pH	5.96	5.96	5.95	0.01	2
Absorber pH	4.93	4.94	4.92	0.01	2
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.34	0.34	0.33	0.00	2
Centrifuge Feed Rate (gpm)	3.84	3.89	3.79	0.07	2
Facility Inlet SO2 Conc. (ppm)	1012	1019	1006	7	2
Inlet SO2 Concentration (ppm)	2001	2003	1998	2	2
Outlet SO2 Concentration (ppm)	607	609	606	1	2
Inlet O2 Concentration (%)	7.23	7.30	7.16	0.07	2
Outlet O2 Concentration (%)	7.05	7.11	6.99	0.06	2
Absorber Gas Velocity (ft/sec)	9.83	9.84	9.83	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	125	125	125	0	2
SO2 Absorbed (mmole/L)	6.46	6.48	6.44	0.02	2
Solids Residence Time (hrs)	16.4	16.4	16.3	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	7.16	7.21	7.10	0.05	2
Spray Zone Pressure Drop (in H2O)	1.37	1.37	1.36	0.00	2
VME Pressure Drop (in H2O)	0.04	0.04	0.04	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	440	439	0	2
NYSEG Load (MW)	639	640	638	1	2

TECO-8 Process Summary Report (Polypak packing depth: 1ft.)
(6/22/94 05:00:00 to 6/22/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	71.6	71.7	71.6	0.1	3
L/G Ratio (gal/macf)	69	69	69	0	3
Reaction Tank pH	5.99	5.99	5.98	0.00	3
Absorber pH	4.98	4.99	4.98	0.00	3
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	2.77	3.46	1.86	0.82	3
Facility Inlet SO2 Conc. (ppm)	1015	1023	1009	6	3
Inlet SO2 Concentration (ppm)	1999	2000	1999	1	3
Outlet SO2 Concentration (ppm)	533	533	531	1	3
Inlet O2 Concentration (%)	7.44	7.47	7.41	0.03	3
Outlet O2 Concentration (%)	7.25	7.27	7.23	0.02	3
Absorber Gas Velocity (ft/sec)	8.05	8.06	8.05	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	125	125	124	0	3
SO2 Absorbed (mmole/L)	5.58	5.59	5.57	0.01	3
Solids Residence Time (hrs)	19.0	19.0	18.9	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	4.93	4.98	4.89	0.04	3
Spray Zone Pressure Drop (in H2O)	0.98	0.98	0.98	0.00	3
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	442	439	1	3
NYSEG Load (MW)	646	651	641	4	3

TECO-9 Process Summary Report (Noell packing depth: 2ft.)
(6/22/94 19:00:00 to 6/22/94 21:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	63.1	63.2	63.1	0.1	2
L/G Ratio (gal/macf)	39	39	39	0	2
Reaction Tank pH	6.02	6.03	6.02	0.01	2
Absorber pH	4.94	4.95	4.93	0.01	2
Flue Gas Flow Rate (scfm)	14000	14000	14000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.34	0.34	0.34	0.00	2
Centrifuge Feed Rate (gpm)	5.17	5.17	5.17	0.00	2
Facility Inlet SO2 Conc. (ppm)	994	1001	987	7	2
Inlet SO2 Concentration (ppm)	2001	2003	1999	2	2
Outlet SO2 Concentration (ppm)	692	692	691	1	2
Inlet O2 Concentration (%)	7.93	8.00	7.86	0.07	2
Outlet O2 Concentration (%)	7.68	7.75	7.61	0.07	2
Absorber Gas Velocity (ft/sec)	14.16	14.16	14.16	0.00	2
Inlet Gas Temperature (F)	321	321	320	1	2
Outlet Gas Temperature (F)	125	125	125	0	2
SO2 Absorbed (mmole/L)	8.61	8.63	8.59	0.02	2
Solids Residence Time (hrs)	12.3	12.3	12.3	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	5.03	5.03	5.02	0.01	2
Spray Zone Pressure Drop (in H2O)	1.90	1.91	1.90	0.00	2
VME Pressure Drop (in H2O)	0.18	0.18	0.18	0.00	2
Oxidation Air to Rxn Tank (acfm)	443	444	443	1	2
NYSEG Load (MW)	628	632	624	4	2

TECO-10 Process Summary Report (Noell packing depth: 2ft.)
(6/22/94 22:00:00 to 6/22/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	62.9	63.1	62.7	0.2	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	6.03	6.03	6.03	0.00	2
Absorber pH	4.93	4.96	4.91	0.02	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.34	0.34	0.33	0.00	2
Centrifuge Feed Rate (gpm)	5.17	5.17	5.17	0.00	2
Facility Inlet SO2 Conc. (ppm)	1003	1006	999	3	2
Inlet SO2 Concentration (ppm)	2002	2002	2002	0	2
Outlet SO2 Concentration (ppm)	698	702	694	4	2
Inlet O2 Concentration (%)	7.91	7.92	7.91	0.01	2
Outlet O2 Concentration (%)	7.68	7.69	7.67	0.01	2
Absorber Gas Velocity (ft/sec)	11.88	11.89	11.88	0.00	2
Inlet Gas Temperature (F)	311	311	310	0	2
Outlet Gas Temperature (F)	124	125	124	0	2
SO2 Absorbed (mmole/L)	7.24	7.26	7.21	0.02	2
Solids Residence Time (hrs)	14.6	14.7	14.6	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	3.52	3.52	3.51	0.00	2
Spray Zone Pressure Drop (in H2O)	1.23	1.23	1.23	0.00	2
VME Pressure Drop (in H2O)	0.10	0.10	0.10	0.00	2
Oxidation Air to Rxn Tank (acfm)	442	443	441	1	2
NYSEG Load (MW)	628	635	622	6	2

TECO-11 Process Summary Report (Noell packing depth: 2ft.)
(6/23/94 01:00:00 to 6/23/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	66.9	67.3	66.5	0.3	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	6.07	6.07	6.06	0.00	3
Absorber pH	5.04	5.07	4.99	0.04	3
Flue Gas Flow Rate (scfm)	9800	9800	9799	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	3.82	4.04	3.70	0.19	3
Facility Inlet SO2 Conc. (ppm)	909	985	798	80	3
Inlet SO2 Concentration (ppm)	1999	2001	1997	2	3
Outlet SO2 Concentration (ppm)	622	629	617	5	3
Inlet O2 Concentration (%)	9.26	10.34	8.40	0.81	3
Outlet O2 Concentration (%)	8.88	9.78	8.18	0.67	3
Absorber Gas Velocity (ft/sec)	9.86	9.90	9.82	0.03	3
Inlet Gas Temperature (F)	302	314	292	9	3
Outlet Gas Temperature (F)	122	123	122	0	3
SO2 Absorbed (mmole/L)	6.38	6.42	6.34	0.03	3
Solids Residence Time (hrs)	16.6	16.7	16.5	0.1	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.47	2.49	2.46	0.01	3
Spray Zone Pressure Drop (in H2O)	0.85	0.86	0.85	0.00	3
VME Pressure Drop (in H2O)	0.04	0.04	0.04	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	440	0	3
NYSEG Load (MW)	511	608	366	104	3

TECO-12 Process Summary Report (Noell packing depth: 2ft.)
(6/23/94 05:00:00 to 6/23/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	69.7	70.1	69.4	0.3	3
L/G Ratio (gal/macf)	68	68	68	0	3
Reaction Tank pH	6.07	6.08	6.07	0.00	3
Absorber pH	4.99	4.99	4.98	0.00	3
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	2.30	2.30	2.30	0.00	3
Facility Inlet SO2 Conc. (ppm)	1042	1143	909	98	3
Inlet SO2 Concentration (ppm)	2002	2004	2000	2	3
Outlet SO2 Concentration (ppm)	569	574	561	6	3
Inlet O2 Concentration (%)	9.59	10.14	9.27	0.39	3
Outlet O2 Concentration (%)	9.15	9.64	8.85	0.35	3
Absorber Gas Velocity (ft/sec)	8.09	8.11	8.08	0.01	3
Inlet Gas Temperature (F)	312	313	309	2	3
Outlet Gas Temperature (F)	122	123	121	1	3
SO2 Absorbed (mmole/L)	5.43	5.46	5.42	0.02	3
Solids Residence Time (hrs)	19.5	19.5	19.4	0.1	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	1.78	1.79	1.78	0.01	3
Spray Zone Pressure Drop (in H2O)	0.67	0.67	0.66	0.00	3
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	438	1	3
NYSEG Load (MW)	478	576	339	101	3

TECO-13 Process Summary Report (Noell packing depth: 1ft.)
(6/23/94 18:00:00 to 6/23/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	58.0	58.1	57.8	0.1	2
LAG Ratio (gal/macf)	39	39	39	0	2
Reaction Tank pH	6.06	6.07	6.06	0.00	2
Absorber pH	5.00	5.02	4.98	0.02	2
Flue Gas Flow Rate (scfm)	14000	14000	13999	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	2
Centrifuge Feed Rate (gpm)	4.0	4.0	4.0	0.0	2
Facility Inlet SO2 Conc. (ppm)	1573	1575	1572	1	2
Inlet SO2 Concentration (ppm)	2000	2001	1998	2	2
Outlet SO2 Concentration (ppm)	784	788	781	4	2
Inlet O2 Concentration (%)	7.77	7.77	7.76	0.00	2
Outlet O2 Concentration (%)	7.49	7.49	7.48	0.00	2
Absorber Gas Velocity (ft/sec)	14.32	14.32	14.32	0.00	2
Inlet Gas Temperature (F)	339	339	339	0	2
Outlet Gas Temperature (F)	129	129	128	0	2
SO2 Absorbed (mmole/L)	7.90	7.91	7.89	0.01	2
Solids Residence Time (hrs)	13.4	13.4	13.4	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	4.70	4.71	4.70	0.00	2
Spray Zone Pressure Drop (in H2O)	1.49	1.50	1.48	0.01	2
VME Pressure Drop (in H2O)	0.19	0.19	0.19	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	440	0	2
NYSEG Load (MW)	657	659	654	2	2

TECO-14 Process Summary Report (Noell packing depth: 1ft.)
(6/23/94 21:00:00 to 6/23/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	60.7	60.9	60.6	0.2	2
LAG Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	6.09	6.10	6.09	0.01	2
Absorber pH	5.06	5.07	5.05	0.01	2
Flue Gas Flow Rate (scfm)	11800	11800	11799	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	2
Centrifuge Feed Rate (gpm)	4.1	4.1	4.1	0.0	2
Facility Inlet SO2 Conc. (ppm)	1488	1493	1484	5	2
Inlet SO2 Concentration (ppm)	2001	2001	2001	0	2
Outlet SO2 Concentration (ppm)	737	740	734	3	2
Inlet O2 Concentration (%)	8.17	8.21	8.13	0.04	2
Outlet O2 Concentration (%)	7.91	7.94	7.87	0.04	2
Absorber Gas Velocity (ft/sec)	12.00	12.00	12.00	0.00	2
Inlet Gas Temperature (F)	319	320	318	1	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	6.98	7.00	6.97	0.02	2
Solids Residence Time (hrs)	15.1	15.2	15.1	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	3.40	3.40	3.40	0.00	2
Spray Zone Pressure Drop (in H2O)	1.06	1.06	1.06	0.00	2
VME Pressure Drop (in H2O)	0.10	0.10	0.10	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	441	438	2	2
NYSEG Load (MW)	669	674	665	4	2

TECO-15 Process Summary Report (Noell packing depth: 1ft.)

(6/24/94 00:00:00 to 6/24/94 03:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	64.6	64.6	64.4	0.1	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	6.10	6.10	6.10	0.00	3
Absorber pH	5.03	5.03	5.03	0.00	3
Flue Gas Flow Rate (scfm)	9802	9804	9800	1	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	4.0	4.0	4.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	1356	1398	1331	29	3
Inlet SO2 Concentration (ppm)	1999	2000	1996	2	3
Outlet SO2 Concentration (ppm)	669	670	668	1	3
Inlet O2 Concentration (%)	9.51	9.71	9.18	0.23	3
Outlet O2 Concentration (%)	9.06	9.25	8.78	0.21	3
Absorber Gas Velocity (ft/sec)	9.89	9.91	9.87	0.01	3
Inlet Gas Temperature (F)	297	300	295	2	3
Outlet Gas Temperature (F)	123	124	122	1	3
SO2 Absorbed (mmole/L)	6.16	6.17	6.14	0.01	3
Solids Residence Time (hrs)	17.2	17.2	17.2	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.43	2.44	2.42	0.01	3
Spray Zone Pressure Drop (in H2O)	0.80	0.81	0.80	0.00	3
VME Pressure Drop (in H2O)	0.04	0.04	0.04	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	438	1	3
NYSEG Load (MW)	521	559	491	28	3

TECO-16 Process Summary Report (Noell packing depth: 1ft.)

(6/24/94 4:00:00 to 6/24/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	68.6	69.1	67.9	0.4	4
L/G Ratio (gal/macf)	67	68	64	2	4
Reaction Tank pH	6.13	6.15	6.06	0.04	4
Absorber pH	5.19	5.51	5.07	0.19	4
Flue Gas Flow Rate (scfm)	7330	8002	5318	1162	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	588	650	402	107	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.32	0.33	0.28	0.02	4
Centrifuge Feed Rate (gpm)	2.5	2.9	2.3	0.3	4
Facility Inlet SO2 Conc. (ppm)	1220	1253	1180	32	4
Inlet SO2 Concentration (ppm)	1810	2007	1232	334	4
Outlet SO2 Concentration (ppm)	534	596	372	93	4
Inlet O2 Concentration (%)	11.22	13.21	10.28	1.16	4
Outlet O2 Concentration (%)	10.69	12.62	9.80	1.12	4
Absorber Gas Velocity (ft/sec)	7.43	8.14	5.33	1.21	4
Inlet Gas Temperature (F)	307	314	293	8	4
Outlet Gas Temperature (F)	121	122	117	2	4
SO2 Absorbed (mmole/L)	4.90	5.39	3.50	0.81	4
Solids Residence Time (hrs)	27.0	48.8	19.6	12.6	4
Slurry Residence Time (min)	10.14	14.21	8.79	2.35	4
Absorber Pressure Drop (in H2O)	1.64	1.84	1.08	0.33	4
Spray Zone Pressure Drop (in H2O)	0.61	0.69	0.39	0.13	4
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	4
Oxidation Air to Rxn Tank (acfm)	406	441	303	60	4
NYSEG Load (MW)	432	528	375	60	4

TECO-17 Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/24/94 19:00:00 to 6/24/94 22:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.4	94.4	94.3	0.0	3
L/G Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.50	5.56	5.43	0.05	3
Absorber pH	5.47	5.51	5.43	0.03	3
Flue Gas Flow Rate (scfm)	13959	14000	13879	57	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	10.1	10.1	10.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	1337	1436	1265	73	3
Inlet SO2 Concentration (ppm)	2000	2006	1995	5	3
Outlet SO2 Concentration (ppm)	105	106	105	1	3
Inlet O2 Concentration (%)	8.17	8.19	8.16	0.02	3
Outlet O2 Concentration (%)	7.92	7.94	7.90	0.02	3
Absorber Gas Velocity (ft/sec)	14.18	14.22	14.10	0.06	3
Inlet Gas Temperature (F)	327	328	326	0	3
Outlet Gas Temperature (F)	126	127	126	0	3
SO2 Absorbed (mmole/L)	12.83	12.86	12.80	0.03	3
Solids Residence Time (hrs)	8.2	8.3	8.2	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	4.99	5.01	4.94	0.04	3
Spray Zone Pressure Drop (in H2O)	1.83	1.85	1.81	0.02	3
VME Pressure Drop (in H2O)	0.20	0.20	0.20	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	661	665	655	5	3

TECO-18 Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/24/94 23:00:00 to 6/25/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.0	94.1	93.9	0.0	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	5.69	5.71	5.67	0.02	3
Absorber pH	5.78	5.79	5.76	0.01	3
Flue Gas Flow Rate (scfm)	11805	11815	11800	7	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.33	0.33	0.33	0.00	3
Centrifuge Feed Rate (gpm)	8.7	9.4	7.8	0.8	3
Facility Inlet SO2 Conc. (ppm)	1044	1115	1002	51	3
Inlet SO2 Concentration (ppm)	1999	2000	1997	1	3
Outlet SO2 Concentration (ppm)	113	114	112	1	3
Inlet O2 Concentration (%)	9.03	9.34	8.50	0.37	3
Outlet O2 Concentration (%)	8.67	8.92	8.25	0.30	3
Absorber Gas Velocity (ft/sec)	11.94	11.96	11.93	0.01	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	125	124	0	3
SO2 Absorbed (mmole/L)	10.80	10.81	10.78	0.01	3
Solids Residence Time (hrs)	9.8	9.8	9.8	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.51	3.52	3.50	0.01	3
Spray Zone Pressure Drop (in H2O)	1.17	1.17	1.16	0.00	3
VME Pressure Drop (in H2O)	0.12	0.12	0.11	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	544	636	486	66	3

TECO-19 Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 03:00:00 to 6/25/94 06:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.3	94.3	94.2	0.0	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	5.75	5.80	5.68	0.05	3
Absorber pH	5.85	5.88	5.80	0.03	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.34	0.34	0.34	0.00	3
Centrifuge Feed Rate (gpm)	9.0	9.0	9.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	873	906	849	24	3
Inlet SO2 Concentration (ppm)	2000	2004	1997	3	3
Outlet SO2 Concentration (ppm)	108	109	107	1	3
Inlet O2 Concentration (%)	9.97	10.20	9.80	0.17	3
Outlet O2 Concentration (%)	9.47	9.67	9.33	0.15	3
Absorber Gas Velocity (ft/sec)	9.93	9.94	9.92	0.01	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	125	123	1	3
SO2 Absorbed (mmole/L)	8.99	9.01	8.98	0.01	3
Solids Residence Time (hrs)	11.8	11.8	11.7	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.51	2.52	2.50	0.01	3
Spray Zone Pressure Drop (in H2O)	0.84	0.85	0.84	0.00	3
VME Pressure Drop (in H2O)	0.05	0.05	0.05	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	428	463	376	37	3

TECO-20 Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 07:00:00 to 6/25/94 10:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.5	95.5	95.5	0.0	3
L/G Ratio (gal/macf)	68	68	68	0	3
Reaction Tank pH	5.85	5.87	5.83	0.02	3
Absorber pH	5.96	5.97	5.94	0.02	3
Flue Gas Flow Rate (scfm)	8003	8008	8000	4	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.34	0.34	0.34	0.00	3
Centrifuge Feed Rate (gpm)	6.5	6.9	6.0	0.4	3
Facility Inlet SO2 Conc. (ppm)	900	933	879	23	3
Inlet SO2 Concentration (ppm)	2002	2004	1999	2	3
Outlet SO2 Concentration (ppm)	85	85	85	0	3
Inlet O2 Concentration (%)	9.89	10.19	9.49	0.29	3
Outlet O2 Concentration (%)	9.44	9.71	9.09	0.26	3
Absorber Gas Velocity (ft/sec)	8.13	8.13	8.13	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	124	124	0	3
SO2 Absorbed (mmole/L)	7.45	7.45	7.44	0.01	3
Solids Residence Time (hrs)	14.2	14.2	14.2	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	1.89	1.89	1.87	0.01	3
Spray Zone Pressure Drop (in H2O)	0.70	0.70	0.70	0.00	3
VME Pressure Drop (in H2O)	0.01	0.01	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	438	1	3
NYSEG Load (MW)	433	532	363	72	3

TECO-18R Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 11:00:00 to 6/25/94 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.0	94.0	93.9	0.0	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	5.71	5.77	5.63	0.06	3
Absorber pH	5.76	5.80	5.70	0.04	3
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.45	0.50	0.34	0.07	3
Centrifuge Feed Rate (gpm)	8.7	10.1	7.0	1.6	3
Facility Inlet SO2 Conc. (ppm)	1090	1112	1063	20	3
Inlet SO2 Concentration (ppm)	2002	2002	2001	0	3
Outlet SO2 Concentration (ppm)	113	114	112	1	3
Inlet O2 Concentration (%)	8.23	8.30	8.19	0.05	3
Outlet O2 Concentration (%)	8.02	8.10	7.98	0.05	3
Absorber Gas Velocity (ft/sec)	11.93	11.93	11.93	0.00	3
Inlet Gas Temperature (F)	314	315	314	0	3
Outlet Gas Temperature (F)	125	125	125	0	3
SO2 Absorbed (mmole/L)	10.81	10.81	10.81	0.00	3
Solids Residence Time (hrs)	9.8	9.8	9.8	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.59	3.59	3.58	0.00	3
Spray Zone Pressure Drop (in H2O)	1.18	1.19	1.18	0.01	3
VME Pressure Drop (in H2O)	0.11	0.12	0.11	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	445	435	4	3
NYSEG Load (MW)	634	641	628	6	3

TECO-17M Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 15:00:00 to 6/25/94 18:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.7	90.8	90.7	0.1	3
L/G Ratio (gal/macf)	32	32	32	0	3
Reaction Tank pH	5.66	5.70	5.62	0.03	3
Absorber pH	5.42	5.44	5.40	0.02	3
Flue Gas Flow Rate (scfm)	14000	14000	14000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	540	540	540	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	8.9	8.9	8.9	0.0	3
Facility Inlet SO2 Conc. (ppm)	1037	1072	1006	27	3
Inlet SO2 Concentration (ppm)	1999	2001	1998	2	3
Outlet SO2 Concentration (ppm)	173	174	172	1	3
Inlet O2 Concentration (%)	8.57	8.84	8.29	0.22	3
Outlet O2 Concentration (%)	8.26	8.49	8.03	0.19	3
Absorber Gas Velocity (ft/sec)	14.21	14.22	14.21	0.01	3
Inlet Gas Temperature (F)	328	329	328	0	3
Outlet Gas Temperature (F)	126	127	126	0	3
SO2 Absorbed (mmole/L)	14.88	14.91	14.86	0.02	3
Solids Residence Time (hrs)	8.6	8.6	8.5	0.0	3
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	3
Absorber Pressure Drop (in H2O)	4.75	4.79	4.73	0.03	3
Spray Zone Pressure Drop (in H2O)	1.48	1.49	1.47	0.01	3
VME Pressure Drop (in H2O)	0.22	0.25	0.20	0.02	3.00
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	608	621	587	15	3

TECO-18M Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 19:00:00 to 6/25/94 22:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.2	90.3	90.2	0.0	3
L/G Ratio (gal/macf)	38	38	38	0	3
Reaction Tank pH	5.76	5.77	5.75	0.01	3
Absorber pH	5.70	5.70	5.70	0.00	3
Flue Gas Flow Rate (scfm)	11795	11800	11785	7	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	540	540	540	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	8.8	8.8	8.8	0.0	3
Facility Inlet SO2 Conc. (ppm)	1058	1077	1037	16	3
Inlet SO2 Concentration (ppm)	2000	2000	1999	0	3
Outlet SO2 Concentration (ppm)	183	184	183	0	3
Inlet O2 Concentration (%)	8.68	8.95	8.52	0.19	3
Outlet O2 Concentration (%)	8.39	8.59	8.26	0.15	3
Absorber Gas Velocity (ft/sec)	11.94	11.95	11.92	0.01	3
Inlet Gas Temperature (F)	314	316	314	1	3
Outlet Gas Temperature (F)	125	125	125	0	3
SO2 Absorbed (mmole/L)	12.48	12.49	12.46	0.01	3
Solids Residence Time (hrs)	10.2	10.2	10.2	0.0	3
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	3
Absorber Pressure Drop (in H2O)	3.36	3.36	3.36	0.00	3
Spray Zone Pressure Drop (in H2O)	0.92	0.92	0.92	0.00	3
VME Pressure Drop (in H2O)	0.12	0.12	0.12	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	607	629	580	20	3

TECO-19M Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/25/94 23:00:00 to 6/26/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.7	90.8	90.7	0.1	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	5.76	5.77	5.75	0.01	3
Absorber pH	5.77	5.77	5.76	0.00	3
Flue Gas Flow Rate (scfm)	9801	9801	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	540	540	540	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	6.8	7.7	5.5	1.1	3
Facility Inlet SO2 Conc. (ppm)	939	980	889	37	3
Inlet SO2 Concentration (ppm)	1999	2003	1994	4	3
Outlet SO2 Concentration (ppm)	174	175	172	2	3
Inlet O2 Concentration (%)	9.70	10.22	9.33	0.38	3
Outlet O2 Concentration (%)	9.28	9.77	8.93	0.36	3
Absorber Gas Velocity (ft/sec)	9.91	9.92	9.91	0.01	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	124	124	0	3
SO2 Absorbed (mmole/L)	10.42	10.43	10.40	0.01	3
Solids Residence Time (hrs)	12.2	12.2	12.2	0.0	3
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	3
Absorber Pressure Drop (in H2O)	2.40	2.41	2.39	0.01	3
Spray Zone Pressure Drop (in H2O)	0.65	0.65	0.65	0.00	3
VME Pressure Drop (in H2O)	0.05	0.05	0.05	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	407	491	338	63	3

TECO-20M Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/26/94 03:00:00 to 6/26/94 06:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.6	92.6	92.6	0.0	3
L/G Ratio (gal/macf)	57	57	57	0	3
Reaction Tank pH	5.88	5.92	5.82	0.05	3
Absorber pH	5.89	5.92	5.85	0.03	3
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	540	540	540	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	4.6	5.2	4.2	0.6	3
Facility Inlet SO2 Conc. (ppm)	790	845	714	56	3
Inlet SO2 Concentration (ppm)	2000	2005	1997	4	3
Outlet SO2 Concentration (ppm)	139	139	138	0	3
Inlet O2 Concentration (%)	11.24	12.26	10.54	0.73	3
Outlet O2 Concentration (%)	10.75	11.74	10.08	0.71	3
Absorber Gas Velocity (ft/sec)	8.09	8.11	8.06	0.02	3
Inlet Gas Temperature (F)	308	313	304	4	3
Outlet Gas Temperature (F)	121	122	120	1	3
SO2 Absorbed (mmole/L)	8.69	8.71	8.67	0.02	3
Solids Residence Time (hrs)	14.7	14.7	14.6	0.0	3
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	3
Absorber Pressure Drop (in H2O)	1.78	1.79	1.77	0.01	3
Spray Zone Pressure Drop (in H2O)	0.54	0.54	0.53	0.00	3
VME Pressure Drop (in H2O)	0.01	0.01	0.01	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	229	267	183	35	3

TECO-18MR Process Summary Report(Noell packing depth:2 ft. with DBA)
(6/26/94 07:00:00 to 6/26/94 10:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	89.9	90.0	89.8	0.1	3
L/G Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.82	5.87	5.75	0.05	3
Absorber pH	5.71	5.74	5.67	0.03	3
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	540	540	540	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.49	0.00	3
Centrifuge Feed Rate (gpm)	7.4	7.9	6.9	0.5	3
Facility Inlet SO2 Conc. (ppm)	954	998	920	33	3
Inlet SO2 Concentration (ppm)	1999	2004	1996	3	3
Outlet SO2 Concentration (ppm)	189	191	187	1	3
Inlet O2 Concentration (%)	9.75	10.10	9.38	0.29	3
Outlet O2 Concentration (%)	9.29	9.60	9.00	0.25	3
Absorber Gas Velocity (ft/sec)	11.89	11.89	11.88	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	123	123	123	0	3
SO2 Absorbed (mmole/L)	12.43	12.47	12.41	0.02	3
Solids Residence Time (hrs)	10.2	10.3	10.2	0.0	3
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	3
Absorber Pressure Drop (in H2O)	3.45	3.45	3.44	0.01	3
Spray Zone Pressure Drop (in H2O)	0.92	0.93	0.92	0.01	3
VME Pressure Drop (in H2O)	0.12	0.12	0.12	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	445	435	4	3
NYSEG Load (MW)	359	382	319	28	3

TECO-17L Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/26/94 11:00:00 to 6/26/94 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	84.6	84.7	84.5	0.1	3
LAG Ratio (gal/macf)	26	26	26	0	3
Reaction Tank pH	5.86	5.87	5.84	0.01	3
Absorber pH	5.37	5.37	5.35	0.01	3
Flue Gas Flow Rate (scfm)	14000	14000	14000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	10.1	10.5	9.8	0.4	3
Facility Inlet SO2 Conc. (ppm)	918	942	897	19	3
Inlet SO2 Concentration (ppm)	2000	2001	1999	1	3
Outlet SO2 Concentration (ppm)	290	291	288	1	3
Inlet O2 Concentration (%)	10.06	10.14	9.99	0.06	3
Outlet O2 Concentration (%)	9.53	9.58	9.47	0.05	3
Absorber Gas Velocity (ft/sec)	14.15	14.17	14.13	0.02	3
Inlet Gas Temperature (F)	317	319	315	2	3
Outlet Gas Temperature (F)	125	126	124	1	3
SO2 Absorbed (mmole/L)	17.43	17.45	17.41	0.02	3
Solids Residence Time (hrs)	9.2	9.2	9.2	0.0	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	4.60	4.62	4.58	0.02	3
Spray Zone Pressure Drop (in H2O)	1.12	1.12	1.12	0.00	3
VME Pressure Drop (in H2O)	0.20	0.20	0.20	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	444	437	3	3
NYSEG Load (MW)	373	375	369	3	3

TECO-18L Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/26/94 15:00:00 to 6/26/94 18:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	84.8	84.8	84.7	0.0	3
LAG Ratio (gal/macf)	31	31	31	0	3
Reaction Tank pH	5.94	5.95	5.93	0.01	3
Absorber pH	5.60	5.60	5.59	0.00	3
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.3	9.8	6.9	2.4	3
Facility Inlet SO2 Conc. (ppm)	1005	1025	988	15	3
Inlet SO2 Concentration (ppm)	2001	2003	1999	2	3
Outlet SO2 Concentration (ppm)	286	287	285	1	3
Inlet O2 Concentration (%)	9.33	9.42	9.28	0.06	3
Outlet O2 Concentration (%)	8.94	9.00	8.90	0.05	3
Absorber Gas Velocity (ft/sec)	11.94	11.94	11.94	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	126	126	126	0	3
SO2 Absorbed (mmole/L)	14.74	14.74	14.72	0.01	3
Solids Residence Time (hrs)	10.9	10.9	10.8	0.0	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	3.26	3.28	3.24	0.02	3
Spray Zone Pressure Drop (in H2O)	0.69	0.69	0.69	0.00	3
VME Pressure Drop (in H2O)	0.13	0.15	0.11	0.02	3
Oxidation Air to Rxn Tank (acfm)	440	444	436	3	3
NYSEG Load (MW)	533	540	525	6	3

TECO-19L Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/26/94 19:00:00 to 6/26/94 22:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	85.5	85.5	85.4	0.1	3
L/G Ratio (gal/macf)	37	37	37	0	3
Reaction Tank pH	6.00	6.02	5.97	0.02	3
Absorber pH	5.67	5.68	5.66	0.01	3
Flue Gas Flow Rate (scfm)	9793	9800	9779	10	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	5.0	5.0	5.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	1222	1312	1122	78	3
Inlet SO2 Concentration (ppm)	2003	2006	2000	2	3
Outlet SO2 Concentration (ppm)	274	275	272	1	3
Inlet O2 Concentration (%)	9.04	9.65	8.56	0.46	3
Outlet O2 Concentration (%)	8.71	9.20	8.31	0.37	3
Absorber Gas Velocity (ft/sec)	9.93	9.94	9.93	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	126	127	125	1	3
SO2 Absorbed (mmole/L)	12.34	12.35	12.32	0.01	3
Solids Residence Time (hrs)	13.0	13.0	12.9	0.0	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	2.33	2.34	2.32	0.01	3
Spray Zone Pressure Drop (in H2O)	0.47	0.47	0.47	0.00	3
VME Pressure Drop (in H2O)	0.05	0.05	0.05	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	439	0	3
NYSEG Load (MW)	602	690	507	75	3

TECO-20L Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/26/94 23:00:00 to 6/27/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	88.5	88.6	88.4	0.1	3
L/G Ratio (gal/macf)	45	45	45	0	3
Reaction Tank pH	5.99	6.00	5.97	0.01	3
Absorber pH	5.88	5.88	5.87	0.01	3
Flue Gas Flow Rate (scfm)	8001	8001	8000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	430	430	430	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	5.0	5.0	5.0	0.0	3
Facility Inlet SO2 Conc. (ppm)	1309	1353	1260	38	3
Inlet SO2 Concentration (ppm)	2000	2002	1998	1	3
Outlet SO2 Concentration (ppm)	216	218	214	2	3
Inlet O2 Concentration (%)	8.97	9.58	8.36	0.50	3
Outlet O2 Concentration (%)	8.67	9.16	8.17	0.40	3
Absorber Gas Velocity (ft/sec)	8.12	8.12	8.11	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	125	124	0	3
SO2 Absorbed (mmole/L)	10.42	10.43	10.41	0.00	3
Solids Residence Time (hrs)	15.3	15.4	15.3	0.0	3
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	3
Absorber Pressure Drop (in H2O)	1.69	1.70	1.69	0.00	3
Spray Zone Pressure Drop (in H2O)	0.40	0.40	0.40	0.00	3
VME Pressure Drop (in H2O)	0.00	0.01	0.00	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	575	677	473	83	3

TECO-18LR Process Summary Report (Noell packing depth:2 ft. with DBA)
(6/27/94 03:00:00 to 6/27/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	84.9	85.0	84.8	0.1	5
L/G Ratio (gal/macf)	31	31	31	0	5
Reaction Tank pH	5.82	5.88	5.77	0.04	5
Absorber pH	5.61	5.62	5.59	0.01	5
Flue Gas Flow Rate (scfm)	11803	11814	11800	5	5
Header 1 Flow (gpm)	0	0	0	0	5
Header 3 Flow (gpm)	430	430	430	0	5
Header 5 Flow (gpm)	0	0	0	0	5
Blowdown to Sump Rate (gpm)	0.48	0.50	0.42	0.03	5
Centrifuge Feed Rate (gpm)	7.8	7.8	7.8	0.0	5
Facility Inlet SO2 Conc. (ppm)	1259	1336	1174	53	5
Inlet SO2 Concentration (ppm)	1999	2003	1997	2	5
Outlet SO2 Concentration (ppm)	284	287	281	2	5
Inlet O2 Concentration (%)	9.05	10.02	8.53	0.60	5
Outlet O2 Concentration (%)	8.71	9.52	8.28	0.50	5
Absorber Gas Velocity (ft/sec)	11.93	11.95	11.91	0.01	5
Inlet Gas Temperature (F)	314	314	313	0	5
Outlet Gas Temperature (F)	126	126	125	1	5
SO2 Absorbed (mmole/L)	14.74	14.76	14.72	0.02	5
Solids Residence Time (hrs)	10.9	10.9	10.8	0.0	5
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	5
Absorber Pressure Drop (in H2O)	3.31	3.34	3.29	0.02	5
Spray Zone Pressure Drop (in H2O)	0.69	0.69	0.68	0.00	5
VME Pressure Drop (in H2O)	0.12	0.13	0.12	0.00	5
Oxidation Air to Rxn Tank (acfm)	440	442	439	1	5
NYSEG Load (MW)	497	588	365	93	5

TECO-21 Process Summary Report (Noell packing depth: 1ft. with DBA)
(6/27/94 17:00:00 to 6/27/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.3	93.4	93.3	0.0	3
L/G Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.68	5.71	5.66	0.02	3
Absorber pH	5.65	5.66	5.64	0.01	3
Flue Gas Flow Rate (scfm)	13974	14001	13922	37	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.34	7.34	7.34	0.00	3
Facility Inlet SO2 Conc. (ppm)	1261	1376	1135	98	3
Inlet SO2 Concentration (ppm)	2004	2007	2002	2	3
Outlet SO2 Concentration (ppm)	126	126	125	1	3
Inlet O2 Concentration (%)	8.48	8.67	8.21	0.19	3
Outlet O2 Concentration (%)	8.19	8.35	7.96	0.16	3
Absorber Gas Velocity (ft/sec)	14.19	14.22	14.14	0.03	3
Inlet Gas Temperature (F)	327	328	325	1	3
Outlet Gas Temperature (F)	126	126	126	0	3
SO2 Absorbed (mmole/L)	12.72	12.74	12.70	0.01	3
Solids Residence Time (hrs)	8.3	8.3	8.3	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	5.02	5.04	4.99	0.02	3
Spray Zone Pressure Drop (in H2O)	1.37	1.38	1.36	0.00	3
VME Pressure Drop (in H2O)	0.23	0.23	0.22	0.00	3
Oxidation Air to Rxn Tank (acfm)	439	440	438	1	3
NYSEG Load (MW)	581	638	545	41	3

TECO-22 Process Summary Report (Noell packing depth: 1ft. with DBA)
(6/27/94 21:00:00 to 6/27/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.1	93.2	93.0	0.1	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	5.75	5.76	5.73	0.01	3
Absorber pH	5.87	5.88	5.86	0.01	3
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.34	7.35	7.34	0.00	3
Facility Inlet SO2 Conc. (ppm)	1454	1502	1426	34	3
Inlet SO2 Concentration (ppm)	2000	2004	1996	3	3
Outlet SO2 Concentration (ppm)	129	132	127	2	3
Inlet O2 Concentration (%)	9.12	9.21	8.97	0.11	3
Outlet O2 Concentration (%)	8.74	8.82	8.61	0.09	3
Absorber Gas Velocity (ft/sec)	11.93	11.93	11.92	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	125	124	0	3
SO2 Absorbed (mmole/L)	10.70	10.71	10.69	0.01	3
Solids Residence Time (hrs)	9.9	9.9	9.9	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.70	3.73	3.68	0.02	3
Spray Zone Pressure Drop (in H2O)	0.97	0.97	0.97	0.00	3
VME Pressure Drop (in H2O)	0.14	0.14	0.13	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	512	529	502	12	3

TECO-23 Process Summary Report (Noell packing depth: 1ft. with DBA)
(6/28/94 01:00:00 to 6/28/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.8	93.9	93.8	0.1	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	5.82	5.85	5.79	0.03	3
Absorber pH	5.98	6.00	5.95	0.02	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.21	7.34	6.94	0.23	3
Facility Inlet SO2 Conc. (ppm)	1456	1505	1403	42	3
Inlet SO2 Concentration (ppm)	2000	2004	1996	3	3
Outlet SO2 Concentration (ppm)	116	117	114	1	3
Inlet O2 Concentration (%)	9.82	10.10	9.54	0.23	3
Outlet O2 Concentration (%)	9.34	9.60	9.10	0.20	3
Absorber Gas Velocity (ft/sec)	9.92	9.93	9.92	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	124	123	0	3
SO2 Absorbed (mmole/L)	8.95	8.98	8.93	0.02	3
Solids Residence Time (hrs)	11.8	11.8	11.8	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.76	2.76	2.75	0.01	3
Spray Zone Pressure Drop (in H2O)	0.80	0.80	0.80	0.00	3
VME Pressure Drop (in H2O)	0.06	0.07	0.06	0.00	3
Oxidation Air to Rxn Tank (acfm)	439	442	437	2	3
NYSEG Load (MW)	427	490	370	49	3

TECO-24 Process Summary Report (Noell packing depth: 1ft. with DBA)
(6/28/94 05:00:00 to 6/28/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.1	95.2	95.0	0.1	3
L/G Ratio (gal/macf)	68	68	68	0	3
Reaction Tank pH	5.91	5.95	5.86	0.03	3
Absorber pH	6.12	6.15	6.08	0.03	3
Flue Gas Flow Rate (scfm)	8006	8017	8000	8	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.27	7.43	6.94	0.28	3
Facility Inlet SO2 Conc. (ppm)	1424	1443	1396	20	3
Inlet SO2 Concentration (ppm)	1998	2002	1996	2	3
Outlet SO2 Concentration (ppm)	92	93	91	1	3
Inlet O2 Concentration (%)	10.01	10.12	9.94	0.08	3
Outlet O2 Concentration (%)	9.53	9.62	9.47	0.06	3
Absorber Gas Velocity (ft/sec)	8.12	8.13	8.11	0.01	3
Inlet Gas Temperature (F)	314	314	313	0	3
Outlet Gas Temperature (F)	123	123	123	0	3
SO2 Absorbed (mmole/L)	7.41	7.42	7.40	0.01	3
Solids Residence Time (hrs)	14.3	14.3	14.3	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.07	2.11	2.04	0.03	3
Spray Zone Pressure Drop (in H2O)	0.65	0.65	0.64	0.00	3
VME Pressure Drop (in H2O)	0.02	0.02	0.02	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	439	0	3
NYSEG Load (MW)	378	405	334	32	3

TECO-25 Process Summary Report (Polypack packing depth: 1ft. w/ DBA)
(6/28/94 18:00:00 to 6/28/94 21:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.2	95.3	95.1	0.1	3
L/G Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.62	5.67	5.56	0.05	3
Absorber pH	5.50	5.52	5.48	0.02	3
Flue Gas Flow Rate (scfm)	13999	14000	13998	1	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.52	0.55	0.50	0.02	3
Centrifuge Feed Rate (gpm)	8.03	8.16	7.88	0.18	3
Facility Inlet SO2 Conc. (ppm)	1140	1149	1132	7	3
Inlet SO2 Concentration (ppm)	2000	2001	1999	1	3
Outlet SO2 Concentration (ppm)	90	92	88	2	3
Inlet O2 Concentration (%)	8.24	8.26	8.22	0.01	3
Outlet O2 Concentration (%)	8.05	8.08	8.00	0.03	3
Absorber Gas Velocity (ft/sec)	14.19	14.23	14.11	0.05	3
Inlet Gas Temperature (F)	324	331	315	7	3
Outlet Gas Temperature (F)	126	127	125	1	3
SO2 Absorbed (mmole/L)	12.98	13.00	12.96	0.02	3
Solids Residence Time (hrs)	8.2	8.2	8.1	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	6.52	6.58	6.44	0.06	3
Spray Zone Pressure Drop (in H2O)	2.62	2.63	2.61	0.01	3
VME Pressure Drop (in H2O)	0.22	0.23	0.22	0.00	3
Oxidation Air to Rxn Tank (acfm)	459	473	447	10	3
NYSEG Load (MW)	599	600	599	0	3

TECO-26 Process Summary Report (Polypack packing depth: 1ft. w/ DBA)
(6/28/94 22:00:00 to 6/28/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.9	94.0	93.9	0.0	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.62	5.63	5.61	0.01	2
Absorber pH	5.64	5.65	5.64	0.00	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	2
Centrifuge Feed Rate (gpm)	8.47	8.47	8.47	0.00	2
Facility Inlet SO2 Conc. (ppm)	1190	1193	1187	3	2
Inlet SO2 Concentration (ppm)	1999	2000	1998	1	2
Outlet SO2 Concentration (ppm)	114	115	113	1	2
Inlet O2 Concentration (%)	8.48	8.49	8.46	0.02	2
Outlet O2 Concentration (%)	8.22	8.23	8.22	0.00	2
Absorber Gas Velocity (ft/sec)	11.97	11.97	11.96	0.00	2
Inlet Gas Temperature (F)	324	324	324	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	10.78	10.78	10.78	0.00	2
Solids Residence Time (hrs)	9.8	9.8	9.8	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	4.61	4.62	4.59	0.01	2
Spray Zone Pressure Drop (in H2O)	1.73	1.73	1.73	0.00	2
VME Pressure Drop (in H2O)	0.13	0.14	0.13	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	442	440	1	2
NYSEG Load (MW)	575	577	573	2	2

TECO-27 Process Summary Report (Polypack packing depth: 1ft. w/ DBA)
(6/29/94 01:00:00 to 6/29/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.2	94.3	94.2	0.0	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	5.73	5.76	5.71	0.02	3
Absorber pH	5.79	5.80	5.78	0.01	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	3
Centrifuge Feed Rate (gpm)	7.08	7.09	7.07	0.01	3
Facility Inlet SO2 Conc. (ppm)	1080	1090	1071	8	3
Inlet SO2 Concentration (ppm)	2000	2005	1997	3	3
Outlet SO2 Concentration (ppm)	108	109	107	0	3
Inlet O2 Concentration (%)	9.91	10.17	9.74	0.19	3
Outlet O2 Concentration (%)	9.44	9.68	9.27	0.18	3
Absorber Gas Velocity (ft/sec)	9.93	9.93	9.92	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	124	124	0	3
SO2 Absorbed (mmole/L)	9.00	9.02	8.98	0.01	3
Solids Residence Time (hrs)	11.8	11.8	11.7	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.28	3.30	3.26	0.02	3
Spray Zone Pressure Drop (in H2O)	1.18	1.18	1.17	0.00	3
VME Pressure Drop (in H2O)	0.07	0.07	0.07	0.00	3
Oxidation Air to Rxn Tank (acfm)	441	444	440	2	3
NYSEG Load (MW)	278	291	271	9	3

TECO-28 Process Summary Report (Polypack packing depth: 1ft. w/ DBA)
(6/29/94 05:00:00 to 6/29/94 07:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.2	95.2	95.2	0.0	2
L/G Ratio (gal/macf)	68	68	68	0	2
Reaction Tank pH	5.90	5.91	5.88	0.02	2
Absorber pH	5.95	5.96	5.94	0.01	2
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.50	0.50	0.50	0.00	2
Centrifuge Feed Rate (gpm)	6.39	6.40	6.39	0.00	2
Facility Inlet SO2 Conc. (ppm)	1006	1008	1004	2	2
Inlet SO2 Concentration (ppm)	2001	2002	2001	0	2
Outlet SO2 Concentration (ppm)	90	90	90	0	2
Inlet O2 Concentration (%)	9.90	10.03	9.78	0.12	2
Outlet O2 Concentration (%)	9.46	9.56	9.36	0.10	2
Absorber Gas Velocity (ft/sec)	8.11	8.12	8.10	0.01	2
Inlet Gas Temperature (F)	311	312	310	1	2
Outlet Gas Temperature (F)	123	123	122	0	2
SO2 Absorbed (mmole/L)	7.42	7.42	7.42	0.00	2
Solids Residence Time (hrs)	14.3	14.3	14.3	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	2.32	2.32	2.32	0.00	2
Spray Zone Pressure Drop (in H2O)	0.83	0.83	0.82	0.00	2
VME Pressure Drop (in H2O)	0.02	0.02	0.02	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	2
NYSEG Load (MW)	282	293	271	11	2

TECO-29 Process Summary Report (Polypak packing depth: 2ft. with DBA)
(6/29/94 18:00:00 to 6/29/94 21:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	98.0	98.1	97.9	0.1	3
LAG Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.69	5.84	5.55	0.12	3
Absorber pH	5.66	5.74	5.58	0.06	3
Flue Gas Flow Rate (scfm)	14001	14001	14000	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	3
Centrifuge Feed Rate (gpm)	7.43	9.88	6.26	1.65	3
Facility Inlet SO2 Conc. (ppm)	1520	1560	1498	29	3
Inlet SO2 Concentration (ppm)	2000	2001	1999	1	3
Outlet SO2 Concentration (ppm)	37	38	35	1	3
Inlet O2 Concentration (%)	8.00	8.08	7.89	0.08	3
Outlet O2 Concentration (%)	7.75	7.82	7.67	0.06	3
Absorber Gas Velocity (ft/sec)	14.28	14.31	14.24	0.03	3
Inlet Gas Temperature (F)	337	340	332	3	3
Outlet Gas Temperature (F)	128	128	127	0	3
SO2 Absorbed (mmole/L)	13.36	13.37	13.35	0.01	3
Solids Residence Time (hrs)	7.9	7.9	7.9	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	8.05	8.11	7.99	0.05	3
Spray Zone Pressure Drop (in H2O)	BV	BV	BV	BV	0
VME Pressure Drop (in H2O)	0.23	0.23	0.23	0.00	3
Oxidation Air to Rxn Tank (acfm)	439	441	437	1	3
NYSEG Load (MW)	655	679	643	17	3

TECO-30 Process Summary Report (Polypak packing depth: 2ft. with DBA)
(6/29/94 22:00:00 to 6/29/94 24:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	97.5	97.5	97.5	0.0	2
LAG Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.73	5.77	5.68	0.04	2
Absorber pH	5.76	5.78	5.73	0.03	2
Flue Gas Flow Rate (scfm)	11782	11804	11760	22	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.13	0.15	0.11	0.02	2
Centrifuge Feed Rate (gpm)	10.12	10.12	10.11	0.01	2
Facility Inlet SO2 Conc. (ppm)	1480	1515	1445	35	2
Inlet SO2 Concentration (ppm)	1998	2002	1994	4	2
Outlet SO2 Concentration (ppm)	47	47	47	0	2
Inlet O2 Concentration (%)	8.88	9.06	8.70	0.18	2
Outlet O2 Concentration (%)	8.53	8.68	8.38	0.15	2
Absorber Gas Velocity (ft/sec)	11.96	11.99	11.93	0.03	2
Inlet Gas Temperature (F)	326	327	325	1	2
Outlet Gas Temperature (F)	126	126	125	0	2
SO2 Absorbed (mmole/L)	11.17	11.17	11.17	0.00	2
Solids Residence Time (hrs)	9.5	9.5	9.5	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	5.49	5.54	5.45	0.05	2
Spray Zone Pressure Drop (in H2O)	2.95	2.98	2.92	0.03	2
VME Pressure Drop (in H2O)	0.13	0.13	0.13	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	441	441	0	2
NYSEG Load (MW)	511	531	490	20	2

TECO-31 Process Summary Report (Polypak packing depth: 2ft. with DBA)
(6/30/94 01:00:00 to 6/30/94 04:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	97.5	97.6	97.5	0.0	3
L/G Ratio (gal/macf)	56	56	56	0	3
Reaction Tank pH	5.83	5.88	5.76	0.05	3
Absorber pH	5.95	5.99	5.90	0.04	3
Flue Gas Flow Rate (scfm)	9800	9801	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	3
Centrifuge Feed Rate (gpm)	7.49	8.76	6.22	1.80	3
Facility Inlet SO2 Conc. (ppm)	1289	1349	1254	43	3
Inlet SO2 Concentration (ppm)	2003	2009	1997	5	3
Outlet SO2 Concentration (ppm)	47	48	46	1	3
Inlet O2 Concentration (%)	10.02	10.58	9.65	0.40	3
Outlet O2 Concentration (%)	9.54	10.08	9.22	0.38	3
Absorber Gas Velocity (ft/sec)	9.90	9.91	9.89	0.01	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	124	124	123	0	3
SO2 Absorbed (mmole/L)	9.32	9.35	9.29	0.03	3
Solids Residence Time (hrs)	11.4	11.4	11.3	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	3.84	3.85	3.83	0.01	3
Spray Zone Pressure Drop (in H2O)	2.01	2.01	2.00	0.00	3
VME Pressure Drop (in H2O)	0.08	0.10	0.06	0.01	3
Oxidation Air to Rxn Tank (acfm)	441	441	440	1	3
NYSEG Load (MW)	258	283	216	30	3

TECO-32 Process Summary Report (Polypak packing depth: 2ft. with DBA)
(6/30/94 05:00:00 to 6/30/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	97.9	97.9	97.9	0.0	3
L/G Ratio (gal/macf)	68	68	68	0	3
Reaction Tank pH	5.78	5.78	5.77	0.00	3
Absorber pH	5.95	5.96	5.95	0.01	3
Flue Gas Flow Rate (scfm)	8000	8005	7998	3	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	3
Centrifuge Feed Rate (gpm)	4.97	4.97	4.97	0.00	3
Facility Inlet SO2 Conc. (ppm)	1360	1399	1324	31	3
Inlet SO2 Concentration (ppm)	1997	2000	1993	3	3
Outlet SO2 Concentration (ppm)	39	39	39	0	3
Inlet O2 Concentration (%)	9.72	9.89	9.51	0.16	3
Outlet O2 Concentration (%)	9.28	9.44	9.09	0.14	3
Absorber Gas Velocity (ft/sec)	8.09	8.09	8.08	0.00	3
Inlet Gas Temperature (F)	314	314	314	0	3
Outlet Gas Temperature (F)	123	123	123	0	3
SO2 Absorbed (mmole/L)	7.62	7.63	7.61	0.01	3
Solids Residence Time (hrs)	13.9	13.9	13.9	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.60	2.61	2.59	0.01	3
Spray Zone Pressure Drop (in H2O)	1.32	1.32	1.31	0.00	3
VME Pressure Drop (in H2O)	0.02	0.02	0.01	0.00	3
Oxidation Air to Rxn Tank (acfm)	438	442	431	5	3
NYSEG Load (MW)	322	378	265	46	3

TECO-29M Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(6/30/94 09:00:00 to 6/30/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	96.0	96.1	95.9	0.1	2
L/G Ratio (gal/macf)	32	32	32	0	2
Reaction Tank pH	5.53	5.62	5.44	0.09	2
Absorber pH	5.56	5.60	5.51	0.04	2
Flue Gas Flow Rate (scfm)	13995	13998	13992	3	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	9.57	10.13	9.01	0.79	2
Facility Inlet SO2 Conc. (ppm)	1521	1562	1479	42	2
Inlet SO2 Concentration (ppm)	2006	2009	2003	3	2
Outlet SO2 Concentration (ppm)	75	77	73	2	2
Inlet O2 Concentration (%)	8.91	9.13	8.69	0.22	2
Outlet O2 Concentration (%)	8.57	8.76	8.39	0.19	2
Absorber Gas Velocity (ft/sec)	14.13	14.13	14.12	0.00	2
Inlet Gas Temperature (F)	320	323	318	3	2
Outlet Gas Temperature (F)	125	126	125	0	2
SO2 Absorbed (mmole/L)	15.80	15.81	15.78	0.01	2
Solids Residence Time (hrs)	8.1	8.1	8.1	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	7.34	7.36	7.33	0.01	2
Spray Zone Pressure Drop (in H2O)	3.75	3.77	3.73	0.02	2
VME Pressure Drop (in H2O)	0.23	0.23	0.23	0.00	2
Oxidation Air to Rxn Tank (acfm)	443	445	442	1	2
NYSEG Load (MW)	519	553	484	34	2

TECO-30M Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(6/30/94 12:00:00 to 6/30/94 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.7	95.7	95.7	0.0	2
L/G Ratio (gal/macf)	38	38	38	0	2
Reaction Tank pH	5.58	5.59	5.58	0.01	2
Absorber pH	5.66	5.67	5.65	0.01	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	6.96	6.96	6.96	0.00	2
Facility Inlet SO2 Conc. (ppm)	1664	1672	1655	8	2
Inlet SO2 Concentration (ppm)	2000	2000	2000	0	2
Outlet SO2 Concentration (ppm)	81	82	80	1	2
Inlet O2 Concentration (%)	8.24	8.28	8.20	0.04	2
Outlet O2 Concentration (%)	8.04	8.08	8.00	0.04	2
Absorber Gas Velocity (ft/sec)	11.92	11.92	11.92	0.00	2
Inlet Gas Temperature (F)	315	316	315	0	2
Outlet Gas Temperature (F)	125	125	125	0	2
SO2 Absorbed (mmole/L)	13.24	13.24	13.23	0.00	2
Solids Residence Time (hrs)	9.6	9.6	9.6	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	5.11	5.11	5.11	0.00	2
Spray Zone Pressure Drop (in H2O)	2.51	2.52	2.51	0.00	2
VME Pressure Drop (in H2O)	0.14	0.14	0.14	0.00	2.00
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	2
NYSEG Load (MW)	562	564	561	2	2

TECO-31M Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(6/30/94 15:00:00 to 6/30/94 17:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.9	95.9	95.9	0.0	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.73	5.74	5.73	0.01	2
Absorber pH	5.84	5.85	5.83	0.01	2
Flue Gas Flow Rate (scfm)	9799	9800	9799	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.13	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	5.89	5.94	5.84	0.06	2
Facility Inlet SO2 Conc. (ppm)	1468	1499	1438	30	2
Inlet SO2 Concentration (ppm)	2000	2001	1999	1	2
Outlet SO2 Concentration (ppm)	76	76	76	0	2
Inlet O2 Concentration (%)	9.02	9.07	8.97	0.05	2
Outlet O2 Concentration (%)	8.66	8.70	8.62	0.04	2
Absorber Gas Velocity (ft/sec)	9.91	9.91	9.91	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	124	124	124	0	2
SO2 Absorbed (mmole/L)	11.02	11.02	11.01	0.01	2
Solids Residence Time (hrs)	11.6	11.6	11.6	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	3.54	3.55	3.53	0.01	2
Spray Zone Pressure Drop (in H2O)	1.68	1.69	1.68	0.01	2
VME Pressure Drop (in H2O)	0.07	0.07	0.07	0.00	2
Oxidation Air to Rxn Tank (acfm)	447	448	446	1	2
NYSEG Load (MW)	562	568	555	7	2

TECO-32M Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(6/30/94 18:00:00 to 6/30/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	96.5	96.6	96.5	0.0	2
L/G Ratio (gal/macf)	57	57	57	0	2
Reaction Tank pH	5.68	5.69	5.67	0.01	2
Absorber pH	5.88	5.89	5.88	0.00	2
Flue Gas Flow Rate (scfm)	8000	8000	7999	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.13	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	5.93	5.93	5.93	0.00	2
Facility Inlet SO2 Conc. (ppm)	1166	1222	1111	55	2
Inlet SO2 Concentration (ppm)	1998	2000	1996	2	2
Outlet SO2 Concentration (ppm)	65	65	64	1	2
Inlet O2 Concentration (%)	9.90	10.03	9.77	0.13	2
Outlet O2 Concentration (%)	9.43	9.56	9.31	0.12	2
Absorber Gas Velocity (ft/sec)	8.10	8.10	8.10	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	123	123	123	0	2
SO2 Absorbed (mmole/L)	9.04	9.05	9.04	0.01	2
Solids Residence Time (hrs)	14.1	14.1	14.1	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	2.38	2.38	2.37	0.01	2
Spray Zone Pressure Drop (in H2O)	1.09	1.09	1.08	0.01	2
VME Pressure Drop (in H2O)	0.01	0.01	0.01	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	440	0	2
NYSEG Load (MW)	370	373	367	3	2

TECO-29L Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(6/30/94 21:00:00 to 6/30/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.6	93.0	92.3	0.4	2
L/G Ratio (gal/macf)	26	26	26	0	2
Reaction Tank pH	5.46	5.61	5.31	0.15	2
Absorber pH	5.42	5.50	5.33	0.08	2
Flue Gas Flow Rate (scfm)	14000	14001	14000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.11	0.11	0.11	0.00	2
Centrifuge Feed Rate (gpm)	10.47	10.50	10.44	0.04	2
Facility Inlet SO2 Conc. (ppm)	1031	1105	958	73	2
Inlet SO2 Concentration (ppm)	1996	1998	1994	2	2
Outlet SO2 Concentration (ppm)	138	145	131	7	2
Inlet O2 Concentration (%)	9.80	9.90	9.70	0.10	2
Outlet O2 Concentration (%)	9.32	9.41	9.24	0.09	2
Absorber Gas Velocity (ft/sec)	14.11	14.11	14.10	0.01	2
Inlet Gas Temperature (F)	314	314	313	0	2
Outlet Gas Temperature (F)	124	124	124	0	2
SO2 Absorbed (mmole/L)	19.05	19.14	18.95	0.10	2
Solids Residence Time (hrs)	8.4	8.4	8.4	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	6.81	6.84	6.78	0.03	2
Spray Zone Pressure Drop (in H2O)	3.18	3.20	3.16	0.02	2
VME Pressure Drop (in H2O)	0.24	0.24	0.23	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	441	440	1	2
NYSEG Load (MW)	340	348	332	8	2

TECO-30L Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(7/1/94 00:00:00 to 7/1/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	92.9	92.9	92.9	0.0	2
L/G Ratio (gal/macf)	31	31	31	0	2
Reaction Tank pH	5.64	5.67	5.62	0.03	2
Absorber pH	5.55	5.56	5.54	0.01	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	8.98	9.70	7.28	1.47	2
Facility Inlet SO2 Conc. (ppm)	851	856	846	5	2
Inlet SO2 Concentration (ppm)	2000	2001	2000	1	2
Outlet SO2 Concentration (ppm)	133	133	133	0	2
Inlet O2 Concentration (%)	9.62	9.70	9.53	0.09	2
Outlet O2 Concentration (%)	9.18	9.26	9.11	0.08	2
Absorber Gas Velocity (ft/sec)	11.91	11.91	11.90	0.01	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	124	124	123	0	2
SO2 Absorbed (mmole/L)	16.14	16.15	16.14	0.01	2
Solids Residence Time (hrs)	9.9	9.9	9.9	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	4.79	4.80	4.78	0.01	2
Spray Zone Pressure Drop (in H2O)	2.12	2.13	2.12	0.00	2
VME Pressure Drop (in H2O)	0.15	0.15	0.14	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	2
NYSEG Load (MW)	312	336	287	25	2

TECO-31L Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(7/1/94 03:00:00 to 7/1/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.3	93.3	93.3	0.0	2
L/G Ratio (gal/macf)	37	37	37	0	2
Reaction Tank pH	5.82	5.82	5.82	0.00	2
Absorber pH	5.72	5.72	5.72	0.00	2
Flue Gas Flow Rate (scfm)	9769	9800	9739	31	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	5.32	5.68	4.98	0.49	2
Facility Inlet SO2 Conc. (ppm)	772	781	763	9	2
Inlet SO2 Concentration (ppm)	1999	2000	1998	1	2
Outlet SO2 Concentration (ppm)	125	126	125	1	2
Inlet O2 Concentration (%)	10.32	10.36	10.28	0.04	2
Outlet O2 Concentration (%)	9.82	9.86	9.79	0.03	2
Absorber Gas Velocity (ft/sec)	9.86	9.89	9.83	0.03	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	123	123	123	0	2
SO2 Absorbed (mmole/L)	13.41	13.45	13.37	0.04	2
Solids Residence Time (hrs)	11.9	12.0	11.9	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	3.25	3.27	3.24	0.01	2
Spray Zone Pressure Drop (in H2O)	1.37	1.38	1.36	0.01	2
VME Pressure Drop (in H2O)	0.07	0.07	0.07	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	442	437	3	2
NYSEG Load (MW)	263	264	263	0	2

TECO-32L Process Summary Report (Polypak packing depth: 2ft. w/ DBA)
(7/1/94 06:00:00 to 7/1/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.6	94.6	94.6	0.0	2
L/G Ratio (gal/macf)	45	45	45	0	2
Reaction Tank pH	5.86	5.86	5.85	0.00	2
Absorber pH	5.87	5.87	5.87	0.00	2
Flue Gas Flow Rate (scfm)	7999	8000	7999	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	3.79	3.79	3.79	0.00	2
Facility Inlet SO2 Conc. (ppm)	1082	1140	1025	57	2
Inlet SO2 Concentration (ppm)	2000	2000	1999	1	2
Outlet SO2 Concentration (ppm)	102	102	102	0	2
Inlet O2 Concentration (%)	9.75	9.79	9.72	0.04	2
Outlet O2 Concentration (%)	9.31	9.34	9.27	0.04	2
Absorber Gas Velocity (ft/sec)	8.10	8.10	8.09	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	123	123	123	0	2
SO2 Absorbed (mmole/L)	11.13	11.14	11.13	0.00	2
Solids Residence Time (hrs)	14.4	14.4	14.4	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	2.21	2.21	2.21	0.00	2
Spray Zone Pressure Drop (in H2O)	0.90	0.90	0.89	0.00	2
VME Pressure Drop (in H2O)	0.02	0.02	0.02	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	2
NYSEG Load (MW)	349	368	329	20	2

TECO-33 Process Summary Report (No Packing, DBA addition)
(7/1/94 17:00:00 to 7/1/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.1	94.4	93.9	0.2	3
L/G Ratio (gal/macf)	39	39	39	0	3
Reaction Tank pH	5.60	5.71	5.53	0.08	3
Absorber pH	6.24	6.25	6.21	0.02	3
Flue Gas Flow Rate (scfm)	14000	14003	13999	2	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	3
Centrifuge Feed Rate (gpm)	9.99	9.99	9.99	0.00	3
Facility Inlet SO2 Conc. (ppm)	1395	1421	1377	19	3
Inlet SO2 Concentration (ppm)	2000	2001	2000	1	3
Outlet SO2 Concentration (ppm)	110	114	105	4	3
Inlet O2 Concentration (%)	8.17	8.25	8.08	0.07	3
Outlet O2 Concentration (%)	7.70	7.77	7.61	0.07	3
Absorber Gas Velocity (ft/sec)	14.25	14.28	14.22	0.02	3
Inlet Gas Temperature (F)	331	333	328	2	3
Outlet Gas Temperature (F)	128	128	127	0	3
SO2 Absorbed (mmole/L)	12.83	12.87	12.80	0.03	3
Solids Residence Time (hrs)	8.2	8.3	8.2	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	5.20	5.23	5.17	0.03	3
Spray Zone Pressure Drop (in H2O)	1.15	1.17	1.14	0.01	3
VME Pressure Drop (in H2O)	0.31	0.31	0.31	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	439	0	3
NYSEG Load (MW)	634	636	632	2	3

TECO-34 Process Summary Report (No Packing, DBA addition)
(7/1/94 21:00:00 to 7/1/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.9	94.0	93.8	0.1	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.66	5.66	5.65	0.01	2
Absorber pH	5.60	5.62	5.59	0.02	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.13	0.11	0.01	2
Centrifuge Feed Rate (gpm)	7.36	8.03	6.69	0.95	2
Facility Inlet SO2 Conc. (ppm)	1435	1454	1416	19	2
Inlet SO2 Concentration (ppm)	1998	1999	1997	1	2
Outlet SO2 Concentration (ppm)	115	116	113	1	2
Inlet O2 Concentration (%)	8.36	8.42	8.30	0.06	2
Outlet O2 Concentration (%)	7.90	7.97	7.84	0.06	2
Absorber Gas Velocity (ft/sec)	11.98	11.99	11.98	0.00	2
Inlet Gas Temperature (F)	323	323	322	0	2
Outlet Gas Temperature (F)	127	127	127	0	2
SO2 Absorbed (mmole/L)	10.78	10.79	10.76	0.01	2
Solids Residence Time (hrs)	9.8	9.8	9.8	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	3.88	3.90	3.86	0.02	2
Spray Zone Pressure Drop (in H2O)	0.90	0.90	0.89	0.00	2
VME Pressure Drop (in H2O)	0.19	0.19	0.19	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	441	440	0	2
NYSEG Load (MW)	644	676	613	32	2

TECO-35 Process Summary Report (No Packing, DBA addition)
(7/2/94 00:00:00 to 7/2/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	94.6	94.7	94.6	0.0	2
L/G Ratio (gal/inacf)	56	56	56	0	2
Reaction Tank pH	5.63	5.64	5.61	0.01	2
Absorber pH	5.66	5.68	5.63	0.02	2
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.12	0.11	0.01	2
Centrifuge Feed Rate (gpm)	5.97	5.97	5.97	0.00	2
Facility Inlet SO2 Conc. (ppm)	1439	1458	1420	19	2
Inlet SO2 Concentration (ppm)	2001	2004	1997	4	2
Outlet SO2 Concentration (ppm)	101	101	100	1	2
Inlet O2 Concentration (%)	8.53	8.57	8.49	0.04	2
Outlet O2 Concentration (%)	8.07	8.11	8.03	0.04	2
Absorber Gas Velocity (ft/sec)	9.93	9.93	9.93	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	9.04	9.06	9.01	0.02	2
Solids Residence Time (hrs)	11.7	11.7	11.7	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	2.93	2.93	2.93	0.00	2
Spray Zone Pressure Drop (in H2O)	0.75	0.76	0.75	0.00	2
VME Pressure Drop (in H2O)	0.11	0.11	0.10	0.00	2
Oxidation Air to Rxn Tank (acfm)	444	447	440	4	2
NYSEG Load (MW)	582	584	580	2	2

TECO-36 Process Summary Report (No Packing, DBA addition)
(7/2/94 03:00:00 to 7/2/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	95.6	95.7	95.5	0.1	2
L/G Ratio (gal/inacf)	68	68	68	0	2
Reaction Tank pH	5.75	5.77	5.73	0.02	2
Absorber pH	5.83	5.85	5.82	0.02	2
Flue Gas Flow Rate (scfm)	8004	8008	7999	4	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	650	650	650	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	6.09	6.19	5.99	0.14	2
Facility Inlet SO2 Conc. (ppm)	1333	1333	1333	0	2
Inlet SO2 Concentration (ppm)	2001	2001	2000	1	2
Outlet SO2 Concentration (ppm)	83	85	81	2	2
Inlet O2 Concentration (%)	9.08	9.18	8.99	0.09	2
Outlet O2 Concentration (%)	8.54	8.60	8.48	0.06	2
Absorber Gas Velocity (ft/sec)	8.11	8.11	8.10	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	124	124	124	0	2
SO2 Absorbed (mmole/L)	7.45	7.46	7.44	0.01	2
Solids Residence Time (hrs)	14.2	14.2	14.2	0.0	2
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	2
Absorber Pressure Drop (in H2O)	2.17	2.17	2.16	0.01	2
Spray Zone Pressure Drop (in H2O)	0.63	0.63	0.62	0.00	2
VME Pressure Drop (in H2O)	0.04	0.04	0.04	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	440	439	1	2
NYSEG Load (MW)	519	525	512	6	2

TECO-33M Process Summary Report (No Packing, DBA addition)
(7/2/94 06:00:00 to 7/2/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	90.6	90.6	90.6	0.0	2
L/G Ratio (gal/macf)	32	32	32	0	2
Reaction Tank pH	5.47	5.49	5.46	0.02	2
Absorber pH	6.12	6.14	6.11	0.01	2
Flue Gas Flow Rate (scfm)	14000	14001	13999	1	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.11	0.13	0.10	0.01	2
Centrifuge Feed Rate (gpm)	10.00	10.00	10.00	0.00	2
Facility Inlet SO2 Conc. (ppm)	1221	1241	1201	20	2
Inlet SO2 Concentration (ppm)	2001	2005	1997	4	2
Outlet SO2 Concentration (ppm)	176	176	175	1	2
Inlet O2 Concentration (%)	9.61	9.94	9.28	0.33	2
Outlet O2 Concentration (%)	8.97	9.23	8.70	0.26	2
Absorber Gas Velocity (ft/sec)	14.18	14.18	14.18	0.00	2
Inlet Gas Temperature (F)	323	324	322	1	2
Outlet Gas Temperature (F)	126	126	125	0	2
SO2 Absorbed (mmole/L)	14.88	14.91	14.85	0.03	2
Solids Residence Time (hrs)	8.6	8.6	8.5	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	5.12	5.14	5.10	0.02	2
Spray Zone Pressure Drop (in H2O)	0.88	0.88	0.88	0.00	2
VME Pressure Drop (in H2O)	0.32	0.32	0.31	0.01	2
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	2
NYSEG Load (MW)	425	464	387	38	2

TECO-34M Process Summary Report (No Packing, DBA addition)
(7/2/94 09:00:00 to 7/2/94 11:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.0	91.1	90.9	0.1	2
L/G Ratio (gal/macf)	38	38	38	0	2
Reaction Tank pH	5.55	5.55	5.54	0.00	2
Absorber pH	5.63	5.66	5.61	0.02	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	9.26	10.30	8.22	1.47	2
Facility Inlet SO2 Conc. (ppm)	1385	1423	1347	38	2
Inlet SO2 Concentration (ppm)	1997	1998	1996	1	2
Outlet SO2 Concentration (ppm)	169	171	167	2	2
Inlet O2 Concentration (%)	8.89	9.18	8.60	0.29	2
Outlet O2 Concentration (%)	8.37	8.62	8.12	0.25	2
Absorber Gas Velocity (ft/sec)	11.93	11.93	11.93	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	12.57	12.59	12.55	0.02	2
Solids Residence Time (hrs)	10.1	10.1	10.1	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	3.78	3.79	3.77	0.01	2
Spray Zone Pressure Drop (in H2O)	0.75	0.76	0.75	0.00	2
VME Pressure Drop (in H2O)	0.19	0.19	0.19	0.00	2.00
Oxidation Air to Rxn Tank (acfm)	443	445	440	2	2
NYSEG Load (MW)	512	541	483	29	2

TECO-35M Process Summary Report (No Packing, DBA addition)
(7/2/94 12:00:00 to 7/2/94 14:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	91.9	91.9	91.8	0.0	2
L/G Ratio (gal/macf)	46	46	46	0	2
Reaction Tank pH	5.56	5.58	5.53	0.02	2
Absorber pH	5.59	5.60	5.58	0.01	2
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.11	0.12	0.11	0.00	2
Centrifuge Feed Rate (gpm)	7.96	7.96	7.96	0.00	2
Facility Inlet SO2 Conc. (ppm)	1382	1412	1351	30	2
Inlet SO2 Concentration (ppm)	1997	1997	1997	0	2
Outlet SO2 Concentration (ppm)	153	153	152	1	2
Inlet O2 Concentration (%)	9.02	9.17	8.86	0.15	2
Outlet O2 Concentration (%)	8.48	8.59	8.37	0.11	2
Absorber Gas Velocity (ft/sec)	9.93	9.94	9.93	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	10.54	10.54	10.53	0.00	2
Solids Residence Time (hrs)	12.1	12.1	12.1	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	2.80	2.81	2.79	0.01	2
Spray Zone Pressure Drop (in H2O)	0.60	0.60	0.60	0.00	2
VME Pressure Drop (in H2O)	0.11	0.11	0.11	0.00	2
Oxidation Air to Rxn Tank (acfm)	441	446	436	5	2
NYSEG Load (MW)	530	541	519	11	2

TECO-36M Process Summary Report (No Packing, DBA addition)
(7/2/94 15:00:00 to 7/2/94 17:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	93.0	93.0	93.0	0.0	2
L/G Ratio (gal/macf)	57	57	57	0	2
Reaction Tank pH	5.71	5.74	5.69	0.02	2
Absorber pH	5.80	5.81	5.78	0.02	2
Flue Gas Flow Rate (scfm)	8000	8000	8000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	540	540	540	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.13	0.11	0.01	2
Centrifuge Feed Rate (gpm)	6.03	6.03	6.03	0.00	2
Facility Inlet SO2 Conc. (ppm)	1373	1414	1332	41	2
Inlet SO2 Concentration (ppm)	2001	2003	2000	1	2
Outlet SO2 Concentration (ppm)	131	132	131	1	2
Inlet O2 Concentration (%)	8.87	9.25	8.49	0.38	2
Outlet O2 Concentration (%)	8.37	8.68	8.06	0.31	2
Absorber Gas Velocity (ft/sec)	8.10	8.10	8.10	0.00	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	124	124	124	0	2
SO2 Absorbed (mmole/L)	8.73	8.74	8.72	0.01	2
Solids Residence Time (hrs)	14.6	14.6	14.6	0.0	2
Slurry Residence Time (min)	10.58	10.58	10.58	0.00	2
Absorber Pressure Drop (in H2O)	2.05	2.05	2.05	0.00	2
Spray Zone Pressure Drop (in H2O)	0.49	0.49	0.49	0.00	2
VME Pressure Drop (in H2O)	0.04	0.04	0.04	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	439	439	0	2
NYSEG Load (MW)	569	624	514	55	2

TECO-33L Process Summary Report (No Packing, DBA addition)
(7/2/94 18:00:00 to 7/2/94 20:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	84.7	84.8	84.6	0.1	2
L/G Ratio (gal/macf)	26	26	26	0	2
Reaction Tank pH	5.33	5.39	5.28	0.05	2
Absorber pH	5.35	5.39	5.30	0.05	2
Flue Gas Flow Rate (scfm)	14000	14000	14000	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.12	0.14	0.11	0.01	2
Centrifuge Feed Rate (gpm)	10.00	10.00	10.00	0.00	2
Facility Inlet SO2 Conc. (ppm)	1349	1351	1347	2	2
Inlet SO2 Concentration (ppm)	2000	2000	1999	1	2
Outlet SO2 Concentration (ppm)	286	288	284	2	2
Inlet O2 Concentration (%)	8.73	8.88	8.58	0.15	2
Outlet O2 Concentration (%)	8.21	8.34	8.08	0.13	2
Absorber Gas Velocity (ft/sec)	14.26	14.27	14.26	0.00	2
Inlet Gas Temperature (F)	331	331	331	0	2
Outlet Gas Temperature (F)	128	128	128	0	2
SO2 Absorbed (mmole/L)	17.46	17.48	17.43	0.03	2
Solids Residence Time (hrs)	9.2	9.2	9.1	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	5.04	5.04	5.03	0.00	2
Spray Zone Pressure Drop (in H2O)	0.64	0.65	0.64	0.01	2
VME Pressure Drop (in H2O)	0.32	0.32	0.32	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	440	439	1	2
NYSEG Load (MW)	565	580	549	15	2

TECO-34L Process Summary Report (No Packing, DBA addition)
(7/2/94 21:00:00 to 7/2/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	86.6	86.6	86.5	0.0	2
L/G Ratio (gal/macf)	31	31	31	0	2
Reaction Tank pH	5.66	5.67	5.66	0.01	2
Absorber pH	5.48	5.48	5.47	0.01	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.10	0.10	0.10	0.00	2
Centrifuge Feed Rate (gpm)	7.45	7.58	7.31	0.19	2
Facility Inlet SO2 Conc. (ppm)	1395	1407	1384	11	2
Inlet SO2 Concentration (ppm)	1999	1999	1999	0	2
Outlet SO2 Concentration (ppm)	252	253	252	1	2
Inlet O2 Concentration (%)	8.94	9.01	8.88	0.07	2
Outlet O2 Concentration (%)	8.42	8.48	8.36	0.06	2
Absorber Gas Velocity (ft/sec)	11.96	11.97	11.96	0.00	2
Inlet Gas Temperature (F)	316	316	315	0	2
Outlet Gas Temperature (F)	127	127	127	0	2
SO2 Absorbed (mmole/L)	15.03	15.04	15.02	0.01	2
Solids Residence Time (hrs)	10.6	10.6	10.6	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	3.73	3.74	3.72	0.01	2
Spray Zone Pressure Drop (in H2O)	0.54	0.54	0.54	0.00	2
VME Pressure Drop (in H2O)	0.20	0.20	0.20	0.00	2
Oxidation Air to Rxn Tank (acfm)	438	440	437	2	2
NYSEG Load (MW)	539	549	529	10	2

TECO-35L Process Summary Report (No Packing, DBA addition)
(7/3/94 00:00:00 to 7/3/94 02:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	87.3	87.3	87.3	0.0	2
L/G Ratio (gal/macf)	37	37	37	0	2
Reaction Tank pH	5.70	5.72	5.69	0.02	2
Absorber pH	5.71	5.72	5.70	0.01	2
Flue Gas Flow Rate (scfm)	9793	9801	9784	9	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.11	0.13	0.09	0.02	2
Centrifuge Feed Rate (gpm)	7.10	7.10	7.10	0.00	2
Facility Inlet SO2 Conc. (ppm)	1391	1474	1308	83	2
Inlet SO2 Concentration (ppm)	2000	2003	1996	3	2
Outlet SO2 Concentration (ppm)	238	239	237	1	2
Inlet O2 Concentration (%)	8.67	9.17	8.16	0.51	2
Outlet O2 Concentration (%)	8.19	8.62	7.75	0.44	2
Absorber Gas Velocity (ft/sec)	9.94	9.94	9.93	0.01	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	12.58	12.59	12.58	0.01	2
Solids Residence Time (hrs)	12.7	12.7	12.7	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	2.74	2.74	2.74	0.00	2
Spray Zone Pressure Drop (in H2O)	0.45	0.45	0.45	0.00	2
VME Pressure Drop (in H2O)	0.12	0.13	0.11	0.01	2
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	2
NYSEG Load (MW)	574	623	526	49	2

TECO-36L Process Summary Report (No Packing, DBA addition)
(7/3/94 03:00:00 to 7/3/94 05:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	88.3	88.3	88.2	0.0	2
L/G Ratio (gal/macf)	45	45	45	0	2
Reaction Tank pH	5.74	5.75	5.74	0.00	2
Absorber pH	5.85	5.85	5.85	0.00	2
Flue Gas Flow Rate (scfm)	8027	8055	8000	28	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.09	0.09	0.09	0.00	2
Centrifuge Feed Rate (gpm)	4.52	4.86	4.17	0.49	2
Facility Inlet SO2 Conc. (ppm)	1519	1541	1497	22	2
Inlet SO2 Concentration (ppm)	1998	2000	1995	3	2
Outlet SO2 Concentration (ppm)	221	221	220	1	2
Inlet O2 Concentration (%)	8.33	8.63	8.04	0.30	2
Outlet O2 Concentration (%)	7.92	8.20	7.64	0.28	2
Absorber Gas Velocity (ft/sec)	8.16	8.19	8.13	0.03	2
Inlet Gas Temperature (F)	314	314	314	0	2
Outlet Gas Temperature (F)	125	126	125	0	2
SO2 Absorbed (mmole/L)	10.42	10.44	10.39	0.03	2
Solids Residence Time (hrs)	15.4	15.4	15.3	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	1.96	1.98	1.94	0.02	2
Spray Zone Pressure Drop (in H2O)	0.38	0.38	0.38	0.00	2
VME Pressure Drop (in H2O)	0.05	0.06	0.05	0.00	2
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	2
NYSEG Load (MW)	644	667	621	23	2

TECO-34LR Process Summary Report (No Packing, DBA addition)
(7/3/94 06:00:00 to 7/3/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	86.7	86.7	86.7	0.0	2
L/G Ratio (gal/macf)	31	31	31	0	2
Reaction Tank pH	5.54	5.56	5.52	0.02	2
Absorber pH	5.47	5.48	5.46	0.01	2
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	2
Header 1 Flow (gpm)	0	0	0	0	2
Header 3 Flow (gpm)	430	430	430	0	2
Header 5 Flow (gpm)	0	0	0	0	2
Blowdown to Sump Rate (gpm)	0.11	0.12	0.09	0.02	2
Centrifuge Feed Rate (gpm)	6.13	6.97	6.49	0.34	2
Facility Inlet SO2 Conc. (ppm)	1499	1566	1431	68	2
Inlet SO2 Concentration (ppm)	2003	2005	2000	3	2
Outlet SO2 Concentration (ppm)	251	251	251	0	2
Inlet O2 Concentration (%)	8.64	9.02	8.26	0.38	2
Outlet O2 Concentration (%)	8.18	8.50	7.87	0.31	2
Absorber Gas Velocity (ft/sec)	11.96	11.97	11.96	0.00	2
Inlet Gas Temperature (F)	315	316	315	0	2
Outlet Gas Temperature (F)	126	126	126	0	2
SO2 Absorbed (mmole/L)	15.08	15.10	15.05	0.02	2
Solids Residence Time (hrs)	10.6	10.6	10.6	0.0	2
Slurry Residence Time (min)	13.28	13.28	13.28	0.00	2
Absorber Pressure Drop (in H2O)	3.90	3.90	3.89	0.01	2
Spray Zone Pressure Drop (in H2O)	0.56	0.57	0.56	0.00	2
VME Pressure Drop (in H2O)	0.21	0.21	0.21	0.00	2
Oxidation Air to Rxn Tank (acfm)	439	440	437	2	2
NYSEG Load (MW)	572	632	511	60	2

TECO-33X Process Summary Report (No Packing, DBA addition)
(7/11/94 16:00:00 to 7/11/94 19:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	87.3	87.8	86.5	0.5	3
L/G Ratio (gal/macf)	38	38	38	0	3
Reaction Tank pH	5.80	5.84	5.78	0.03	3
Absorber pH	5.78	5.80	5.76	0.01	3
Flue Gas Flow Rate (scfm)	14000	14001	13999	1	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.32	0.32	0.32	0.00	3
Centrifuge Feed Rate (gpm)	9.45	9.95	8.44	0.71	3
Facility Inlet SO2 Conc. (ppm)	1387	1441	1291	68	3
Inlet SO2 Concentration (ppm)	1999	2003	1997	3	3
Outlet SO2 Concentration (ppm)	237	252	228	11	3
Inlet O2 Concentration (%)	8.00	8.11	7.79	0.14	3
Outlet O2 Concentration (%)	7.53	7.63	7.33	0.14	3
Absorber Gas Velocity (ft/sec)	14.35	14.36	14.35	0.00	3
Inlet Gas Temperature (F)	342	342	341	0	3
Outlet Gas Temperature (F)	130	130	130	0	3
SO2 Absorbed (mmole/L)	11.90	11.95	11.81	0.06	3
Solids Residence Time (hrs)	8.9	9.0	8.9	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	5.42	5.46	5.37	0.04	3
Spray Zone Pressure Drop (in H2O)	0.81	0.82	0.80	0.01	3
VME Pressure Drop (in H2O)	0.15	0.25	0.09	0.08	3
Oxidation Air to Rxn Tank (acfm)	440	441	439	1	3
NYSEG Load (MW)	649	677	633	20	3

TECO-34X Process Summary Report (No Packing, DBA addition)
(7/11/94 20:00:00 to 7/11/94 23:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	86.9	87.3	86.6	0.3	3
L/G Ratio (gal/macf)	46	46	46	0	3
Reaction Tank pH	5.79	5.81	5.75	0.02	3
Absorber pH	5.86	5.89	5.82	0.03	3
Flue Gas Flow Rate (scfm)	11800	11800	11800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.32	0.32	0.32	0.00	3
Centrifuge Feed Rate (gpm)	5.92	6.34	5.44	0.37	3
Facility Inlet SO2 Conc. (ppm)	1231	1235	1226	4	3
Inlet SO2 Concentration (ppm)	2002	2005	1998	3	3
Outlet SO2 Concentration (ppm)	245	252	239	5	3
Inlet O2 Concentration (%)	7.98	8.02	7.92	0.04	3
Outlet O2 Concentration (%)	7.55	7.60	7.50	0.04	3
Absorber Gas Velocity (ft/sec)	12.05	12.05	12.05	0.00	3
Inlet Gas Temperature (F)	329	329	328	0	3
Outlet Gas Temperature (F)	129	129	129	0	3
SO2 Absorbed (mmole/L)	10.00	10.04	9.98	0.03	3
Solids Residence Time (hrs)	10.6	10.6	10.5	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	4.06	4.09	4.03	0.02	3
Spray Zone Pressure Drop (in H2O)	0.65	0.65	0.64	0.00	3
VME Pressure Drop (in H2O)	0.04	0.05	0.04	0.00	3
Oxidation Air to Rxn Tank (acfm)	441	441	440	0	3
NYSEG Load (MW)	655	668	636	14	3

TECO-35X Process Summary Report (No Packing, DBA addition)
(7/12/94 00:00:00 to 7/12/94 03:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	87.4	87.6	87.2	0.1	3
L/G Ratio (gal/macf)	55	55	55	0	3
Reaction Tank pH	5.80	5.81	5.77	0.02	3
Absorber pH	5.92	5.93	5.90	0.01	3
Flue Gas Flow Rate (scfm)	9800	9800	9800	0	3
Header 1 Flow (gpm)	0	0	0	0	3
Header 3 Flow (gpm)	650	650	650	0	3
Header 5 Flow (gpm)	0	0	0	0	3
Blowdown to Sump Rate (gpm)	0.32	0.32	0.32	0.00	3
Centrifuge Feed Rate (gpm)	5.30	5.45	5.22	0.11	3
Facility Inlet SO2 Conc. (ppm)	1406	1431	1390	18	3
Inlet SO2 Concentration (ppm)	2000	2002	1997	2	3
Outlet SO2 Concentration (ppm)	238	241	234	3	3
Inlet O2 Concentration (%)	8.12	8.22	8.01	0.09	3
Outlet O2 Concentration (%)	7.72	7.82	7.62	0.08	3
Absorber Gas Velocity (ft/sec)	9.97	9.97	9.96	0.00	3
Inlet Gas Temperature (F)	315	316	314	1	3
Outlet Gas Temperature (F)	127	128	127	0	3
SO2 Absorbed (mmole/L)	8.34	8.34	8.32	0.01	3
Solids Residence Time (hrs)	12.7	12.7	12.7	0.0	3
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	3
Absorber Pressure Drop (in H2O)	2.99	3.01	2.98	0.01	3
Spray Zone Pressure Drop (in H2O)	0.50	0.51	0.50	0.00	3
VME Pressure Drop (in H2O)	0.01	0.01	0.01	0.00	3
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	3
NYSEG Load (MW)	687	690	682	3	3

TECO-36X Process Summary Report (No Packing, DBA addition)
(7/12/94 04:00:00 to 7/12/94 08:00:00)

Process Variable	Average	Max	Min	Std.Dev.	Points
SO2 Removal (%)	87.6	87.6	87.5	0.1	4
L/G Ratio (gal/macf)	68	68	68	0	4
Reaction Tank pH	5.84	5.84	5.82	0.01	4
Absorber pH	5.99	6.01	5.98	0.01	4
Flue Gas Flow Rate (scfm)	8003	8012	8000	5	4
Header 1 Flow (gpm)	0	0	0	0	4
Header 3 Flow (gpm)	650	650	650	0	4
Header 5 Flow (gpm)	0	0	0	0	4
Blowdown to Sump Rate (gpm)	0.32	0.32	0.32	0.00	4
Centrifuge Feed Rate (gpm)	5.04	5.50	4.70	0.29	4
Facility Inlet SO2 Conc. (ppm)	1368	1407	1321	35	4
Inlet SO2 Concentration (ppm)	1999	2000	1996	2	4
Outlet SO2 Concentration (ppm)	234	235	232	1	4
Inlet O2 Concentration (%)	8.43	8.53	8.30	0.08	4
Outlet O2 Concentration (%)	8.04	8.13	7.91	0.08	4
Absorber Gas Velocity (ft/sec)	8.14	8.15	8.14	0.01	4
Inlet Gas Temperature (F)	314	314	314	0	4
Outlet Gas Temperature (F)	126	126	126	0	4
SO2 Absorbed (mmole/L)	6.82	6.83	6.80	0.01	4
Solids Residence Time (hrs)	15.5	15.5	15.5	0.0	4
Slurry Residence Time (min)	8.79	8.79	8.79	0.00	4
Absorber Pressure Drop (in H2O)	2.18	2.21	2.17	0.01	4
Spray Zone Pressure Drop (in H2O)	0.42	0.42	0.41	0.00	4
VME Pressure Drop (in H2O)	0.00	0.00	0.00	0.00	4
Oxidation Air to Rxn Tank (acfm)	440	440	440	0	4
NYSEG Load (MW)	690	692	689	1	4

WET SCRUBBER QA/QC SUMMARY

The objective of the wet scrubber QA/QC program is to ensure the accuracy of key process instrumentation used on the pilot and mini-pilot systems. Flow control valve flow meters, pump flow meters, tank level monitors, and flue gas flow rates are checked at least once a month with errors greater than 5% generally indicating that the instrument in question is in need of calibration. Continuous emission monitors (CEM's) used to measure the inlet and outlet SO₂ and O₂ levels are checked daily with span errors over 1% requiring an adjustment of the span potentiometer. During additive tests, chemical addition rates are checked daily with adjustments made if they are outside of the test parameter. A status update for each QA/QC point out of calibration is presented below.

MAY/JUNE 1994

Pilot

Pilot Velocity Traverse

Two velocity traverses performed during the months of May and June resulted in values that deviated from the WDPF values by slightly more than 5%. The first of these was performed on May 5 and the second on June 30. The project engineer was notified of the error in both cases. It was decided that there would be no adjustment made to the WDPF until after the completion of the Pilot High Velocity test block unless larger errors are measured in subsequent tests.

Pilot Blowdown to Sump

A flow check on the pilot blowdown to sump was completed on June 29. The actual flow rate was approximately 8% lower than the WDPF flow rate. The I & C department was notified of the discrepancy, and replied that the inaccuracy of the WDPF reading was due to a faulty flow meter. The flow meter has been looked at several times by the I & C department, but as of yet, the problem has not been resolved. The blowdown to sump flow rate will continue to be monitored on a regulate basis until the error is eliminated.

Pilot FLRT Tank Level

A FLRT tank level check was performed on June 28. The actual level was 10% lower than the WDPF level. However, the tank level determined by the level check is not entirely accurate due to the fact that the level was measured using the level tube during forced oxidation conditions. It was decided that no action would be taken until a more accurate method of measuring the tank level could be found. Therefore, another level check will be performed on the FLRT when either the level

can be measured directly or when the level tube is not affected by forced oxidation conditions.

Mini-Pilot

Mini-Pilot Reagent Feed

Two flow checks were performed on June 7. They indicated that the WDPF reading was low by approximately 7%. The project engineer was informed of the error and determined that since the feed pump was operating below its lower span limit, the error was within acceptable limits.

EPRI ECTC Wet Process QA/QC Record
May/June 1994

	Date	Measured	Instrument Reading	Percent Error	Measured	Instrument Reading	Percent Error
Mini-Pilot							
Reagent feed (gpm)	6/7	0.2403	0.222	-7.62%	0.239	0.226	-5.56%
Blowdown to filter press (gpm)	6/7	0.5258	0.535	1.75%			
Pilot							
Velocity traverse (scfm)	5/5	12328	13000	5.45%			
Velocity traverse (scfm)	6/30	13350	14000	4.87%			
Velocity traverse (scfm)	6/30	13286	14000	5.37%			
Velocity traverse (scfm)	6/30	11338	11800	4.07%			
Velocity traverse (scfm)	6/30	9430	9800	3.92%			
Service water to RWWT (gpm)	6/1	3.8612	3.812	-1.27%	2.7502	2.713	-1.35%
Recycle water to RWWT (gpm)	6/1	3.0000	3.150	5.00%	1.1388	1.182	3.79%
Reagent feed (gpm)	6/1	1.6110	1.595	-0.99%	1.6110	1.592	-1.18%
Quench (gpm)	6/2	3.1943	3.259	2.03%	2.611	2.706	3.64%
Service water to FLRT (gpm)	6/2	2.9167	-	-	2.6110	-	-
Service water to FLRT (gpm)	6/2	2.2775	-	-	-	-	-
Blowdown to sump (gpm)	6/29	0.922	0.999	8.35%	0.928	1.000	7.76%
ME-RWWT tank level (feet)	6/28	4.083	4.088	0.12%			
FLRT tank level (feet)	6/28	11.050	12.203	10.43%			
RWST tank level (feet)	6/28	4.438	4.298	-3.15%			
RSST tank level (feet)	6/28	11.896	12.064	1.41%			

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