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Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

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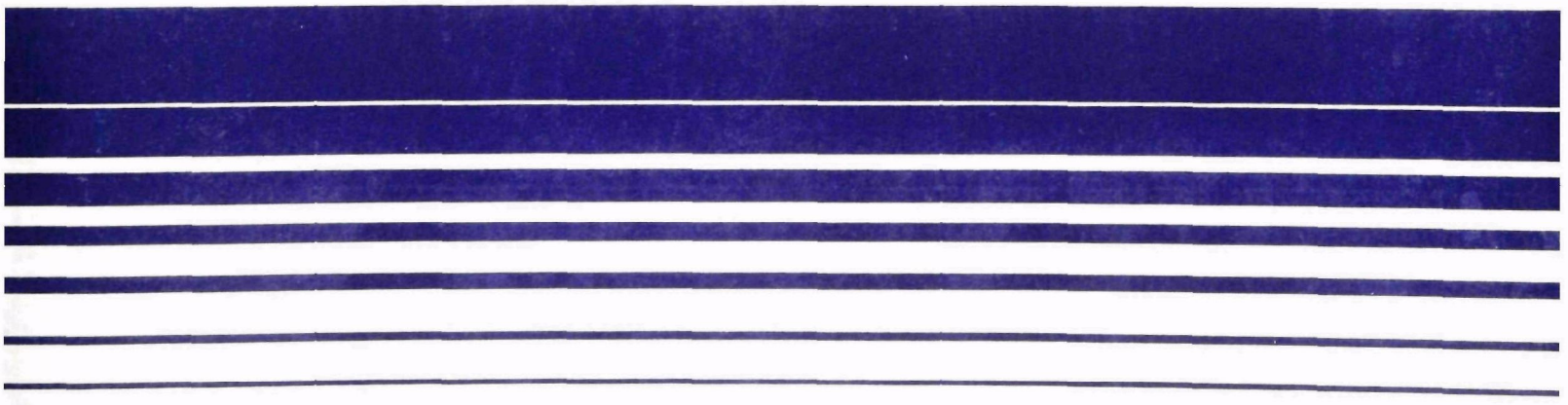
EPA

Municipal Waste Combustion HCl Continuous Monitoring Study

Emission Test Report

Maine Energy Recovery Company
Solid Waste-to-Energy Facility
Refuse-Derived Fuel Process
Biddeford, Maine



EMISSION TEST REPORT

HCl CONTINUOUS MONITORING FOR MUNICIPAL WASTE COMBUSTION STUDY

MAINE ENERGY RECOVERY COMPANY
SOLID WASTE-TO-ENERGY FACILITY
REFUSE-DERIVED FUEL PROCESS
BIDDEFORD, MAINE

ESED Project No. 86/19a
EPA Contract No. 68-02-4336
Work Assignment No. 16

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1.0 INTRODUCTION

1.1 BACKGROUND

The U. S. Environmental Protection Agency (EPA) published an advance notice of proposed rulemaking in the Federal Register (July 7, 1987) which describes upcoming emission standards development for new and modified municipal waste combustors (MWC) under Section 111 of the Clean Air Act and for existing MWC under Section 111(d) of the Act. The Federal Register notice culminates more than a year of work on the development of the technical and health related documents which comprise EPA's Report to Congress on MWC. The Report to Congress was a joint effort involving the Offices of Air Quality Planning and Standards (OAQPS), Solid Waste (OSW), and Research and Development (ORD).

The OAQPS, through the Industrial Studies Branch (ISB in the Emission Standards Division) and the Emission Measurement Branch (EMB in the Technical Support Division), is responsible for reviewing the existing air emission data base and gathering additional data where necessary. As a result of this review, several MWC emission tests have been performed and several more are in the planning stages to support the current standards development work. Of particular importance is a more complete data base on emerging air pollution control technologies for MWC.

The emissions being studied in this assessment are the criteria pollutants -- particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and total hydrocarbons (THC); other acid gases, such as hydrochloric acid (HCl); chlorinated organics, including chlorinated dibenzo-p-dioxins (CDD), chlorinated dibenzofurans (CDF), and dioxin precursors; and specific metals, including arsenic (As), cadmium (Cd), total chromium (Cr), mercury (Hg), nickel (Ni), and lead (Pb).

1.2 PURPOSE AND OBJECTIVES

A number of MWC's have undergone emissions testing programs sponsored by the EPA and others to supplement the data base on MWC. However, no data are currently available from a state-of-the-art refuse-derived fuel (RDF) MWC facility in terms of uncontrolled and controlled emission levels under normal operating conditions or under normal variations in facility operation. The control technologies as well as the regulatory data requirements for RDF facilities are the same as those for mass-burn facilities.

Combustion Engineering (CE) and Babcock and Wilcox (B&W) are the two principal suppliers of RDF combustor technology in the United States. The EPA is currently involved with Environment Canada in the planning of an extensive test program at a CE-designed RDF facility with a spray dryer/fabric filter (SD/FF) emission control system located in Hartford, Connecticut. The test program will involve both characterization and performance testing of the facility during the summer and fall of 1988. However, the data from this test will not become available until late in EPA's regulatory development schedule. Therefore, the test program at the Maine Energy Recovery Company (MERC) in Biddeford, Maine, a B&W unit with an SD/FF emission control system, will provide ESED with the opportunity to move ahead with regulatory development for RDF MWC facilities with a limited amount of data, while awaiting the data from

the CE-designed facility in Connecticut. The MERC test program was conducted in conjunction with the compliance tests for CDD/CDF conducted by Entropy for MERC's holding company, KTI Holdings, Inc. Data from the compliance test will also be available to EPA.

Specific objectives of the Biddeford test program were:

1. To determine the level of uncontrolled MWC emissions, including criteria pollutants, metals, acid gases, and dioxin/furans, from a state-of-the-art refuse-derived fuel facility.

2. To determine the control efficiency on RDF MWC emissions, including criteria pollutants, metals, acid gases, and dioxin/furans, of a spray dryer/fabric filter control system.

Entropy conducted continuous emission monitoring for HCl at the inlet to the spray dryer, at the outlet of the spray dryer, and at the outlet of the fabric filter. Midwest Research Institute (MRI) performed manual sampling for CDD/CDF, particulate matter, metals, O_2, and CO_2, and conducted continuous emission monitoring of CO, CO_2, SO_2, O_2, NO_x, and THC (see Table 1.1). Sampling of the fly ash, lime slurry, and refuse-derived fuel was also conducted and coordinated by MRI. The HCl monitoring data collected by Entropy is presented to compliment the other emission test data gathered by MRI.

Process and control system operating data were collected over the course of the test program by Radian Corporation (Radian). This included all computer-logged process data from the plant instrumentation and all available emission control system parameters. Collection of these data is described and the data are summarized in Section 3.0 (prepared by Radian).

1.3 BRIEF PROCESS DESCRIPTION

Figure 1.1 is a process schematic showing the sampling and monitoring locations for Unit A, one of the two identical combustor systems at the Maine Energy Recovery Company, which was tested during this program. The facility processes municipal waste through extensive sorting and shredding into refuse-derived fuel. The RDF plus supplemental fuel is used to fire two 150×10^6 Btu/hour boilers that can provide steam for up to 22 MW of power generation, which is sold to Central Maine Power. The combustion gases from each boiler pass through a spray dryer followed by a fabric filter and exit through a common stack. 100% RDF was fired in both boilers during this test program.

1.4 SAMPLING MATRIX

Table 1.1 presents the overall test program matrix including sampling and analytical procedures employed by Entropy and MRI. Sampling at all three locations occurred simultaneously, and process samples (fly ash, lime slurry, and RDF) were taken at regular intervals during the test periods.

TABLE 1.1. TEST MATRIX FOR MERC TEST PROGRAM

Location[a]	Sample Type	Sampling Method	Sampling Duration	Analysis Parameter	Analysis Method
1-Spray dryer inlet	Combustion gas	M5[e]	4 hours	Particulate Metals (Cd, Cr, As, Pb, Hg)	Gravimetric AAS/ICAP
		MM5	4 hours	CDD/CDF[b]	HRGC/HRMS
		M3	4 hours	O_2, CO_2	Orsat
		CEMS		CO, CO_2 SO_2 THC[c] HCl[c]	NDIR Pulsed fluorescence Heated FID Infrared absorption
2-Spray dryer outlet	Combustion gas	CEMS	4 hours	CO_2 O_2[c] HCl[c]	NDIR Polarographic Specific ion electrode
3-Fabric filter outlet	Combustion gas	MM5	4 hours	CDD/CDF[d]	HRGC/HRMS
		M5	4 hours	Particulate Metals (Cd, Cr, As, Pb, Hg)	Gravimetric AA/ICAP
		M3	4 hours	O_2, CO_2	Orsat
		CEMS	4 hours	CO_2, O_2, SO_2 NO HCl	NDIR, Polarographic Pulsed fluorescence Chemiluminesence Infrared absorption
A-Cyclone ash discharge	Fly ash	Integrated grab	4 hours	Metals Percent Carbon Percent combustibles	AAS/ICAP ASTM E830 ASTM E777
B-Fabric filter (Baghouse)	Fly ash	Integrated grab	4 hours	Percent carbon Metals Percent combustibles Resistivity K factor	ASTM AA/ICAP ASTM IEEE 548-1984
C-Bottom ash discharge	Bottom ash	Integrated grab	4 hours	Percent combustibles Percent carbon Metals	ASTM E830 ASTM E777 AA/ICAP
D-Spray dryer holding tank	Lime slurry	Integrated grab	4 hours 3-run composite	Metals (Cd, Cr, As, Hg, Pb)	ICAP/AAS
E-Boiler inlet	RDF	Integrated grab	4 hours	Retained	Retained

[a] Numbers or letters refer to Figure 1.1.
[b] Separate analysis of front and back half.
[c] HCl monitoring performed by Entropy; all other sampling performed by MRI; process monitoring by Radian.
[d] Combined front- and back-half analysis.
[e] Flexible heated Teflon sample line will be used immediately following probe to next component of sampling train.

ASSUMPTIONS

1. Three identical test runs.
2. Sampling time 4 hr
3. Front half/back half PCDD/PCDF analyses on inlet samples; combined CDD/CDF analysis on outlet samples.
4. No ash samples collected from the preheater/economizer discharge and the grate siftings hopper

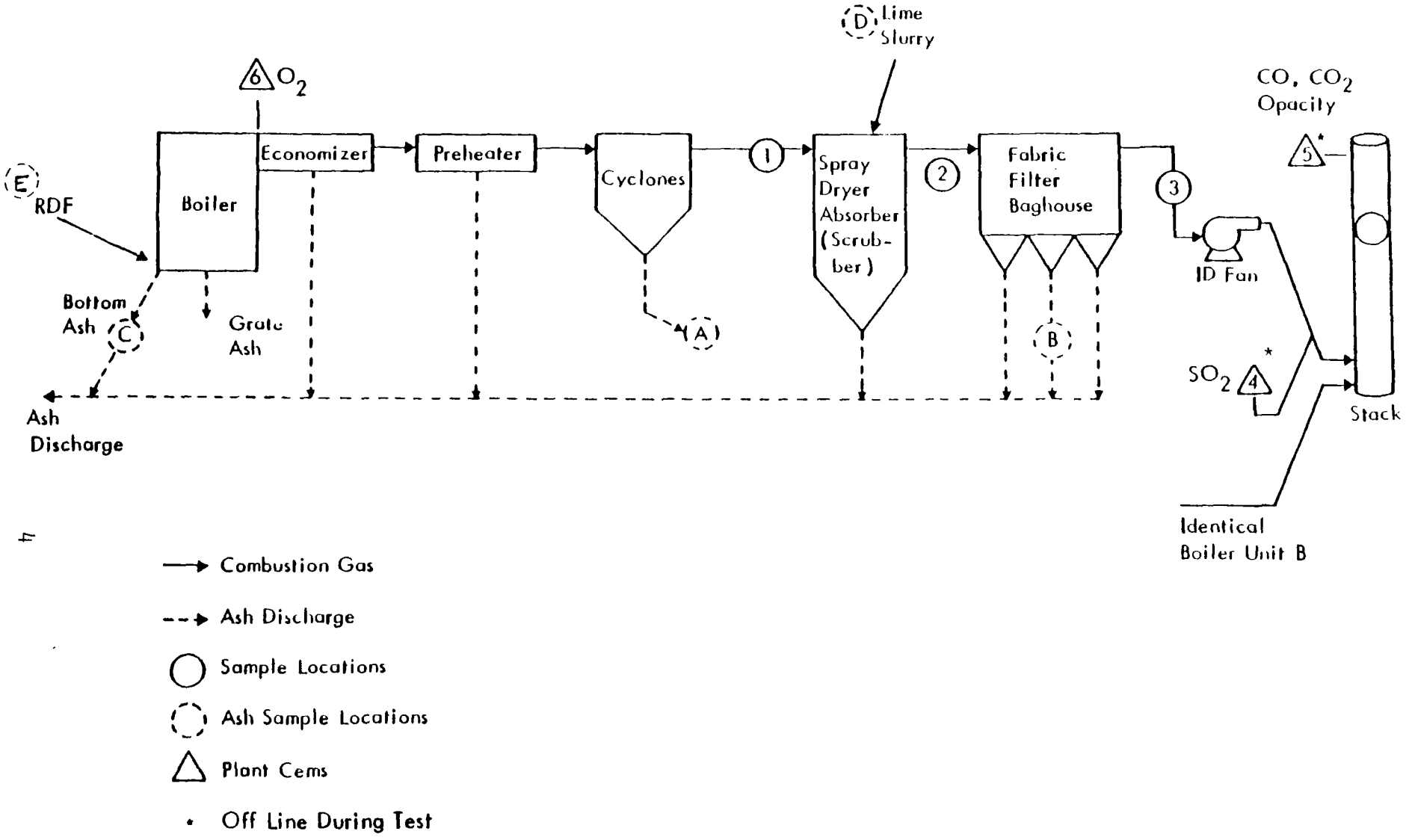


Figure 1-1. Process schematic for MERC in Biddeford, Maine; sampling and monitoring locations are keyed to Table 1.1.

1.5 QUALITY ASSURANCE/QUALITY CONTROL

Prior to performing this test, Entropy prepared both a Quality Assurance/ Quality Control (QA/QC) Project Plan and a Site-Specific Test Plan. The QA/QC Project Plan details all QA/QC activities undertaken for the test program; the Site-Specific Test Plan describes the particulars of the sampling and analytical procedures and the test locations. Section 6.0 of this report summarizes the results of the QA/QC activities performed by Entropy. A separate report by Research Triangle Institute (RTI) summarizes the results of an external technical systems (checklist) audit on the HCl monitoring performed during the test program by RTI staff.

1.6 SCHEDULE

The test program began with the on-site arrival of the Entropy test crew on December 1, 1987. The first seven days on-site were used to set up the three HCl monitoring systems and perform preliminary checks to ensure that all of the monitoring equipment was functioning properly prior to the anticipated December 8 initiation of the testing. The emissions testing was scheduled to be conducted during a three day period. However, the plant experienced numerous process operating problems which caused delays and disruptions in the testing. The three test runs were performed between December 9 and December 13, 1987. The Entropy test crew departed the test site on December 16, 1987 after disassembling and packing the test equipment.

1.7 ORGANIZATION

Mr. Mike Johnston of the Office of Air Quality Planning and Standards (OAQPS) and Dr. Ted Brna of the Air & Energy Engineering Research Laboratory (AEERL) participated as program coordinators. Mr. Winton Kelly of Radian assisted the program coordinators in monitoring the process operations. The test program coordinators were responsible for coordinating the overall test program with the plant officials and assuring that the process and control equipment operating conditions were suitable for testing. Mr. Gene Riley of OAQPS was the EPA Task Manager, and was responsible for coordinating the efforts of the Entropy and MRI test crews.

Mr. J. Ron Jernigan was the Project Coordinator for the HCl monitoring conducted by Entropy. Mr. Scott Shanklin served as the HCl Test Team Leader and was responsible for field testing and on-site QA/QC activities. The organizational scheme showing Entropy in relationship to all parties involved in the test program is shown in Figure 1.2.

CONTRACTOR EFFORT

Contractor	Scope of Work	Funding Source
MRI	Conduct field test program	AEERL
Radian	Perform process monitoring	OAQPS
Entropy (Source Test Div.)	Compliance field testing	KTI Energy, Inc.
Entropy (CEM/Eng. Div.)	Conduct HCl monitoring	OAQPS/AEERL
RTI	Test program QA	AEERL

GOVERNMENT PERSONNEL ON TEST SITE

EPA, AEERL	James Kilgroe Ted Brna
EPA, OAQPS	Mike Johnston Gene Riley
MDEP	Scott Mason

MAINE ENERGY RECOVERY COMPANY TEST PROGRAM MANAGEMENT PROTOCOL FOR DECISION MAKING

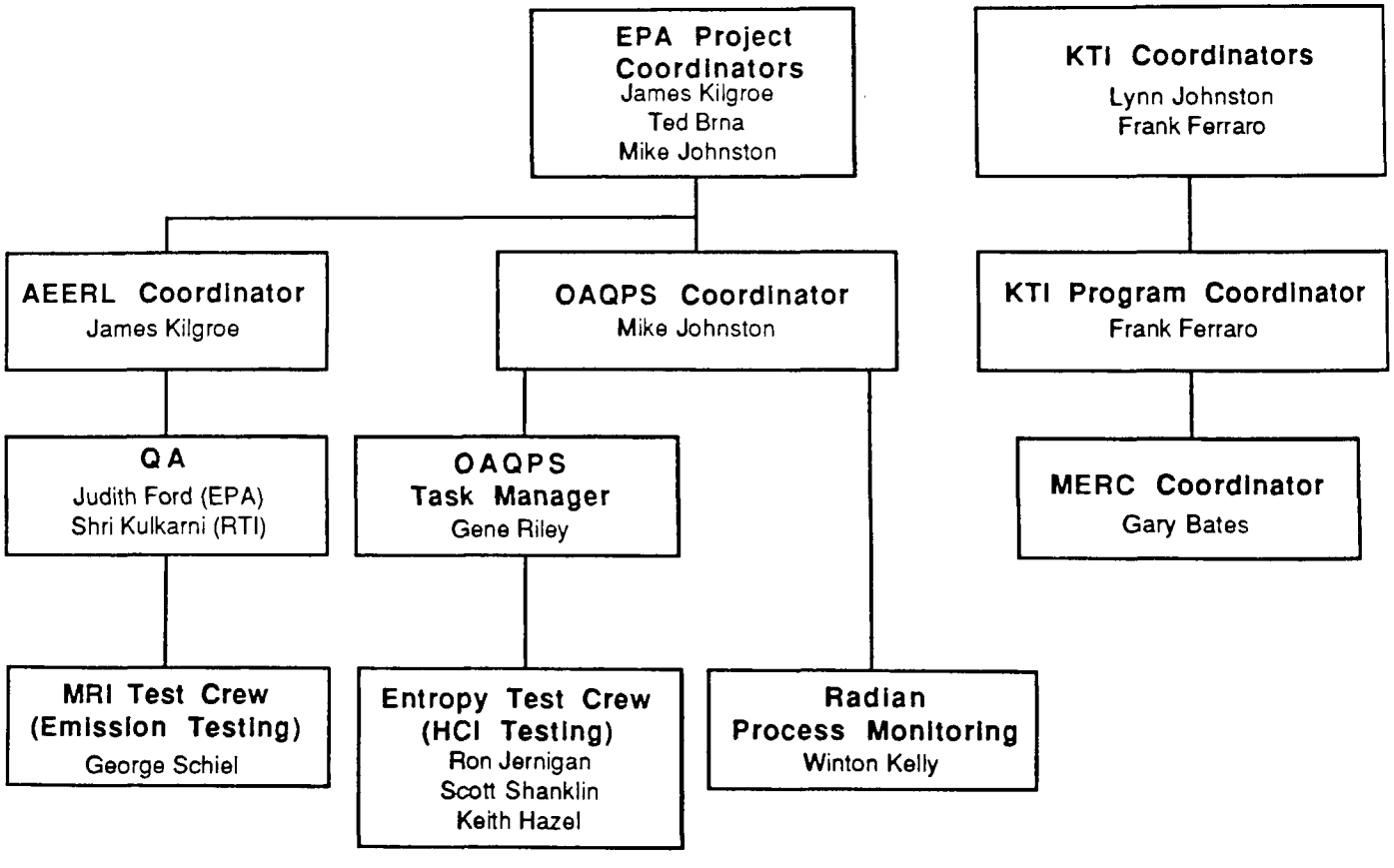


Figure 1.2. Organizational scheme for MERC testing program.

2.0 SUMMARY AND DISCUSSION OF RESULTS

The mean HCl monitoring results and process HCl scrubber removal efficiencies are presented in Table 2.1. The HCl concentrations at the spray dryer inlet (inlet) and spray dryer outlet (midpoint) sampling locations (TECO and Compur CEMS's, respectively) were measured on a wet basis and converted to dry basis values using EPA Method 4 data supplied by MRI. The HCl measurement data for each test run were corrected for calibration drift using the pre- and post-test calibration results according to the procedures in EPA Method 6C.

HCl removal efficiencies were calculated from the inlet to the midpoint location, and from the inlet to the outlet location. The removal efficiencies were computed on a mass emission rate basis (lb HCl/hr) using the Entropy HCl continuous monitoring data collected at the three test locations and volumetric flow rate data provided by MRI.

The moisture and volumetric flow rate results as well as the test run times utilized by Entropy in calculating the monitoring results and HCl removal efficiencies were obtained from MRI (see Tables 2.2 and 2.3, respectively). The moisture values used to correct the inlet HCl monitoring results were averages of the results from the two trains (particulate/metals and CDD/CDF) operated at the inlet location (see Table 2.3). The outlet moisture values were used to correct the midpoint HCl monitoring results since no manual testing was conducted at the midpoint location. The increase in the moisture observed from the inlet to the outlet is the result of the spray dryer lime slurry injection. The volumetric flow rate values used to calculate the percent removal efficiencies were also averages of the results from the two trains operated at both the inlet and outlet (see Table 2.3). The average of the values from the two trains was used with inlet and outlet HCl values; the average of these averages (inlet averaged with outlet) was used with the midpoint HCl data.

The HCl monitoring data that were printed by the data acquisition system during the testing program are presented in Appendix A. The daily calibration results manually recorded on calibration drift summary sheets are contained in Appendix B.

2.1 TEST RUN 1

The HCl monitoring results for Test Run 1 are summarized in Table 2.4 and are presented graphically in Figures 2-1 and 2-2. The two trend graphs present one-minute averages recorded throughout the test run, excluding any periods of "process upsets". Figure 2-2 presents the monitoring data corresponding to the MRI metals train sampling times, and excludes the data collected during the MRI sampling port changes.

The mean HCl concentration results were 560 ppm, 75 ppm, and 9 ppm HCl at the inlet, midpoint, and outlet locations, respectively. The mean HCl removal efficiencies from the inlet to the midpoint and from the inlet to the outlet locations were 87% and 98%, respectively. The removal efficiencies were calculated from the one-minute averaged emission rate values (lb HCl/hr) and are shown in Figure 2-3.

TABLE 2.1.

SUMMARY OF HCl MONITORING DATA
REFUSE-DERIVED FUEL
MUNICIPAL WASTE COMBUSTOR TEST PROGRAM
MAINE ENERGY RECOVERY COMPANY

Test Run	Spray Dryer Inlet	Spray Dryer Outlet		Baghouse Outlet	
	HCl conc. (ppm_v, dry)	HCl Conc. (ppm_v, dry)	HCl Removal (%)	HCl Conc. (ppm_v, dry)	HCl Removal (%)
1	560	75	86.7	9	98.4
2	564	8	98.6	4	99.3
3	537	1*	99.8*	3	99.4

*The midpoint measurements may be questionable for Run 3 because the Compur CEMS accuracy is unknown at this low concentration range. The Compur had not been operated and tested at the outlet of HCl control during previous EPA studies.

TABLE 2.2. SAMPLING LOG SUMMARY, MERC - BIDDEFORD

Date	Run	Sample Type	Location	Sampling Times (24 hr clock)	Comments	Elapsed Time (min)	Averaging Times for HCl Monitoring at All Locations* (24 hr clock)
12/9	1	Metals	Inlet	1530-1650 1718-1838	Stopped for port change; run discontinued because process down	80 80 160 total	1530-1630 1630-1730 1730-1830 1830-1842
12/9	1	MM5	Inlet	1535-1655 1723-1843	Stopped for port change; run discontinued because process down	80 80 160 total	
12/9	1	Metals	Outlet	1532-1652 1719-1839	Stopped for port change; run discontinued because process down	80 80 160 total	
12/9	1	MM5	Outlet	1535-1655 1720-1840	Stopped for port change; run discontinued because process down	80 80 160 total	
12/10	2	Metals	Inlet	1250-1410 1435-1555 1640-1800	Stopped for port changes	80 80 80 240 total	1300-1400 1400-1500 1500-1600 1600-1700 1700-1800
12/10	2	MM5	Inlet	1245-1405 1431-1551 1636-1756	Stopped for port changes	80 80 80 240 total	
12/10	2	Metals	Outlet	1246-1406 1433-1553 1636-1756	Stopped for port changes	80 80 80 240 total	
12/10	2	MM5	Outlet	1247-1302 1305-1410 1500-1620 1637-1757	Stopped to change XAD and twice to change ports	15 65 80 80 240 total	
12/12	3	Metals	Inlet	1124-1139 1204-1309 1329-1449 1514-1524 1819-1834	Process down 1139-1204 and 1524-1819; other stops for port changes	15 65 80 10 15 185 total	1115-1139 1204-1215 1215-1315 1315-1415 1415-1515 1515-1524 1819-1834
12/12	3	MM5	Inlet	1120-1140 1200-1300 1325-1445 1510-1525 1815-1835	Process down during first and last stops; other two stops for for port changes	20 60 80 15 20 195 total	
12/12	3	Metals	Outlet	1117-1142 1200-1255 1325-1445 1510-1525 1815-1835	Process down during first and last stops; other two stops for for port changes	25 55 80 15 20 195 total	
12/12	3	MM5	Outlet	1116-1141 1201-1256 1326-1446 1511-1531	Process down during first stop; other two stops for port changes	25 55 80 20 180 total	

*Periods when process was down were not included in HCl monitoring data averaging times; periods during port changes were included.

TABLE 2.3. MRI VOLUMETRIC FLOW RATE AND MOISTURE DATA USED IN HCl MONITORING CALCULATIONS - MERC TEST PROGRAM

Run No.	Inlet		Outlet		Midpoint**	
	Flow Rate (dscfm)	Moisture (%)	Flow Rate (dscfm)	Moisture (%)	Flow Rate (dscfm)	Moisture (%)
Particulate/Metals Train						
1	41,500	15.1	39,800	16.8		
2	42,100	15.2	41,900	16.3		
3	42,500	16.8	44,400	14.6*		
CDD CDF Train						
1	38,300	14.3	39,200	15.3		
2	40,500	14.4	41,100	13.5*		
3	41,000	16.0	42,500	17.0		
Average of Particulate/Metals and CDD/CDF Trains***						
1	39,900	14.7	39,500	16.1	39,700	16.1
2	41,300	14.8	41,500	16.3	41,400	16.3
3	41,800	16.4	43,500	17.0	42,600	17.0

*Did not pass final leak check; moisture values not used in averages.

**No manual testing was conducted at the midpoint. Flow rate values are average of inlet and outlet values; moisture values are outlet values (since increase from inlet to outlet moisture values is result of spray dryer).

***Calculated for use in determining (1) moisture corrections and (2) percent removal efficiency of HCl for midpoint and outlet locations.

TABLE 2.4.

HCl MONITORING RESULTS - RUN 1
MAINE ENERGY RECOVERY COMPANY - UNIT A
DECEMBER 9, 1987

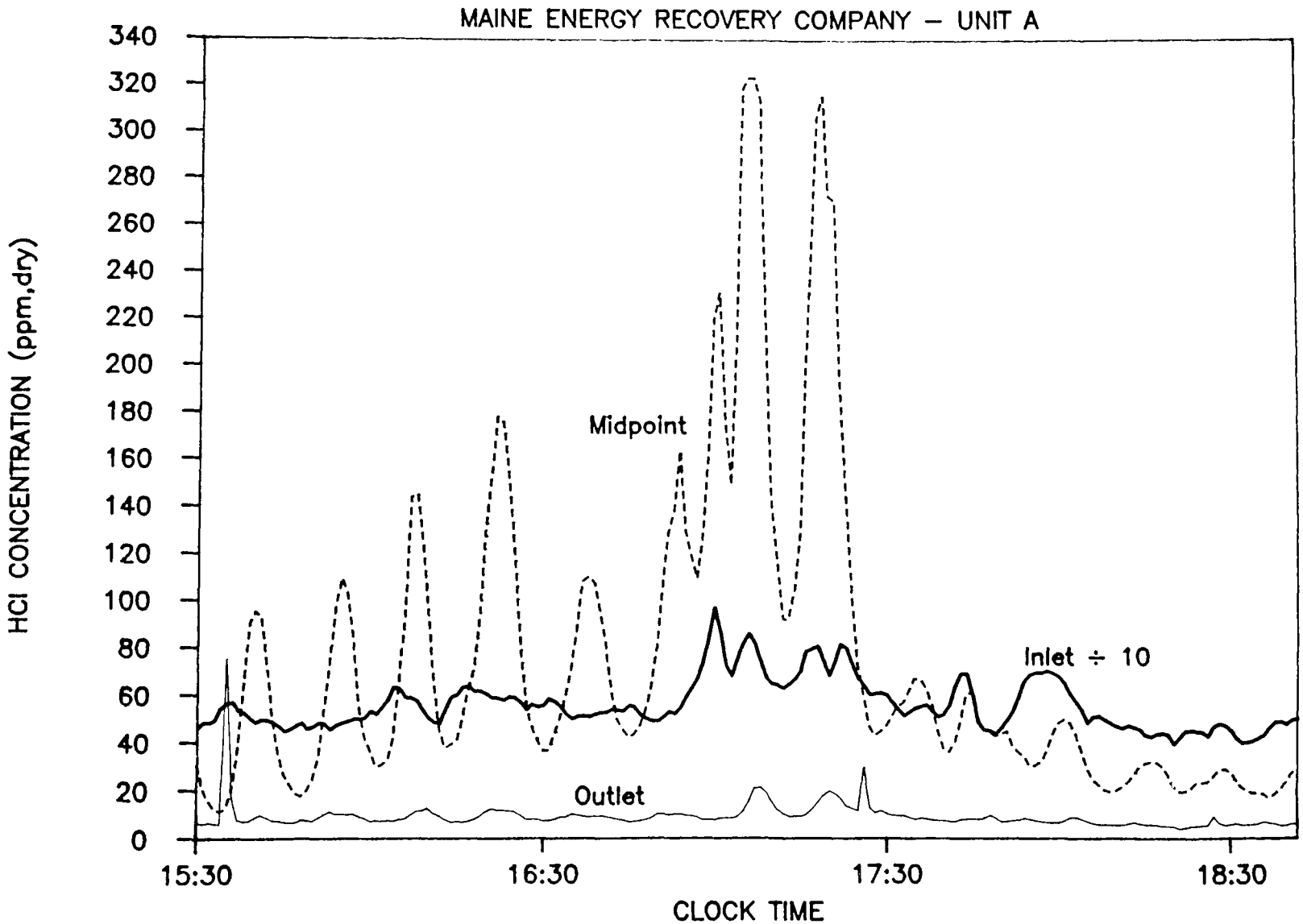
Hour	Time	Inlet HCl (ppmv, dry)	Midpoint HCl (ppmv, dry)	Removal Efficiency (%)	Outlet HCl (ppmv, dry)	Removal Efficiency (%)
1	15:30-16:30	533	66	87.7	10	98.1
2	16:30-17:30	643	134	79.3	11	98.3
3	17:30-18:30	528	38	92.8	7	98.7
4	18:30-18:42*	453	21	95.4	6	98.7
Test Average (Time Weighted)		560	75	86.7	9	98.4
Highest 1-min. average:		1040	321		82	
Lowest 1-min. average:		443	13		5	

Note: Inlet and midpoint concentration measurements were made on a wet basis and corrected to a dry basis using the Method 4 moisture data provided by MRI.

Inlet Moisture = 14.7% H_2O
Midpoint Moisture = 16.1% H_2O (as measured at the baghouse outlet sample location)

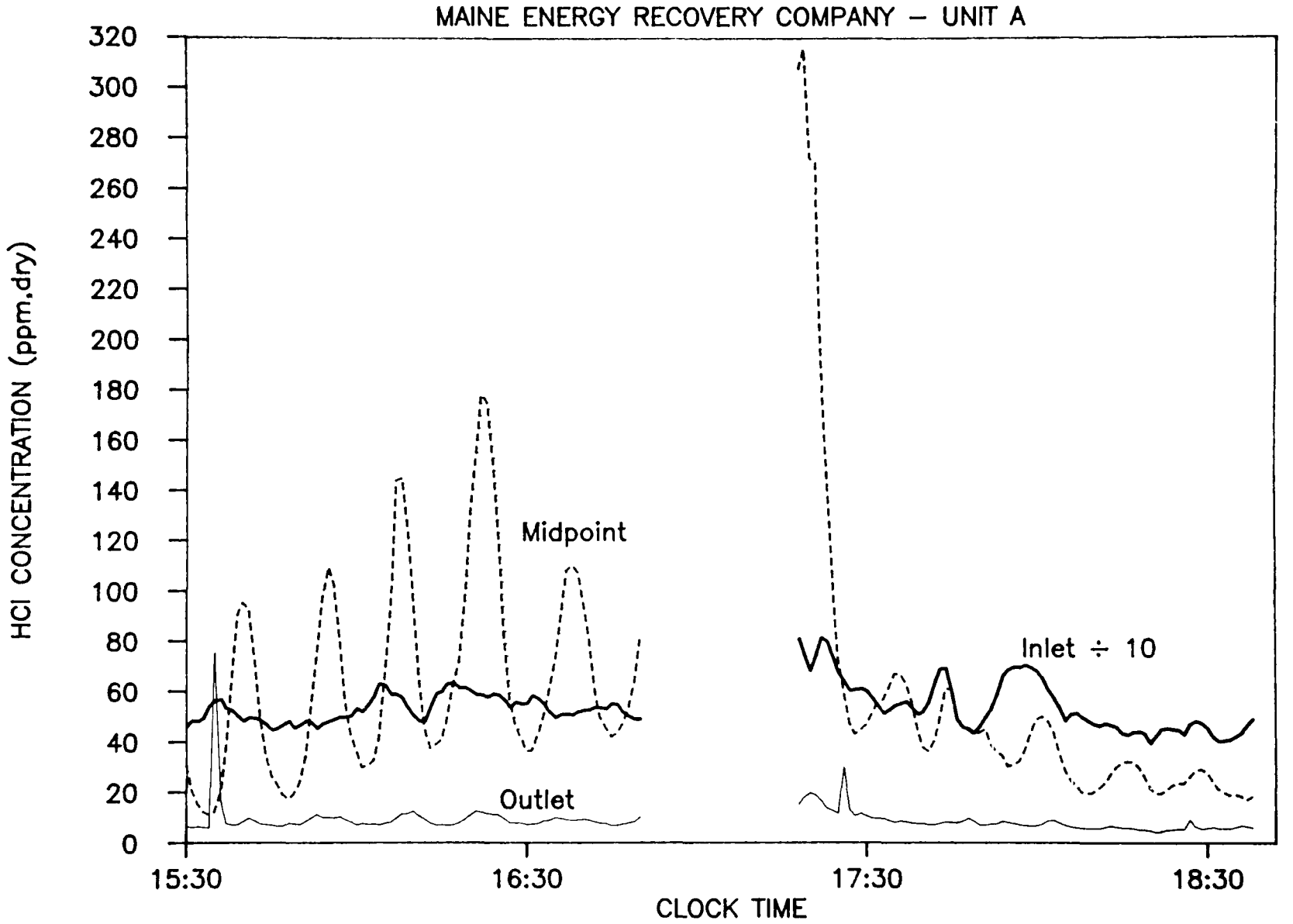
* The test run was terminated at 18:42 because of process operating problems.

Figure 2-1. HCl MONITORING DATA - RUN #1 12/9/87



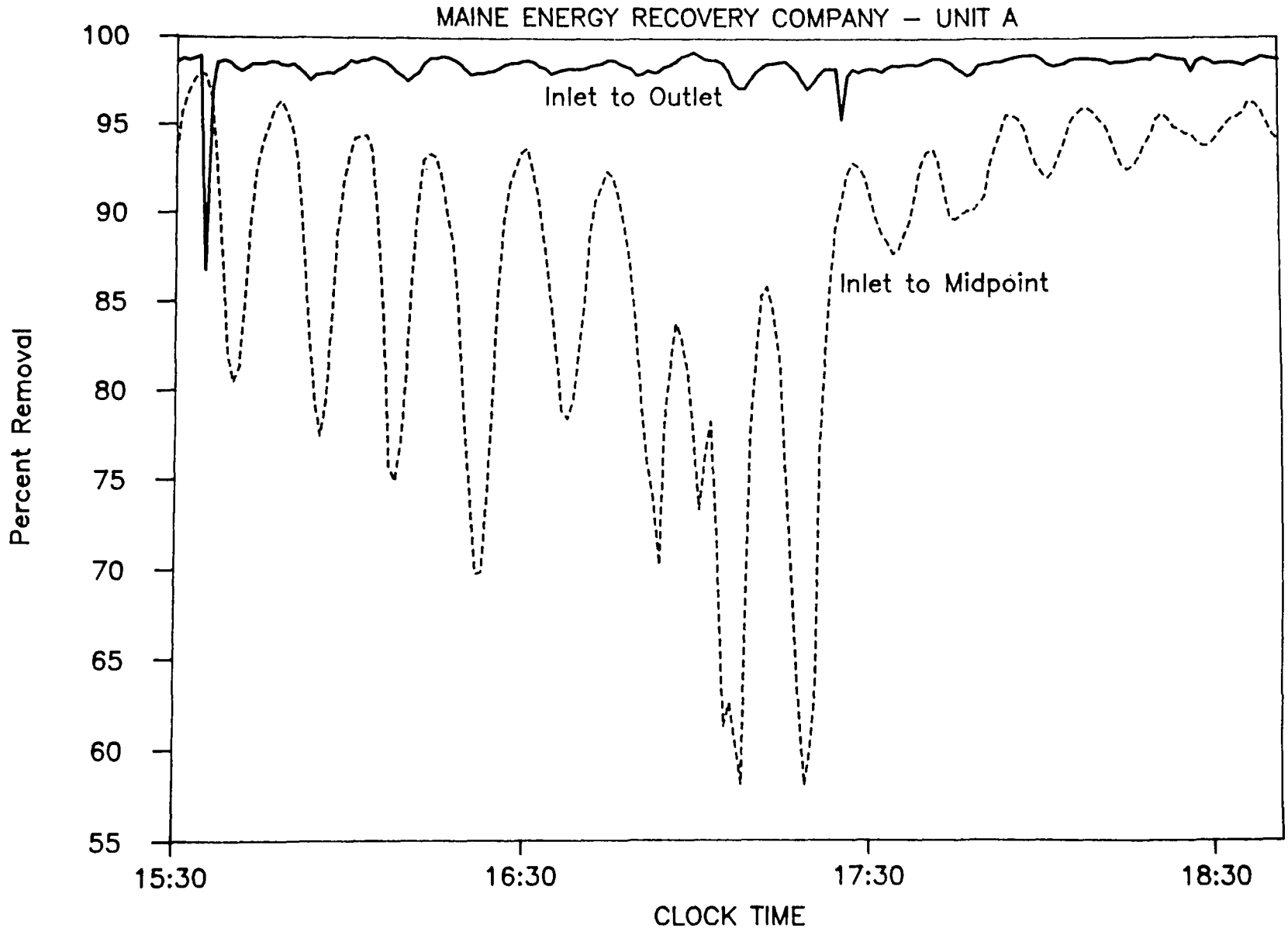
NOTE: Test run was ended at 18:38 due to Unit A process problems.

Figure 2-2. HCl MONITORING DATA - RUN #1 12/9/87



NOTE: HCl data deleted during MRI sampling port change from 16:50 to 17:18. Test run was ended at 18:38 due to Unit A process operating problems.

Figure 2-3. HCl REMOVAL EFFICIENCY - RUN #1



NOTE: Test run was ended at 18:38 due to Unit A process problems.

Babcock & Wilcox personnel on-site during the test program stated that the fluctuations observed in the midpoint HCl measurements during Run 1 were evidence of unsteady scrubber operation. The Unit A forced draft fan motor malfunctioned at 18:38 and the run was terminated.

2.2 TEST RUN 2

The HCl monitoring results for Test Run 2 are summarized in Table 2.5 and are presented graphically in Figures 2-4 and 2-5. The two trend graphs present the one-minute averages recorded throughout the test run, excluding any periods of "process upsets." Figure 2-5 presents the monitoring data corresponding to the MRI metals train sampling times, and excludes the data collected during the MRI sampling port changes.

The mean HCl concentration results were 564 ppm, 8 ppm, and 4 ppm HCl at the inlet, midpoint, and outlet locations, respectively. The mean HCl removal efficiencies from the inlet to the midpoint and from the inlet to the outlet locations were 98.6% and 99.3%, respectively. The removal efficiencies were calculated from the one-minute averaged emission rate values (lb HCl/hr) and are shown in Figure 2-6.

At approximately 13:45, the lime slurry flow rate into the spray dryer system was increased by 100% due to higher than expected SO_2 emissions measured by MRI. This process change resulted in a reduction in the HCl emissions measured at the midpoint and improved the HCl removal efficiency across the spray dryer.

The test run was begun at 12:45; however, the HCl monitoring data collection did not begin until 13:00 in order to allow sufficient time for the HCl CEMS's to collect representative effluent samples after returning from their calibration modes.

2.3 TEST RUN 3

The HCl monitoring results for Test Run 3 are summarized in Table 2.6 are are presented graphically in Figures 2-7 and 2-8. The two trend graphs present the one-minute averages recorded throughout the test run, excluding any periods of "process upsets." Figure 2-8 presents the monitoring data corresponding to the MRI metals train sampling times, and excludes the data collected during the MRI sampling port changes.

The mean HCl concentration results were 537 ppm, 1 ppm, and 3 ppm HCl at the inlet, midpoint, and outlet locations, respectively. The mean HCl removal efficiency from the inlet to the outlet locations was 99.4%. The removal efficiency was calculated from the one-minute averaged emission rate values (lb HCl/hr) and shown in Figure 2-9.

The midpoint data relative to the baghouse outlet data during Run 3 were low, with many of the midpoint values recorded as zeros. The scrubber operating conditions were the same as during Run 2, but lower than expected midpoint concentration measurements were recorded. Visual inspection of the Compur probe filters and the barrel nozzle did not indicate a problem which would cause a low bias in the measurements. The low measurements are most likely due to questionable Compur monitor and/or dilution probe performance during this test run at these extremely low HCl emissions.

The test run was interrupted on two occasions and was terminated at 18:34 because of process operating problems.

TABLE 2.5.

HCl MONITORING RESULTS - RUN 2
MAINE ENERGY RECOVERY COMPANY - UNIT A
DECEMBER 10, 1987

Hour	Time	Inlet HCl (ppmv, dry)	Midpoint HCl (ppmv, dry)	Removal Efficiency (%)	Outlet HCl (ppmv, dry)	Removal Efficiency (%)
1	13:00-14:00*	520	15	97.1	6	98.8
2	14:00-15:00	566	7	98.8	4	99.3
3	15:00-16:00	581	7	98.8	4	99.3
4	16:00-17:00	578	6	99.0	4	99.3
5	17:00-18:00	576	6	99.0	3	99.5
Test Average		564	8	98.6	4	99.3
Highest 1-min. average:		675	37		9	
Lowest 1-min. average:		400	2		2	

Note: Inlet and midpoint concentration measurements were made on a wet basis and corrected to a dry basis using the Method 4 moisture data provided by MRI.

Inlet Moisture = 14.8% H_2O
Midpoint Moisture = 16.3% H_2O (as measured at the baghouse outlet sample location)

* Manual testing began at 12:45; HCl monitoring data collection did not begin until 13:00 in order to allow sufficient time for the HCl CEMS's to collect representative effluent samples after returning from their calibration modes.

Figure 2-4. HCl MONITORING DATA - RUN #2 12/10/87

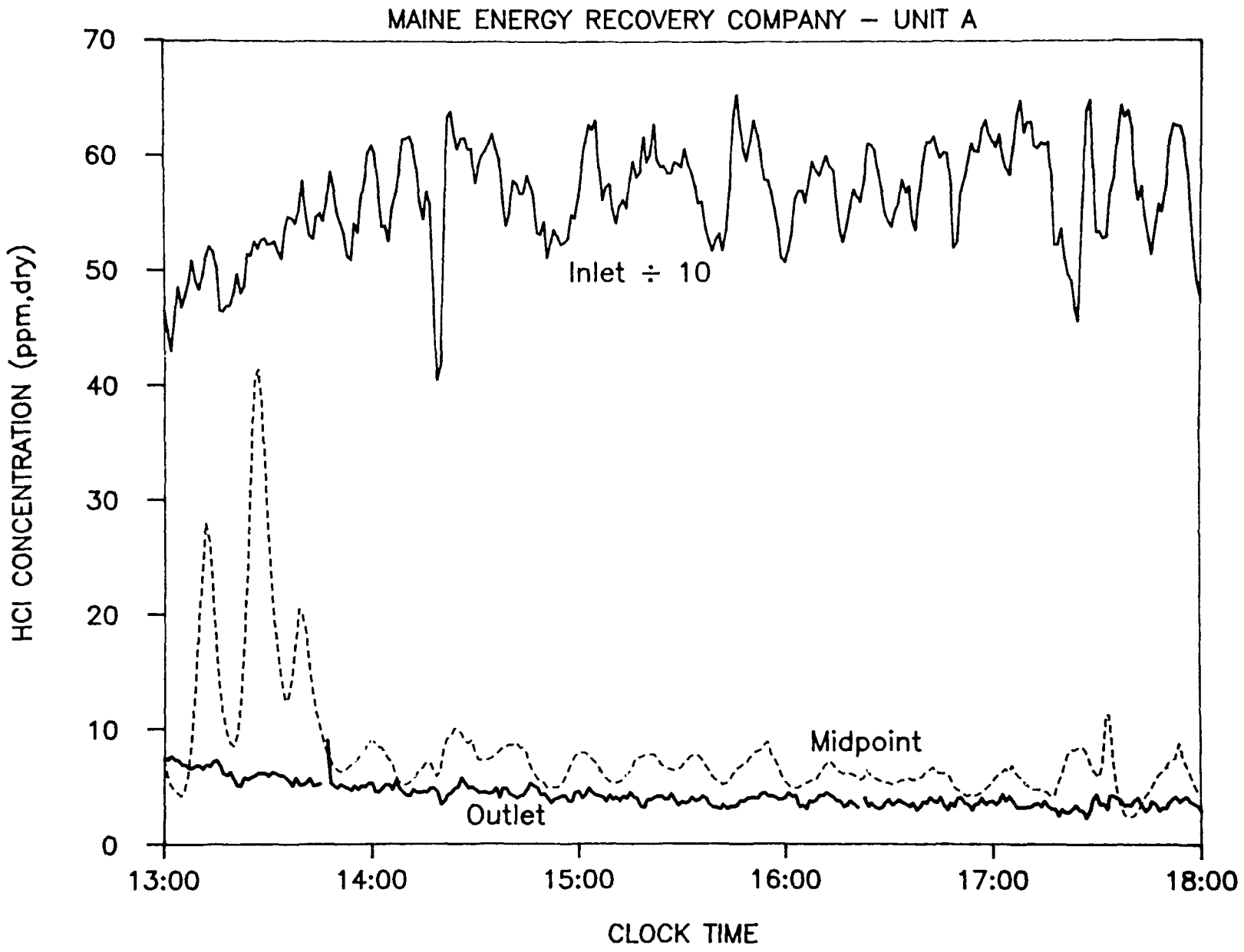
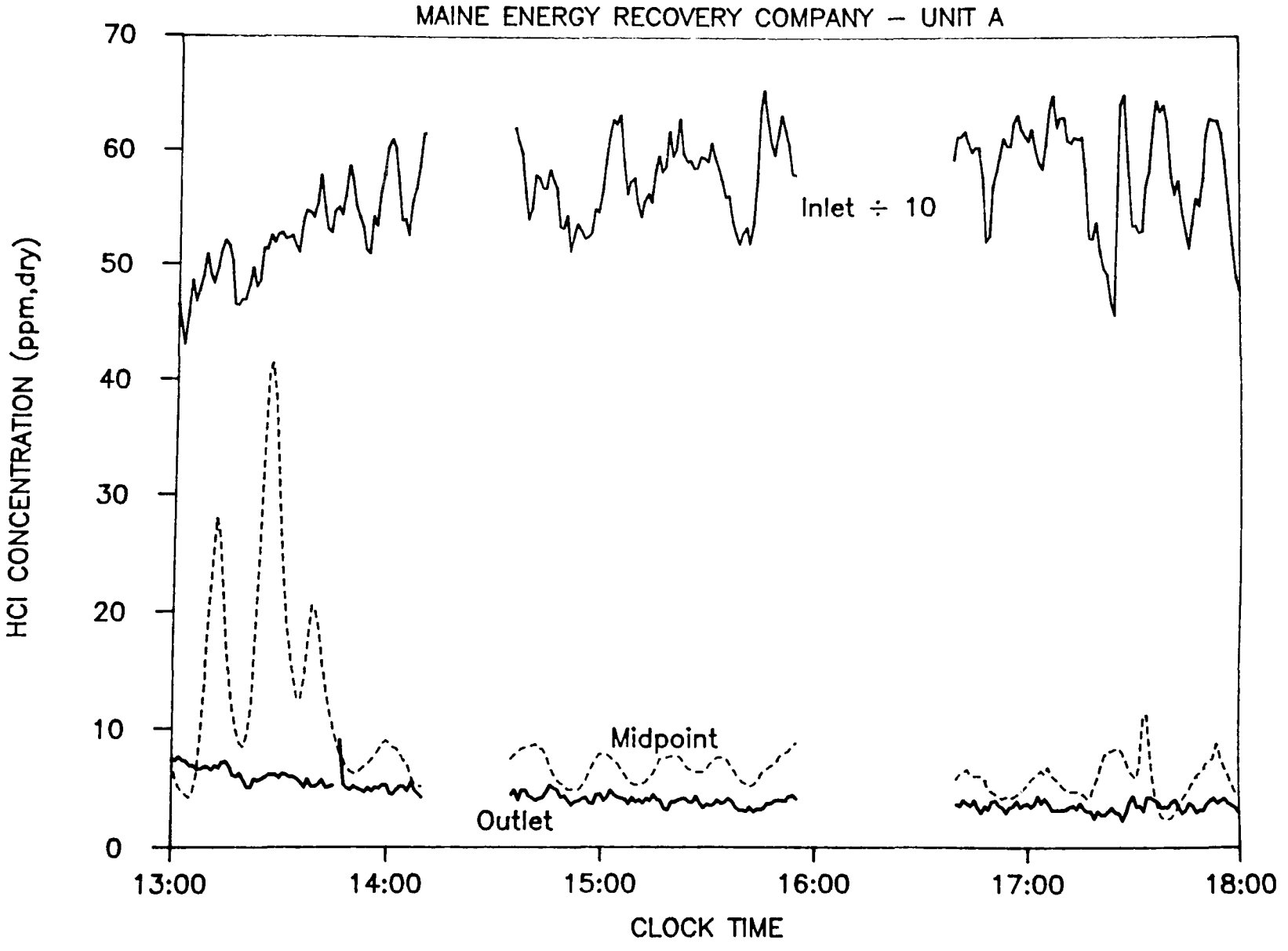


Figure 2-5. HCl MONITORING DATA - RUN #2 12/10/87



NOTE: HCl data deleted during MRI sampling port changes from 14:10 to 14:35 and 15:55 to 16:40.

Figure 2-6. HCl REMOVAL EFFICIENCY - RUN #2

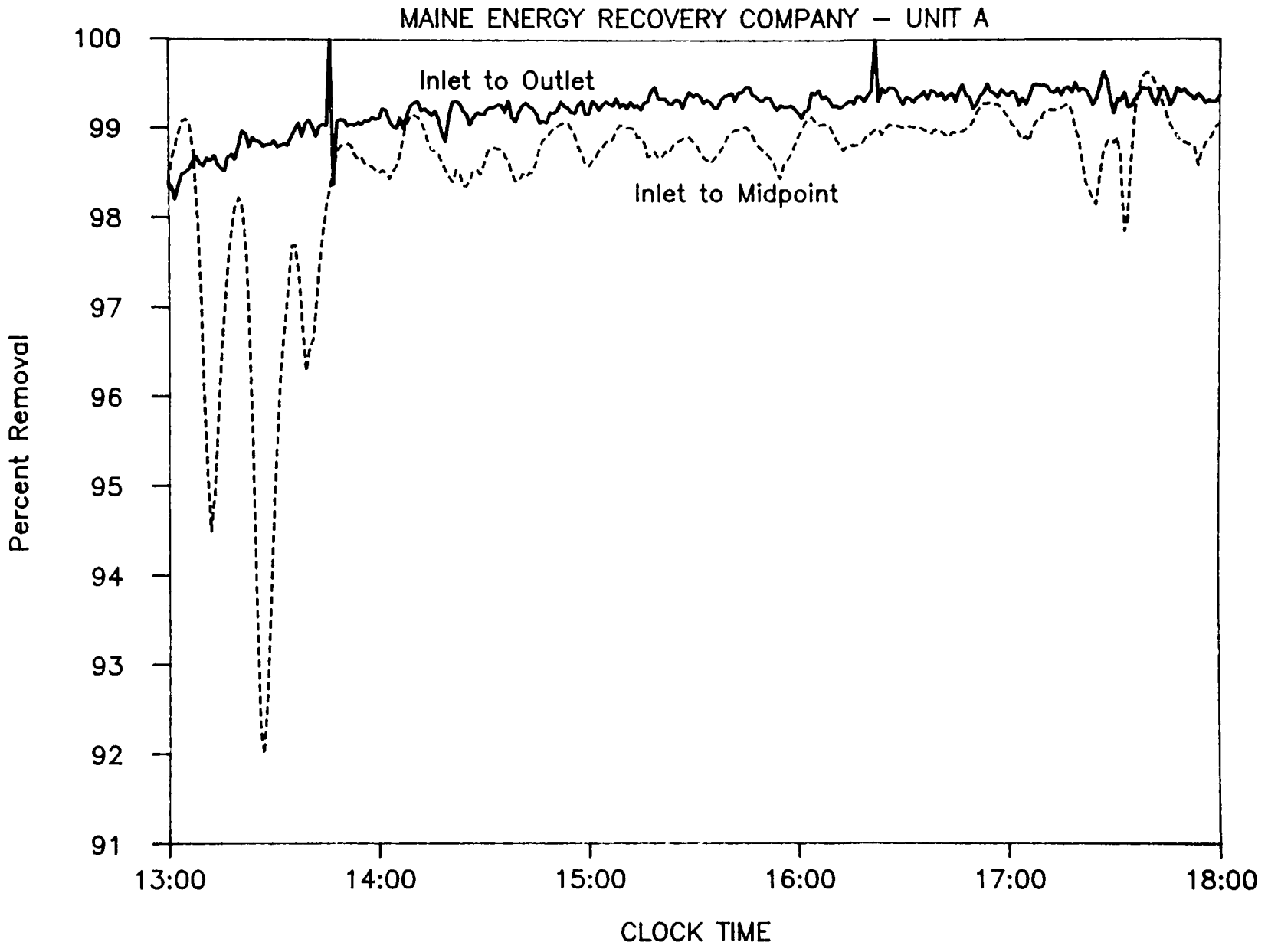


TABLE 2.6.

HCl MONITORING RESULTS - RUN 3
MAINE ENERGY RECOVERY COMPANY - UNIT A
DECEMBER 12, 1987

Hour	Time	Inlet HCl (ppmv, dry)	Midpoint HCl* (ppmv, dry)	Removal Efficiency (%)	Outlet HCl (ppmv, dry)	Removal Efficiency (%)
1	11:15-11:39**	459	6	98.7	5	98.9
	12:04-12:15	498	1	99.8	4	99.2
2	12:15-13:15	513	0	100	3	99.4
3	13:15-14:15	545	0	100	3	99.4
4	14:15-15:15	598	0	100	3	99.5
5	15:15-15:24**	544	1	99.8	2	99.6
	18:19-18:34**	504	1	99.8	5	99.0
Test Average (Time Weighted)		537	1	99.8	3	99.4
Highest 1-min. average:		872	25		8	
Lowest 1-min. average:		388	0		2	

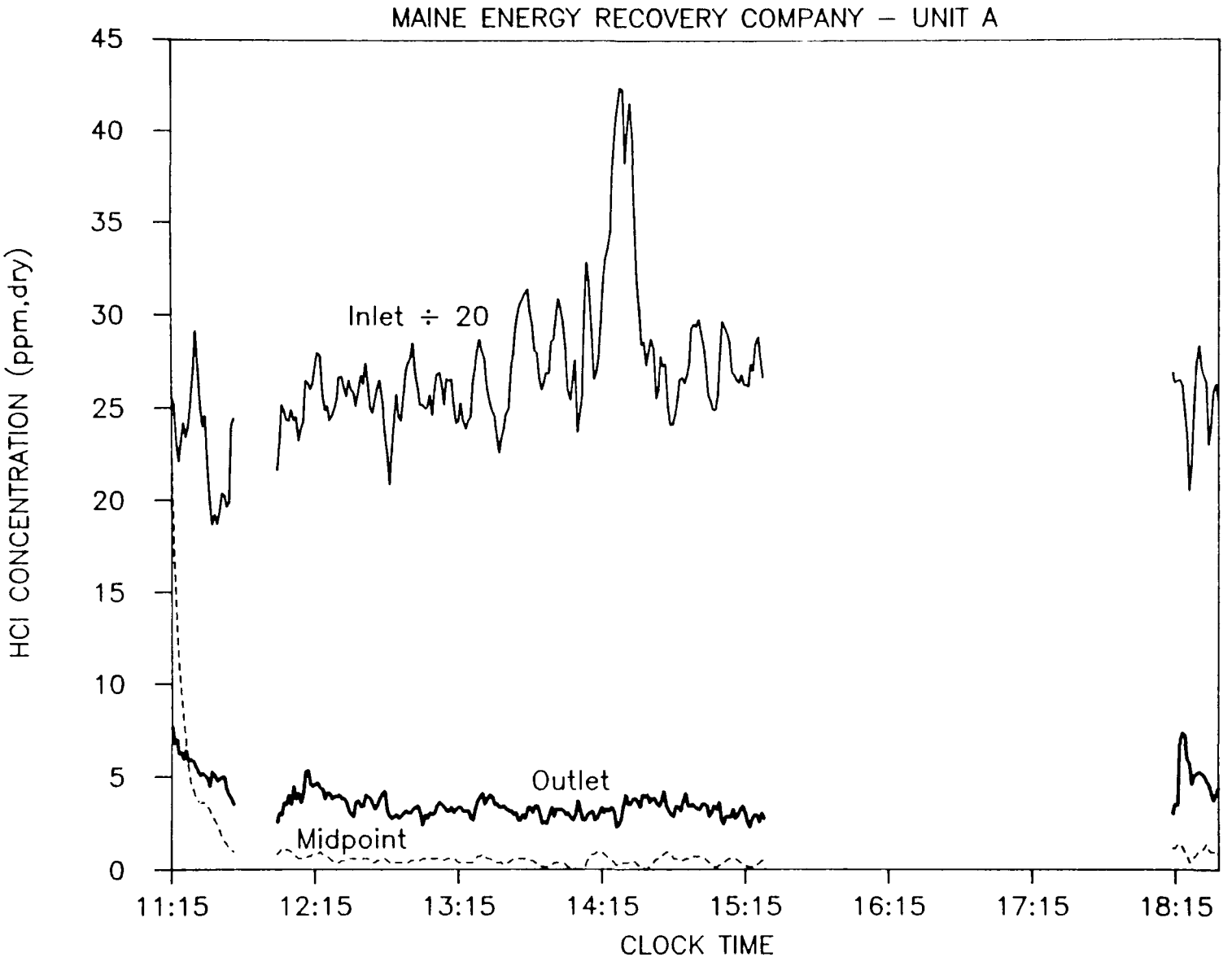
Note: Inlet and midpoint concentration measurements were made on a wet basis and corrected to a dry basis using the Method 4 moisture data provided by MRI.

Inlet Moisture = 16.4% H_2O
Midpoint Moisture = 17.0% H_2O (as measured at the baghouse outlet sample location)

* The midpoint results are questionable. The scrubber operating conditions are the same as during Run 2, and lower than expected midpoint values were recorded. The Compur CEMS accuracy is unknown at this low range because the Compur had not been operated and tested at the outlet of HCl control equipment during previous EPA studies.

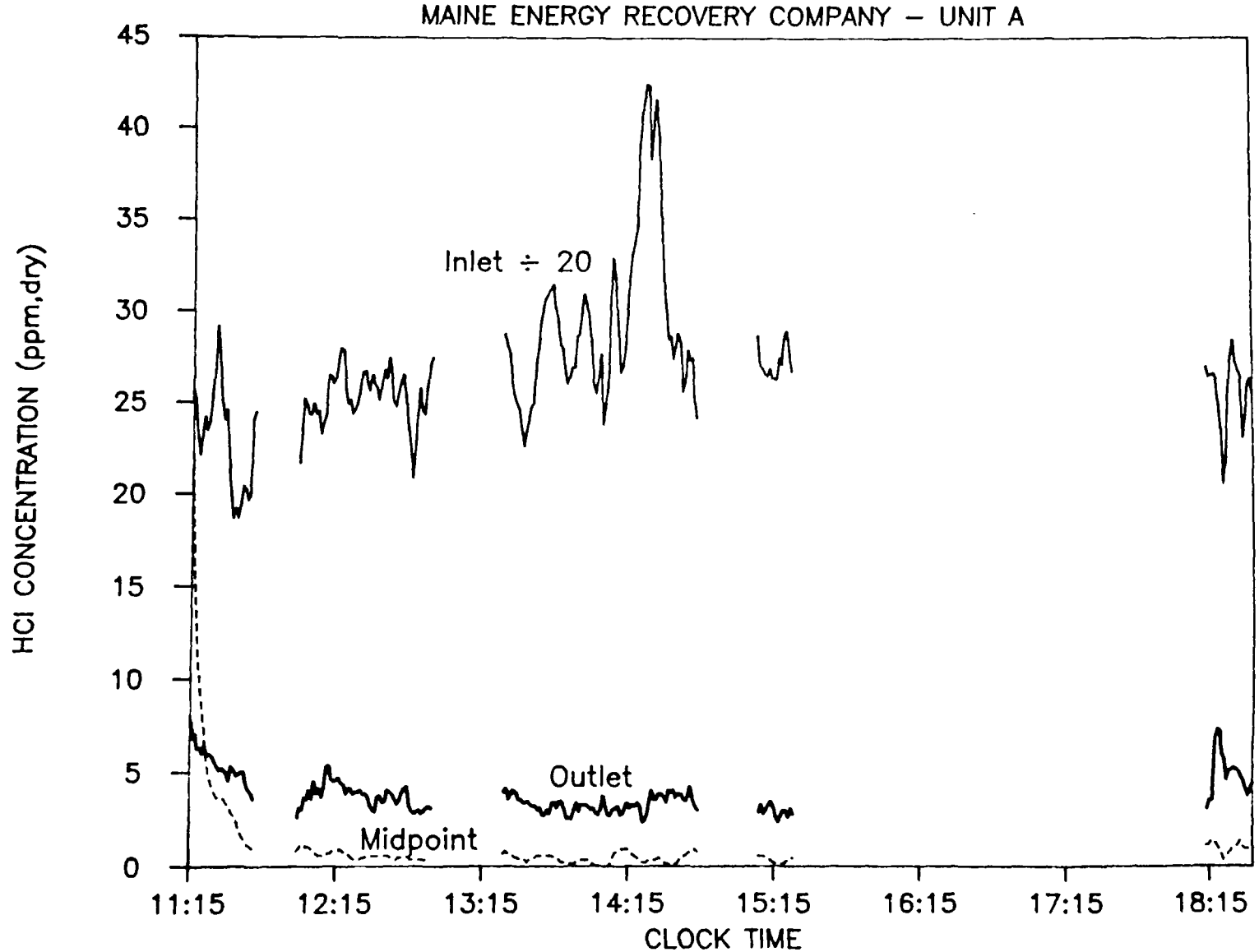
** The test run was interrupted during 11:39-12:04 and 15:24-18:19 time periods, and terminated at 18:34 because of process operating problems.

Figure 2-7. HCl MONITORING DATA - RUN #3 12/12/87



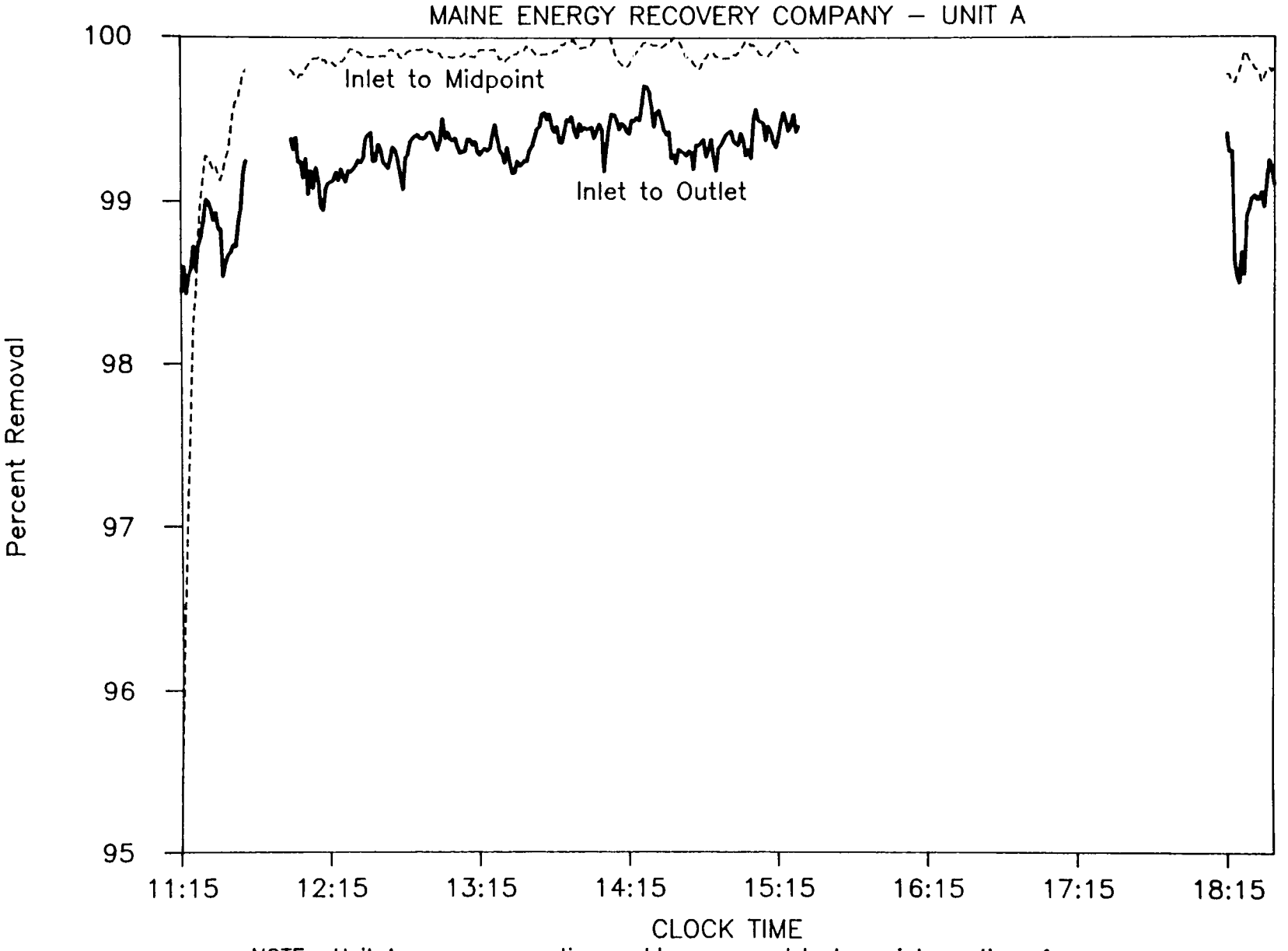
NOTE: Unit A process operating problems caused test run interruptions from 11:39 to 12:04 and 15:24 to 18:19, and ended the test run at 18:34. Midpoint measurements are questionable for this run because the Compur analyzer accuracy is unknown at this low range.

Figure 2-8. HCl MONITORING DATA - RUN #3 12/12/87



NOTE: HCl data deleted during MRI sampling port changes from 13:09 to 13:29 and 14:49 to 15:14. Unit A process operating problems caused test run interruptions from 11:39 to 12:04 and 15:24 to 18:19, and ended the test run at 18:34. Midpoint measurements are questionable for this run because the Compur analyzer accuracy is unknown at this low range.

Figure 2-9. HCl REMOVAL EFFICIENCY - RUN #3



NOTE: Unit A process operating problems caused test run interruptions from 11:39 to 12:04 and 15:24 to 18:19, and ended the test run at 18:34. Midpoint measurements are questionable for this run because the Compur analyzer accuracy is unknown at this low concentration range.

3.0 PROCESS DESCRIPTION AND OPERATION DURING TEST PROGRAM

This section contains a description of the Maine Energy Recovery Company's (MERC) York County Waste-to-Energy facility located in Biddeford, Maine. This section also summarizes the operation of the facility and the key operating parameters that were measured during the test program.

3.1 FACILITY DESCRIPTION

The MERC facility consists of two identical process lines with separate emission control systems that exhaust to a common stack. The process line is illustrated in Figure 3-1. Refuse-derived fuel (RDF) enters the combustor and is fired with preheated combustion air. Auxiliary fuel (natural gas or fuel oil) is sometimes used. The combustion gases pass through superheater, economizer, and combustion air preheater heat recovery stations. The combustion gases then pass through a cyclone to remove large particulate, an alkaline spray dryer to control acid gas emissions and lower the flue gas temperature, and a fabric filter to reduce particulate emissions. The flue gas finally exhausts to the atmosphere through a 244-foot stack which is common to both units.

The MERC facility is rated at 500 tons/day of RDF. The facility was developed by KTI Holdings, Inc., and was designed and built by General Electric Company. Approximately 105,000 lb/hr of steam at a temperature of 760°F and pressure of 675 psig (superheated) is generated by each unit. The steam from the boilers is supplied to a stem turbine which generates up to 22 MW of electricity. The electricity is sold to Central Maine Power.

3.1.1 Preparation of Refuse-Derived Fuel

At the MERC facility, preparation of RDF follows the scheme shown in Figure 3-2. Solid waste from local municipalities is received in packer trucks and transfer trailers and is unloaded on the tipping floor which is enclosed. The waste is visually inspected and potentially explosive or hazardous items are removed. Over-sized waste is removed and sent to a shear shredder. The sorted waste is reduced in size by a flail mill and combined with the end product from the shear shredder. Then, a magnetic separator removes ferrous metal, which is reclaimed. A trommel screen separates non-processible wastes and the remaining refuse is shredded to a nominal top size of 4 inches by the secondary shredder. At this point, the waste has become RDF. MERC estimates that 607 tons/day of solid waste is processed to produce 500 tons/day RDF.

If desired, as the RDF enters the combustor feed hopper, wood chips or sewage sludge may be added. To date, only wood chips have been used. Sewage sludge can be received into a separate hopper which is enclosed by a hydraulically operated steel cover. The sewage sludge has a design moisture content between 12 and 21 percent and a design feedrate of 0.833 yd^3/hr. This amount of sludge, as a percentage of the total fuel volume, has an insignificant effect on the boiler's firing rate. The fuel, whether RDF or RDF mixed with wood chips and/or sewage sludge, is metered from the hopper by dual feeders to the stoker.

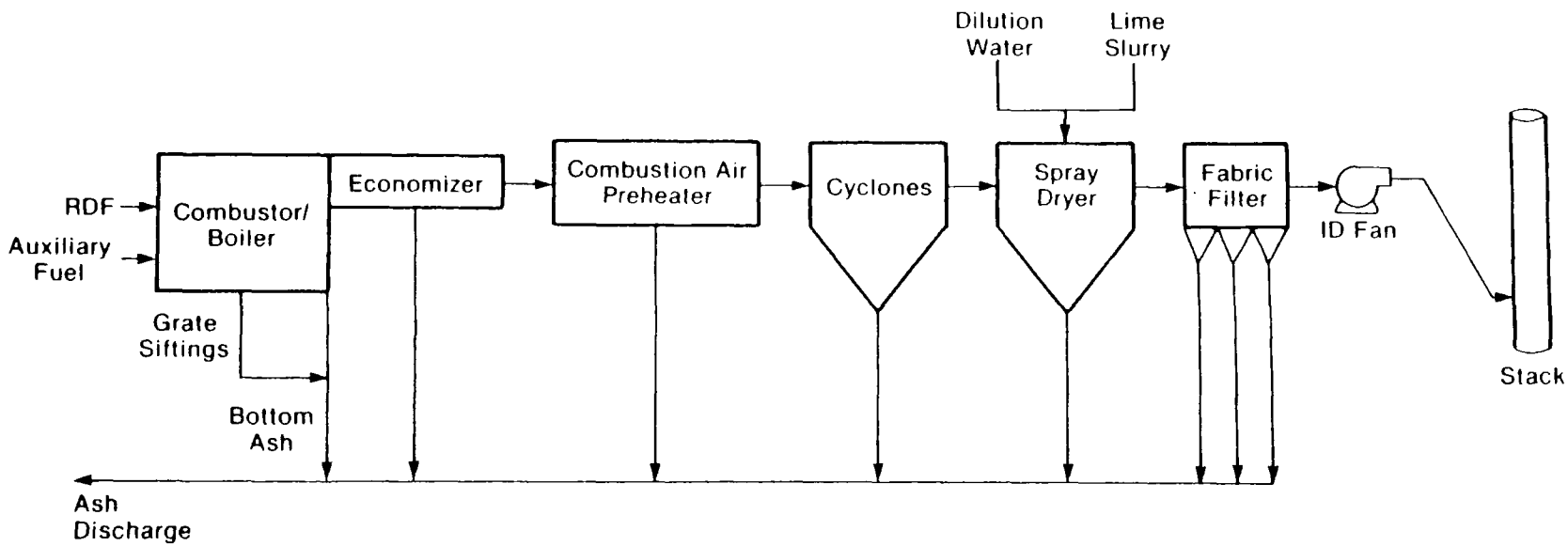


Figure 3-1. The process line for Unit A of the York County Waste-to-Energy Facility, Biddeford, Maine.

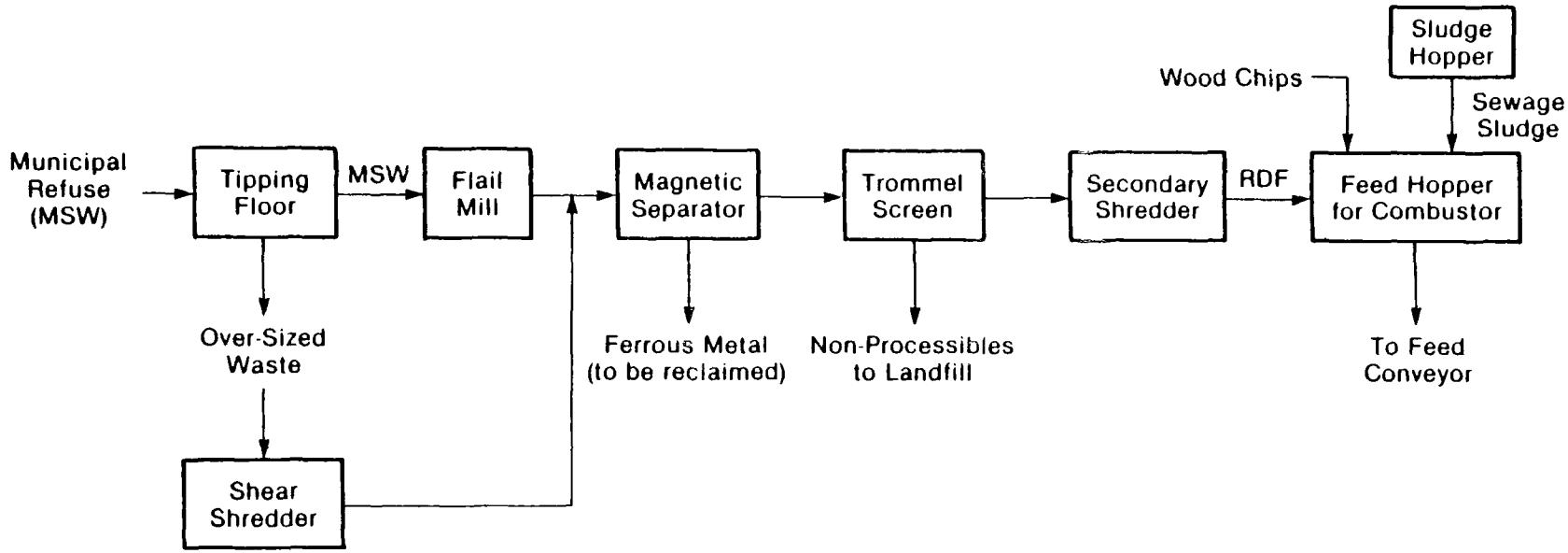


Figure 3-2. Preparation of Refuse-Derived Fuel at MERC in Biddeford, Maine.

3.1.2 Combustion Air

Air from the tipping floow area and the boiler penthouse is withdrawn by a forced-draft fan to supply the air heater section of the heat recovery system. The preheated combustion air is split to supply the natural gas burners, overfire air ports, and undergrate air. The combustion air scheme is shown in Figure 3-3. The slightly negative pressure in the tipping floor area prevents the release of odors created by the solid waste.

3.1.3 Combustor and Boiler

The combustor and boiler are combined into one unit called a controlled combustion zone boiler by Babcock and Wilcox. The combustion zone boiler is rated at 150 x 10^6 Btu/hr of steam.

The stoker is a traveling grate located at the bottom of the boiler. The fuel from the feeders enters the front of the boiler. If required to maintain steam load, natural gas and #2 fuel oil burners located above the feeders may be used. The sulfur content of the natural gas and fuel oil are limited by the air permit to a maximum of 0.7 percent.

The boiler is balanced draft. One fan (forced-draft) is used to feed combustion air and the second fan (induced-draft) located just prior to the stack is used to draw out the combustion gases. A control system based on oxygen and carbon monoxide concentrations is used to optimize combustion efficiency. The target excess air level is in the range of five to ten percent.

In addition to the waterwalls in the combustion zone, the heat recovery system includes superheater, economizer, and combustion air heater sections. At the exit to the air heater, the flue gas temperature is approximately 400°F.

3.1.4 Cyclone, Spray Dryer, and Fabric Filter

The combustion gases from the air heater enter a cylone-type mechanical dust collector which removes large particulate. Next, an alkaline spray dryer is used to control acid gas emissions. The spray dryer is a reaction vessel where lime slurry is sprayed into the flue gas that contains particulate, SO_2, acid gases, and other pollutants in gaseous and aerosol form. The slurry water is evaporated by the flue gas heat and the acid gases react with the lime. Particulate and excess lime serve as nucleation for volatile organic compounds (VOC) and metal adsorption and agglomeration.

The lime-to-SO_2 reactant ratio and the flue gas temperature at the exit to the spray dryer can be controlled separately. The lime that is introduced as a slurry is diluted with water before entering the reaction vessel at rates appropriate to achieve the desired SO_2 removal and temperature reduction. The rate of slurry addition is varied based on the continuously monitored SO_2 concentration at the outlet of the fabric filter. The facility is required by its operating permit to maintain an outlet SO_2 concentration of 30 ppm. However, at no time during the test program were the facility's SO_2 monitors providing accurate readings. The spray dryer outlet temperature is directly controlled by the amount of dilution water added and is typically 280°-300°F.

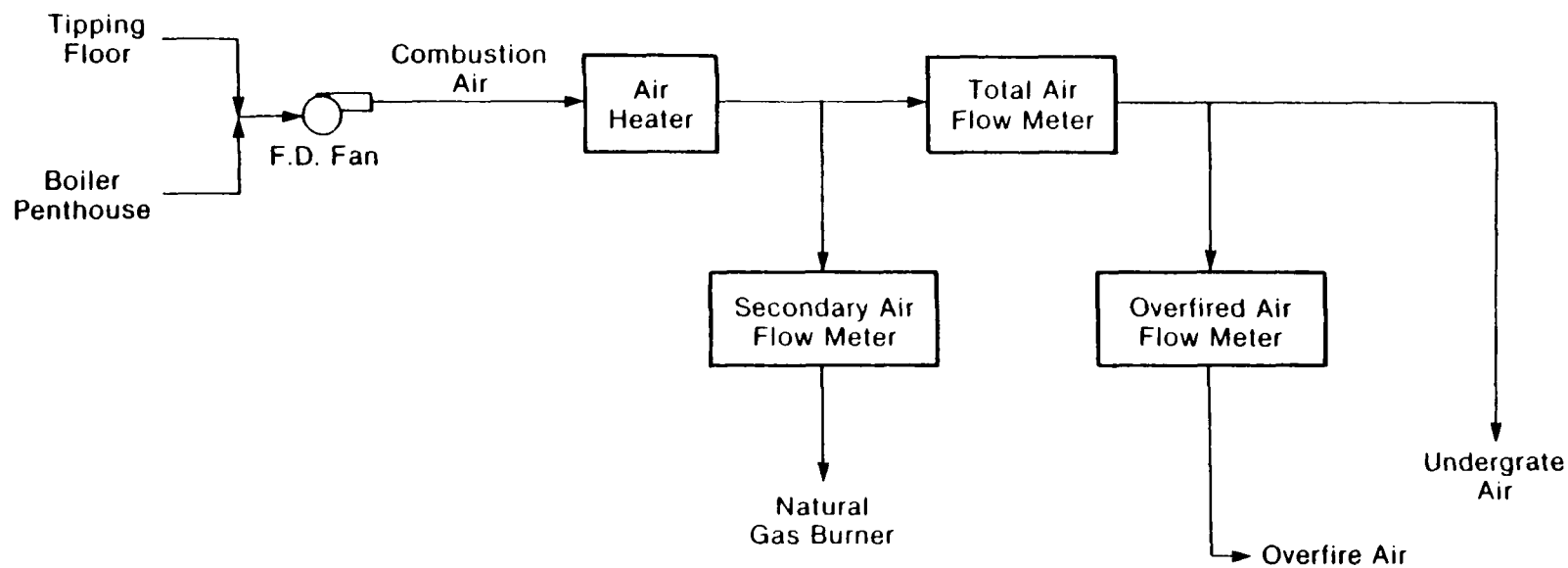


Figure 3-3. Combustion air scheme at the MERC Facility in Biddeford, Maine.

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The fabric filter then collects the particulate from the gas stream. The excess lime in the bag filter cake provides a second-stage reaction site for further acid gas removal. The fabric filter unit has six modules. Five modules filter flue gas while one module is being cleaned in a continuous cycle. The total time needed to complete a fabric filter cleaning cycle is about 18 minutes.

3.1.5 Ash Handling

An ash system removes ash from the stoker discharge, generating bank hopper, air heater hopper, mechanical dust collector hopper, spray dryer, and fabric filter modules. All of the hopper discharges are through rotary seal valves. This ensures a positive seal to prevent boiler gases from entering the ash conveyors and air from entering the hoppers and boilers.

The ash from the fabric filter modules discharges into 6 identical drag/screw conveyors. Each set of these drag/screw conveyors discharges into one of two identical drag chain collecting conveyors. The spray dryer and mechanical dust collector discharge directly onto these collecting drag chain conveyors. The generating hopper and air heater hopper discharge ash onto a transverse drag conveyor which feeds to the collecting drag conveyors. The combined fly ash from each collecting conveyor is fed to one of two identical ash conditioning screw conveyors. The ash is conditioned by the addition of water at a controlled rate.

The bottom ash from each stoker discharges into one of the two submerged drag chain ash conveyors. The discharge of the ash conditioners deposits into the dewatering section of the bottom ash drag conveyor. It is at this point that the fly and bottom ash streams combine. The combined ash streams are then dumped into a specially designed trailer for removal from the site.

Dust control within the processing building is achieved through two separate control systems. One system serves the tipping/processing area, while the other serves the conveyors in the boiler building and RDF reclaim area. Each system contains a baghouse, fan duct hoods, and dust collection ducts at key conveyor and transfer processing points. Dust laden air is drawn through one of two pulsed jet baghouses which exhaust in the vicinity of the boiler forced-draft fan intake. The baghouse air exhaust thus becomes incorporated into the combustion air for the boilers. Dust captured by the baghouses is returned to and becomes a part of the RDF fuel.

3.2 SUMMARY OF OPERATIONS BY TEST RUN

Three test runs were conducted on Unit A between December 8 and December 12, 1987. During each test run only RDF was fired.

3.2.1 Operation During Run 1

Run 1 was originally scheduled for December 8, but power problems in the afternoon delayed Run 1 until December 9. Both units were down overnight.

The facility was still experiencing operational problems on the morning of December 9. The units were started up in the morning and were preheated on natural gas. However, problems with the feeder conveyors delayed bringing

the boilers up to full load until 1400. At 1500, CEM data indicated that the boilers were stabilized.

Run 1 began at 1530 hours and continued until approximately 1840 hours, when the Unit A forced-draft fan failed. Two of three traverses had been completed at the time of the shutdown. Since replacement of the fan motor required overnight work, Run 1 was considered to be complete.

3.2.2 Operations During Run 2

Run 2 was conducted on December 10, 1987. The fan was repaired at approximately 0100 that morning, and both units were back on-line. However, at 1030, there was a feeder conveyor failure and a unit shutdown occurred. The units were brought back on-line at 1200 hours, and Test 2 began at 1245. Facility personnel decided to increase the lime slurry feed rate at 1330. Minor excursions of SO_2 were being experienced and the facility did not want to exceed their permit range. Therefore, the lime slurry feed rate was increased from approximately 3.0 gpm to approximately 8.0 gpm. This increase reduced the HCl concentrations at the midpoint and the outlet location to almost 0. Testing continued and was completed at 1800 hours. All three traverse points were sampled for a complete run.

3.2.3 Operations During Run 3

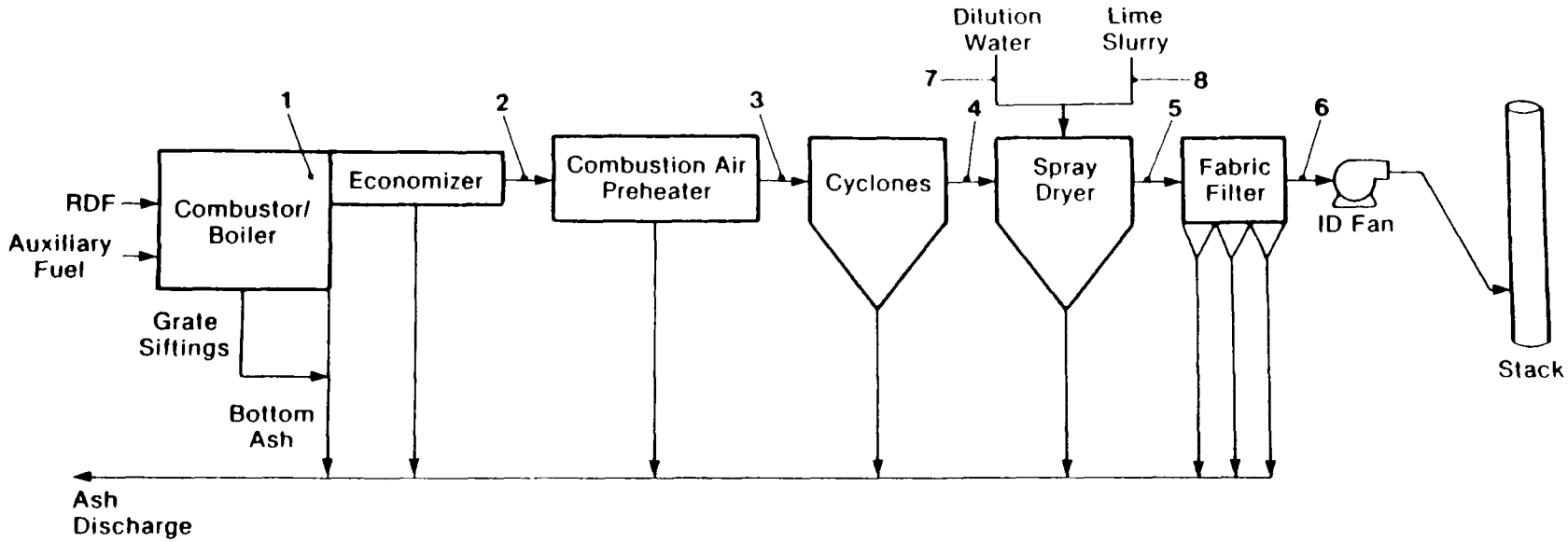
Run 3 was conducted on December 12, 1987. Originally scheduled for December 11, problems continued throughout the day with feeder conveyors and testing was postponed until the next day. Test 3 began at 1115 hours. A brief test interruption occurred during 1138-1200 due to a feeder malfunction. Testing continued until 1525, restarted at 1815, but was stopped at 1830 due to recurring feeder problems. Throughout Run 3, the lime slurry feed rate was maintained between 7 and 8 gpm. Due to the late hour and the fact that the facility estimated that the delay time would be four to eight hours. The test was considered complete at the end of two complete port traverses and part of the third.

3.3 SUMMARY OF OPERATING PARAMETERS DURING THE TEST PROGRAM

This section summarizes the values of key operating parameters during the test program. The purpose of evaluating these operating parameters was to determine: 1) if the system was operating at normal conditions, and 2) if the system was operating at similar conditions during each of the three test runs. Only selected parameters are discussed in this section.

The operating data were recorded once every four minutes by computer. The spray dryer related operating data showing each four-minute value is included in Appendix K. The locations of temperature, pressure, and flow sensors are indicated in Figure 3-4. Also, plots of the four-minute data versus time are presented in this section. The plots have been reduced in size in order to present all three runs on one page. Full-sized plots of spray dryer related data for each run are included in Appendix K if more detail is required by the reader.

Average values for selected operating parameters over the actual testing intervals are summarized in Table 3.1. On an average basis, the combustor operating conditions appear to be about the same for all three runs. The only variation of consequence is the higher air flow and economizer inlet



1 - Superheater steam flowrate, pressure, temperature and economizer inlet flue gas temperature
2 - Economizer outlet flue gas temperature and excess oxygen
3 - Air heater outlet flue gas temperature and pressure
4 - Spray dryer inlet flue gas temperature and pressure
5 - Spray dryer outlet flue gas temperature and pressure
6 - Fabric filter outlet temperature
7 - Dilution water feedrate
8 - Lime slurry feedrate

Figure 3-4. Location of temperature, pressure, and flow sensors at the the MERC Facility.

TABLE 3.1. SUMMARY OF KEY OPERATING PARAMETERS DURING THE MERC TEST PROGRAM IN BIDDEFORD, MAINE

Parameter	Run 1 12/9/87	Run 2 12/10/87	Run 3 12/12/87	Average
Superheater steam				
Flowrate (1,000 lb/hr)	106	109	108	108
Pressure (psig)	663	676	671	670
Outlet temperature (^{o}F)	746	751	748	748
Combustion Air				
Total air flowrate (1,000 lb/hr)	124	123	134	127
Undergrate air flowrate (1,000 lb/hr)[a]	50.0	64.1	52.4	55.5
Overfire air flowrate (1,000 lb/hr)	71.2	73.2	70.1	71.5
Overfire air distribution (%)[b]	60	60	50	57
Undergrate air pressure (in H_2O)	-0.23	-0.86	-0.26	-0.45
Overfire air fan pressure (in H_2O)	25.3	25.6	25.0	25.3
Air heater inlet air temperature (^{o}F)	127	66	118	104
Air heater outlet air temperature (^{o}F)	381	368	385	378
Excess Oxygen (% by volume, wet)				
left side	5.59	5 77	5.78	5.71
right side	7.91	8.13	8.02	8.02
Heat Release (10^6 Btu/hr)				
Total (RDF + auxiliary fuel)	150	153	151	151
RDF only	150	153	150	151
Flue gas temperatures (^{o}F)				
Economizer inlet	779	788	801	789
Economizer outlet/air heater inlet	515	523	532	523
Air heater outlet	374	363	383	373
Spray dryer inlet	374	364	384	374
Spray dryer outlet/fabric filter inlet	277	278	279	278
Fabric filter outlet	268	268	268	268
Gas Differential Pressures (in H_2O)				
Undergrate to furnace	0.46	0.34	0.44	0.41
Dust collector (cyclone)	3.02	3.07	3.37	3.15
Spray dryer	4.24	4.84	5.17	4 75
Fabric filter	7.16	7.89	8.22	7.75
Flue gas pressures (in H_2O)				
Spray dryer inlet	-7.20	-7.25	-7.39	-7.28
Spray dryer outlet	11.5	-13.1	-13.4	-12.7
I.D. fan suction	-18.7	-21.0	-21.7	-20.5
Lime Slurry Feedrate (GPM)	2.91	6.70	7.80	5.80
Dilution Water Feedrate (GPM)	6.95	3.39	4.89	5.07
Total Lime Slurry & Water Feedrate (GPM)	9.86	10.1	12.7	10.9

[a]Undergrate air flowrate was calculated as the difference between the total air flowrate and overfire air flowrate.

[b]Overfire air distribution was calculated as the overfire air flowrate divided by the total air flowrate.

flue gas temperature during Run 3. Although the operating conditions appear similar, there is no way to judge if the entire combustor system reached the same degree of thermal equilibrium for each run.

The emission control system was operated differently during each run. First, the average lime slurry feed rate increased during each test, with Run 2 being higher than Run 1, and Run 3 being higher than Run 2. This increase in slurry flow, combined with the higher spray dryer inlet temperature and air flow during Run 3, is consistent with the increase in pressure drop across the spray dryer and fabric filter during each test.

3.3.1 Steam Load and Heat Release

In Figure 3-5, RDF heat release, superheater steam flow, superheater steam pressure, and steam temperature at the superheater outlet are plotted against time. The RDF heat release is calculated from the steam flow minus the heat content supplied by any auxiliary fuel (natural gas or fuel oil). During this test program, only RDF was fired, and sampling was discontinued during periods when auxiliary natural gas firing was necessary. Thus, for this test program, the RDF heat release is equivalent to the total heat release.

These combustion parameters were operating in a similar and normal manner for all three runs in which the manual sampling trains were operating. The relative standard deviation of the steam load was an average of four percent during the sampling periods.

3.3.2 Combustion Air

Overfire air distribution, undergrate-to-furnace differential pressure, and excess oxygen are plotted against time in Figure 3-6. The overfire air distribution was calculated by dividing the overfire air mass flowrate by the total air mass flowrate.

The variation in excess oxygen was greater during Run 3 than in Runs 1 and 2. During Run 3, the relative standard deviation was twenty two percent, as compared to sixteen and twelve percent for Runs 1 and 2. However, the average concentrations were not significantly different.

The overfire air (OF) distribution was lower and undergrate-furnace differential pressure was higher during Run 3. The average OF air distribution was sixty percent during Runs 1 and 2, but decreased to fifty perent during Run 3. The undergrate-furnace differential pressure increased to 0.4 in. H_2O during Run 3 from 0.3 in. H_2O during Run 2.

The overfire air flow pressures were measured in the combustor. The pressures measured during the MERC test program are presented in Figure 3-7. Once the combustor is optimized, the pressures do not vary. Pressurized air from two air swept spouts is also used to spray the RDF across the grate as it enters the combustor. The air swept pressure is varied in a set range in order to spray the RDF evenly across the grate.

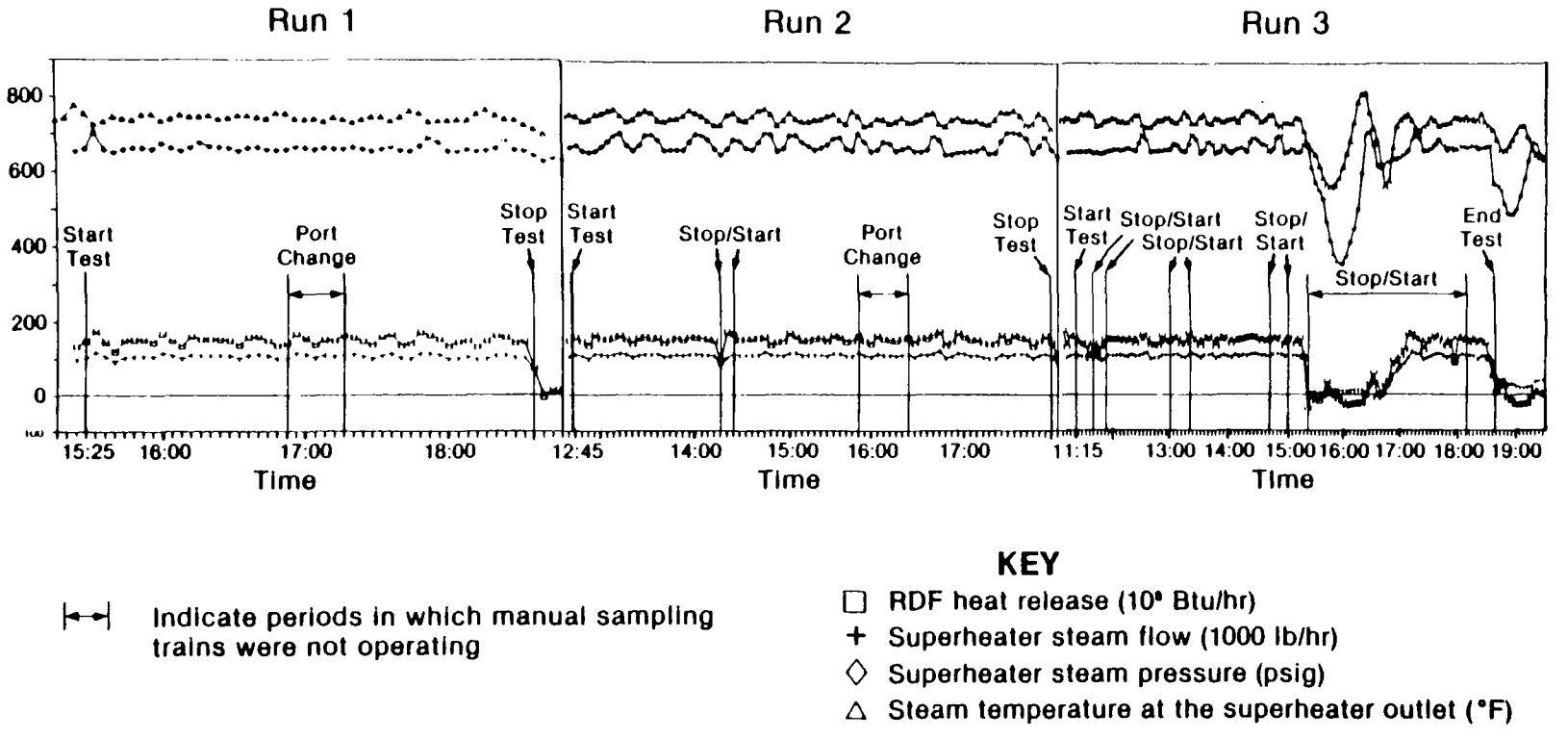


Figure 3-5. RDF heat release and steam flow, pressure, and temperature as a function of time during the MERC Test Program.

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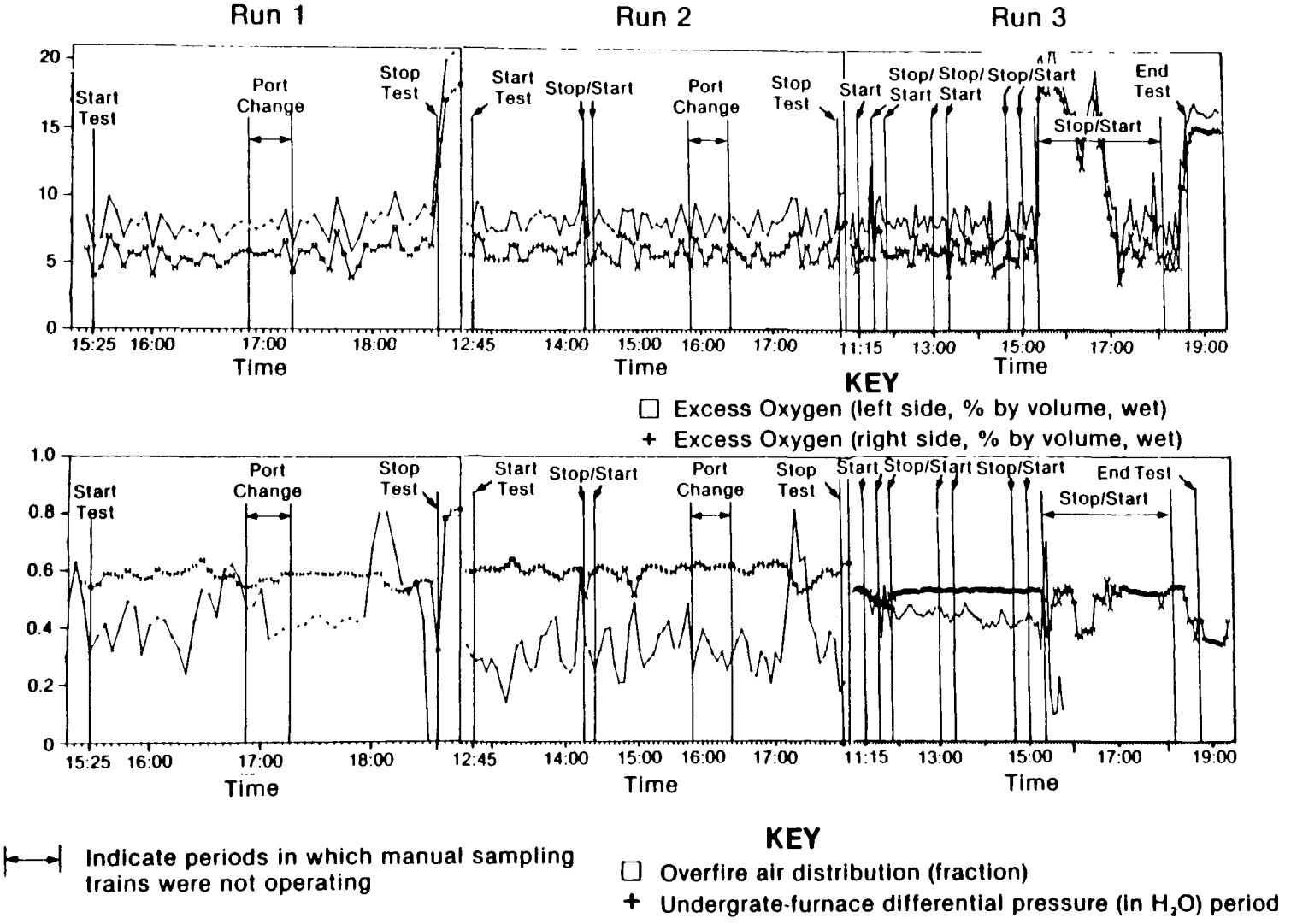
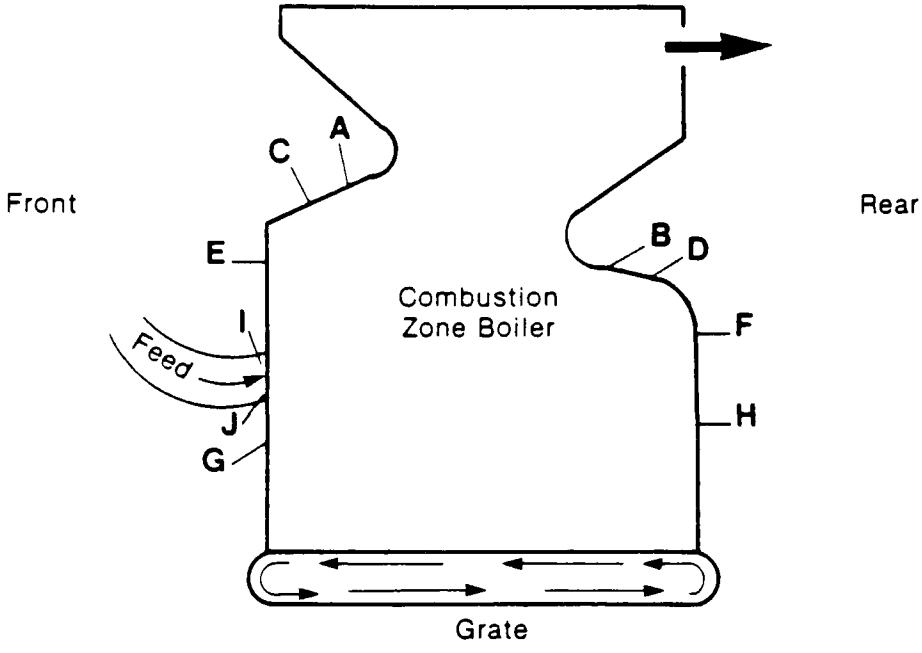


Figure 3-6. Combustion air parameters as a function of time during the MERC Test Program.



Pressure (in H_2O)

A - 23"
B - 24"
C - 23"
D - 24"
E - 23"
F - 24"
G - 13"
H - 24"
I - Air Swept Spout - Range of 9" to 24"
J - Air Swept Spout - Range of 9" to 24"

Figure 3-7. Overfire air flow pressures measured during the MERC Test Program.

3.3.3 Temperature Profile

The inlet and outlet flue gas temperatures of the economizer, air heater, spray dryer, and fabric filter are plotted against time in Figure 3-8. The economizer inlet, economizer outlet, and air heater outlet temperatures were ten to twenty degrees (^{o}F) hotter during Run 3. However, after the spray dryer, the flue gas temperature during Run 3 was the same as during Runs 1 and 2. The spray dryer outlet temperature was very consistent during all three runs.

3.3.4 Spray Dryer and Fabric Filter

The operation of the spray dryer and fabric filter was evaluated using two plots. The first plot (Figure 3-9) included the spray dryer inlet and outlet temperatures, the lime slurry and dilution water feed rates, and the fabric filter differential pressure. The second plot (Figure 3-10) includes the flue gas differential pressures across the cyclone, spray dryer, and fabric filter.

The difference in spray dryer operation during the runs is shown clearly in Figure 3-9. During Run 2, the lime slurry feed rate was increased significantly. This increase was due to the high SO_2 concentration being monitored at the fabric filter outlet by the test contractor, which was more than [redacted] the permit level of 30 ppm. Subsequently, the lime slurry feed rate was increased from 3 gpm to over 7 gpm, and remained at this level through Run 3. A corresponding decrease in the dilution water feed rate was observed at this time such that the total lime slurry and dilution water feed rate increased only slightly. The spray dryer outlet temperature remained constant throughout all three test runs. During Run 3, both the dilution water and the lime slurry feed rates increased from Run 2. This may have been partially due to the higher spray dryer inlet temperature during Run 3. However, the spray dryer outlet temperature remained consistent during all three runs.

The differential pressures across all three control devices (cyclone, spray dryer, and fabric filter) increased during Runs 2 and 3, with Run 3 having the greatest increase. For Run 2, the increase in the lime slurry feed rate may have caused the pressure drop increase, since the pressure drop across the cyclone did not change significantly. However, for Run 3, a combination of air flow rate and lime slurry feed rate may have caused the increased pressure drop.

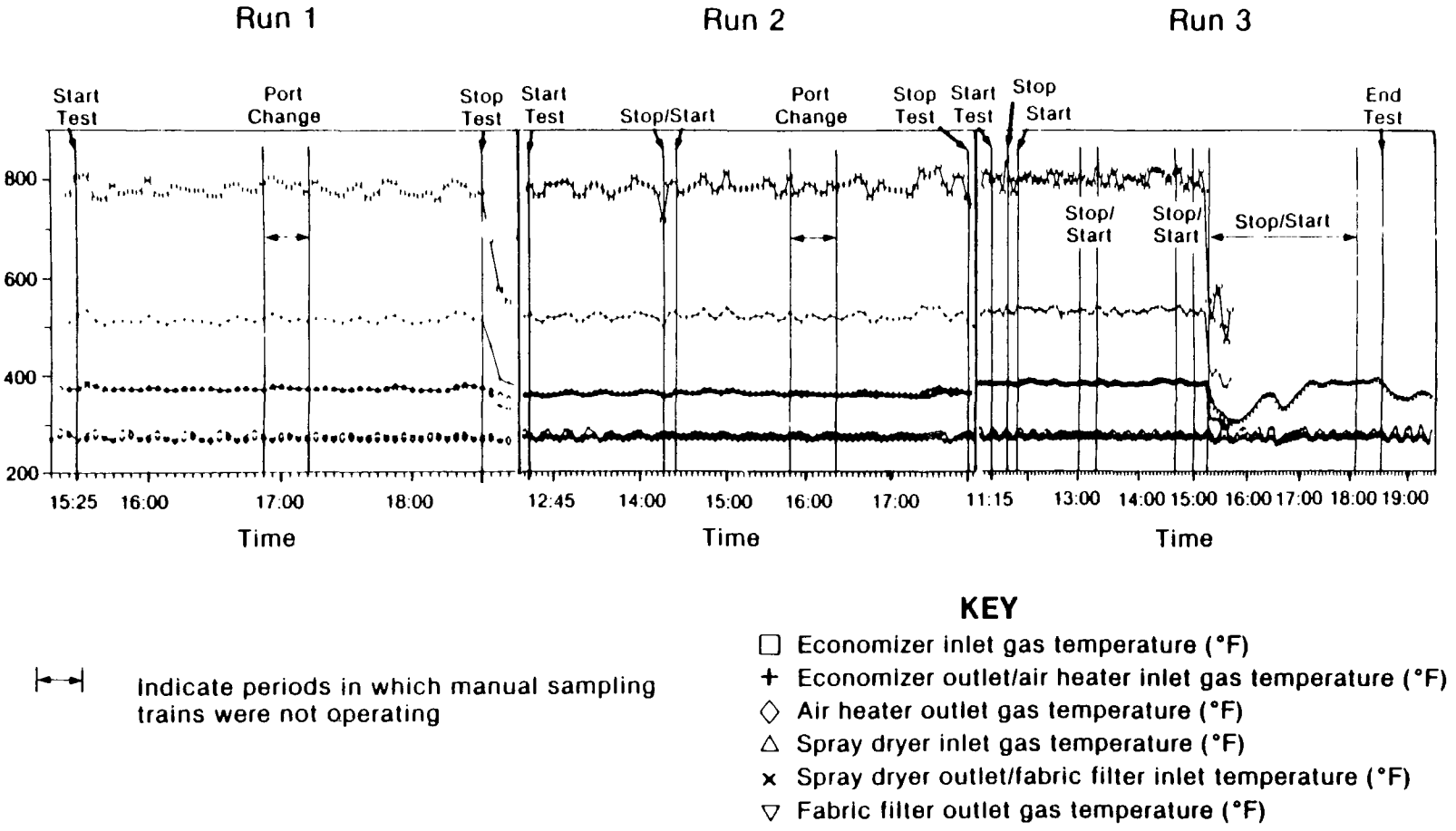


Figure 3-8. Flue gas temperature as a function of time during the MERC Test Program.

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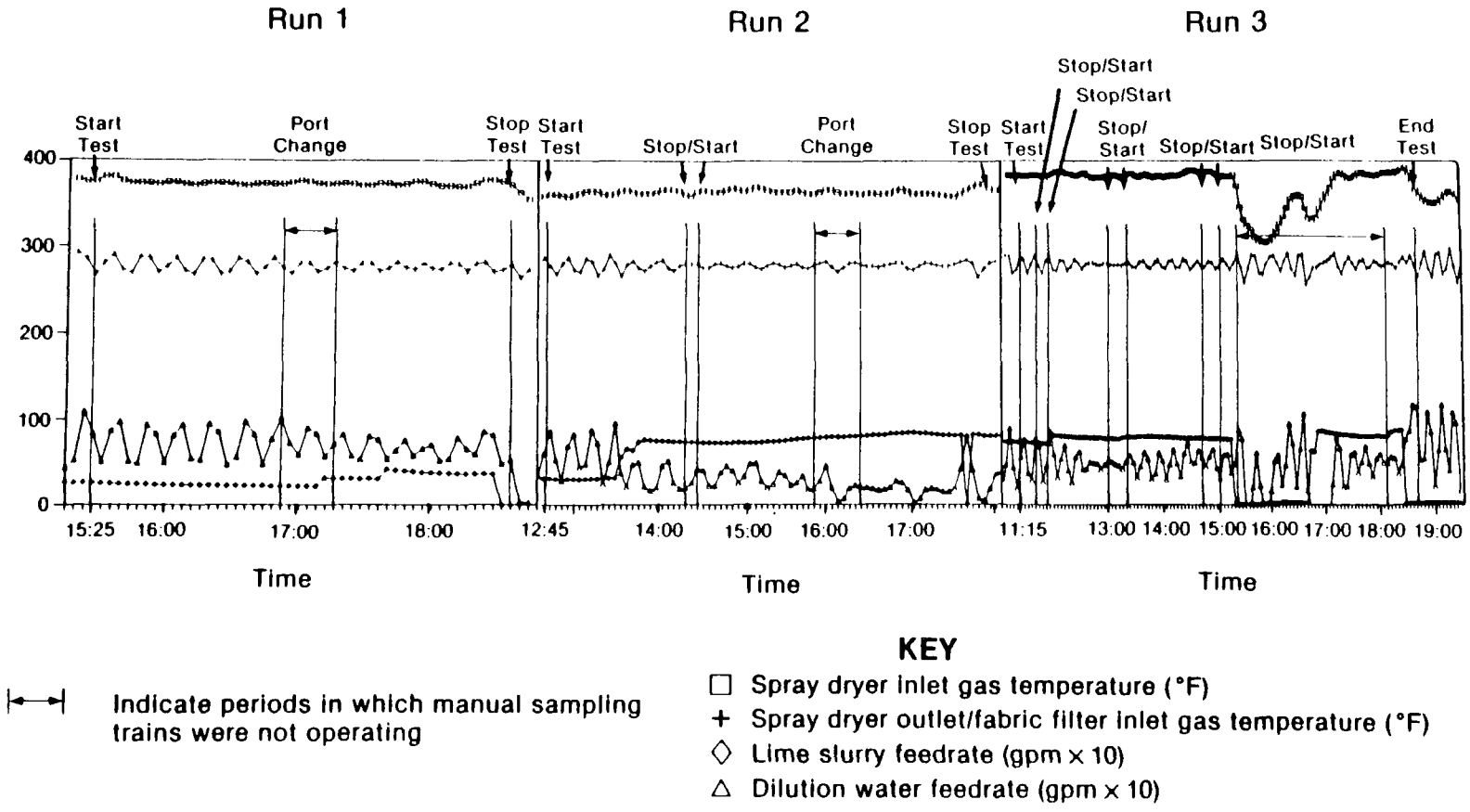

Figure 3-9. Spray dryer operating parameters as a function of time during the MERC Test Program.

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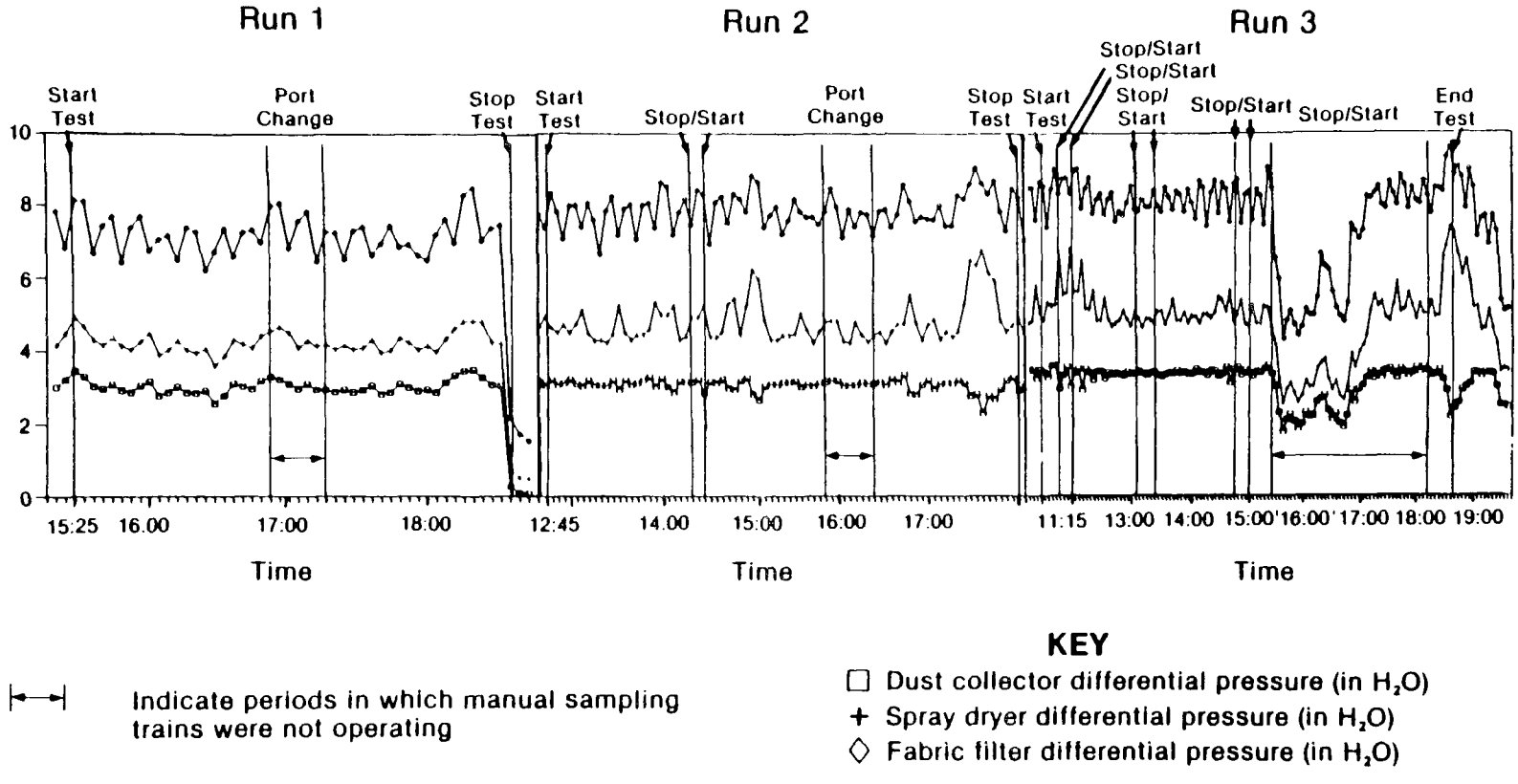

Figure 3-10. Differential pressures across the control devices during the MERC Test Program.

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4.0 HCl CONTINUOUS EMISSION MONITORING SYSTEM DESCRIPTIONS

The following discusions briefly outline the operational principles of the monitoring equipment employed to quantify the HCl concentrations at three locations within the Unit A flue gas handing system.

Entropy is currently evaluating these instruments in another study for the EPA and has compiled information on their operational parameters and principles. This information is presented in the descriptions that follow. It should be noted that operational characteristics of these instruments are not yet fully established as they have been for SO_2 and NO_x CEM systems.

4.1 THERMO ELECTRON MODEL 15 HCl ANALYZER/MODEL 200 DILUTION SYSTEM

The Thermo Electron system was used at the spray dryer inlet monitoring location (see Section 5).

The Thermo Electron (TECO) Model 15 Gas Filter Correlation (GFC) HCl analyzer is an analytical instrument for continuous, real time measurement of HCl on a wet basis.

GFC spectroscopy is based upon comparison of the absorption of a selected wavelength within the infrared (IR) absorption spectrum by the measured gas to that of other gases also present in the sample being analyzed. The technique is implemented by using a high concentration sample of the measured gas (i.e., HCl) as a filter for the IR radiation transmitted through the analyzer. The analyzer contains a correlation wheel that consists of two hemispherical cells, one filled with HCl and the other with N_2. Integral with the correlation wheel is the chopper pattern necessary to produce the high frequency chop required by the IR detector.

Radiation from an IR source is chopped and then passed through the gas filter, alternating between HCl and N_2 as the filter wheel rotates. The radiation then passes through a narrow bandpass interference filter and enters a multiple optical pass cell where it is absorbed by the sample gas. The IR radiation that is not absorbed then exits the sample cell and is measured by the IR detector.

The HCl gas filter produces a reference beam that cannot be further attenuated by HCl in the sample cell. The N_2 side of the filter wheel is transparent to the IR radiation and therefore produces a measure beam that can be absorbed by HCl in the cell. The chopped detector signal is modulated by the alteration between the two gas filters with an amplitude related to the concentration of HCl in the sample cell. Other gases do not cause modulation of the detector signal, because they absorb the reference and measure beams equally. Thus, the GFC system responds specifically to HCl.

With the improved rejection of interference afforded by the GFC technique, the sensitivity of the analyzer is increased by using multiple pass optics in the sample cell, which leads to a large path length, and thus an improved sensivity, in a small physical space. This allows full scale sensitivity down to 1 ppm.

Because IR absorption is a nonlinear measurement technique, the instrument electronics transform the basic analyzer signal into a linear output. The exact calibration curve is stored in the computer's memory and is used to linearize the instrument output over all the ranges. The microcomputer is used to process signals from both a pressure and temperature transducer to make corrections to the instrument output, resulting in HCl concentration measurements that are unaffected by changes in the temperature or pressure of the sample gas.

The analyzer has 10 selectable operating ranges from 0-5 ppm up to 0-5000 ppm HCl. The analyzer was operated on the 0-100 ppm full scale range during the test program. The vendor claims that the detection limit for this instrument is 0.1 ppm.

The Model 200 dilution system comprises the following components:

- In-situ dilution probe with sample orifice,
- Transport tubing, and
- M200 stack probe control unit.

The dilution probe is designed to extract a small amount of sample continuously through a fine filter. The sample flow rate is precisely controlled to within 2% by a glass critical orifice of low coefficient of expansion. By reducing the pressure after the fine filter with a precision aspirator to create a vacuum of 0.46 bar in the volume downstream of the critical orifice, a constant flow of flue gas sample is drawn through the orifice, thoroughly mixed with the aspirator air, and then transported through the sample line to the appropriate analyzer.

The sampling system is designed to permit stepwise dilution ratios of 12:1 to 350:1 within the probe by a single selected orifice.

Calibrations are performed by introducing calibration gas through the calibration line to a point within the probe upstream of the first fine filter in the probe dilution orifice. In this way, the calibration gas follows all of the sample conditioning steps taken by the flue gas sample.

The lines transporting flue gas sample and calibration gas are Teflon, and the dilution air and vacuum lines are polyethylene. The flue gas sample line is heated to approximately 300°F.

The dilution air and calibration gas flow controls are contained within the M200 control unit.

4.2 COMPUR MODEL 4150 ZGSM HCl ANALYZER/MODEL 4330 DILUTION SYSTEM

The Compur system was used at the spray dryer outlet monitoring location (see Section 5).

The Compur 4150 HCl analyzer uses an ion selective electrode (Cl^-) to measure (after dilution) HCl concentrations in a range of 0-150 ppm on a wet basis. Detection limits for this instrument are unknown.

The sample gas is drawn into the analyzer by means of an air aspirator. The sample passes through an atomizer, the measuring cell, and then to the waste reservoir, where the gas is exhausted from the analyzer. A peristaltic pump delivers absorption solution from the storage reservoir to the atomizer, where it is atomized to an aerosol. The HCl in the gas sample passing through the atomizer is scrubbed from the gas by the atomized absorbing solution. A highly enriched solution is produced and passed between two electrodes, a reference and a chloride ion electrode. The concentration related potential of the electrodes is fed to the microprocessor. The corresponding HCl concentration in units of grams per cubic meter is displayed on a front panel digital display. A 0 - 1 volt output is provided for a data recorder.

The analyzer performs its own internal calibration automatically at selected time intervals by using a liquid standard. Continuous self-diagnostic routines verify proper operation of the analyzer. The alphanumeric display and built-in printer provide status conditions of the analyzer, alarm functions, and identification of the cause of any malfunctions, as well as continuous updates on the concentration measurements.

Compur developed a dilution probe to be used in conjunction with the Model 4150 analyzer to sample stack emissions. The dilution probe is an extractive sampling device that produces constant sample gas dilutions at selected ratios varying from 10:1 to 100:1. (The operating range of the Compur monitoring system is decided upon in the field after the optimum dilution ratio is chosen, and then verified using an independent analyzer and calibration gases.) The dilution probe is electrically heated to 200°C (392°F) and is constructed of corrosion resistant materials. The flue gas sample line is also electrically heated (approximately 300°F).

An air jet pump within the probe acts as an in-stack dilution device by aspirating the flue gas sample through an orifice and diluting the gas sample with dry regulating air. By reducing the pressure downstream of the orifice with the aspirator air, a constant flow of flue gas sample is drawn through the orifice and mixed with the aspirator air. The orifice operates within the critical region, greatly reducing the influence of pressure fluctuations at the sampling point which tend to affect the flow of sample gas and thereby to change the dilution rate.

Calibration of the system is performed by injecting calibration gas through a transport tube to the probe, at a point upstream of the critical orifice. Thus, the calibration gas is conditioned in the same manner as the flue gas sample (i.e., filtered, diluted, and transported).

The Model 4150 analyzer continuously monitors all Model 4330 dilution system parameters, such as probe temperature, pressures, and flow rates. The analyzer's microprocessor calculates the actual HCl concentrations present in the effluent by correcting the analyzer measurements for the dilution ratio selected by the operator.

4.3 BODENSEEWERK SPECTRAN MODEL 677 IR HCl MONITORING SYSTEM

The Bodenseewerk system was used at the baghouse outlet monitoring location (see Section 5).

The Bodenseewerk 677 HCl analyzer employs the gas filter correlation (GFC) technique with the multiple optical pass cell and sampling system maintained at an elevated temperature of 180°C (356°F). HCl concentrations are recorded on a dry basis within a system range of 0-250 ppm. The analyzer measurement is made on a wet basis. Molecular interaction between HCl and water vapor in the sample gas increases the absorption of IR as water vapor content increases. This phenomenon is used to compensate for the dilution effect of water vapor in the sample gas. The Bodenseewerk 677 analyzer was configured at the factory for applications with approximately 15 percent moisture content in the effluent. Accordingly, the analyzer concentration readings correspond to a dry measurement. The vendor claims the detection limit of this instrument is 2 ppm.

GFC spectroscopy is based upon comparison of the absorption of a selected wavelength within the infrared (IR) absorption spectrum by the measured gas to that of other gases also present in the sample being analyzed. The technique is implemented by using a high concentration sample of the measured gas (i.e., HCl) as a filter for the IR radiation transmitted through the analyzer. The analyzer contains a correlation wheel that consists of two hemispherical cells, one filled with HCl and the other with N_2. Integral with the correlation wheel is the chopper pattern necessary to produce the high frequency chop required by the IR detector.

Radiation from an IR source is chopped and then passed through the gas filter, alternating between HCl and N_2 as the filter wheel rotates. The radiation then passes through a narrow bandpass interference filter and enters a multiple optical pass cell where it is absorbed by the sample gas. The IR radiation that is not absorbed then exits the sample cell and is measured by the IR detector.

The HCl gas filter produces a reference beam that cannot be further attenuated by HCl in the sample cell. The N_2 side of the filter wheel is transparent to the IR radiation and therefore produces a measure beam that can be absorbed by HCl in the cell. The chopped detector signal is modulated by the alteration between the two gas filters with an amplitude related to the concentration of HCl in the sample cell. Other gases do not cause modulation of the detector signal, because they absorb the reference and measure beams equally. Thus, the GFC system responds specifically to HCl.

The sample gas is drawn from the effluent via a heated sample pump at a rate of approximately 13 liters/minute. A coarse, fritted filter is located at the probe tip for filtering particulate matter. The sample gas is heated to approximately 180°C (356°F), and it maintains this temperature throughout the transport system and the sample cell until it is exhausted from the analyzer.

The Model 677 analyzer employs zero air and an internal sealed gas cell for zero and upscale calibration checks. The monitoring system can accept calibration gases; the gas injection point is located at the probe.

The concentration measurements in units of ppm (dry) are displayed on a front panel meter and are also recorded by a built-in strip chart recorder. A 0-1 volt output is provided for an external data-recording device.

5.0 DESCRIPTION OF THE HCl CEM SAMPLING PROGRAM

Three independent HCl continuous emission monitoring systems were employed by Entropy to measure HCl emissions continuously at (1) the spray dryer inlet, (2) the spray dryer outlet, and (3) the baghouse outlet. All three CEM systems used in the test program are complete in themselves; no time-sharing was done. (See Figures 5.1 and 5.2.) Both the spray dryer outlet and the baghouse outlet monitoring systems were measuring low concentrations of HCl (i.e., generally < 100 ppm). There are no data available on the performance of the Compur HCl CEMS for monitoring low HCl emissions to support the accuracy of the Compur in this concentration range. The Compur has not yet been operated and tested in the EPA's HCl CEM evaluation program at a source of controlled HCl emissions. The Bodenseewerk HCl CEMS has been operated at the outlet of HCl control equipment during previous studies. Independent accuracy audits have provided verification of the Bodenseewerk measurement data in terms of accuracy at the low concentration levels.

A brief description of each HCl CEM system by sampling location is outlined in the sections that follow.

5.1 SPRAY DRYER INLET - THERMO ELECTRON HCl MONITORING SYSTEM

The Thermo Electron (TECO) monitoring system was comprised of a Model 15 analyzer (operated on the 0-20 ppm analyzer range), a Model 200 probe control unit, and a dilution probe (45:1 dilution ratio). This system was employed to measure HCl emissions at the spray dryer inlet location (see Figures 5.2 and 5.3). The operating range of the measurement system was 0-900 ppm HCl. A three point linearity check was performed at the beginning of the test program using the following gases: 0 ppm, 428 ppm, and 881 ppm HCl. Prior to each test run, a two-point calibration was performed utilizing a zero gas and one upscale HCl gas concentration (428 ppm). The gases were injected through the entire sample handling system, which includes the dilution probe. At the conclusion of the test run, the same two gases were again injected through the measurement system to check for drift; no adjustments to the system were made. The calibration drift corrections to the HCl measurement data were made according to the procedures in Method 6C.

The analyzer output signal was recorded by a computerized data acquisition system.

The TECO probe dilution ratio was verified at the beginning of the test program by flowing a CO calibration gas (Protocol No. 1 certification) through the dilution system and recording the response displayed by a calibrated CO analyzer.

Since the TECO system measures HCl on a wet basis, the results were corrected to a dry basis using Method 4 results provided by MRI.

5.2 SPRAY DRYER OUTLET (MIDPOINT) - COMPUR HCl MONITORING SYSTEM

The Compur Model 4150 HCl analyzer with heated dilution probe (dilution ratio 40 to 1) was used to measure the HCl concentrations at the spray dryer

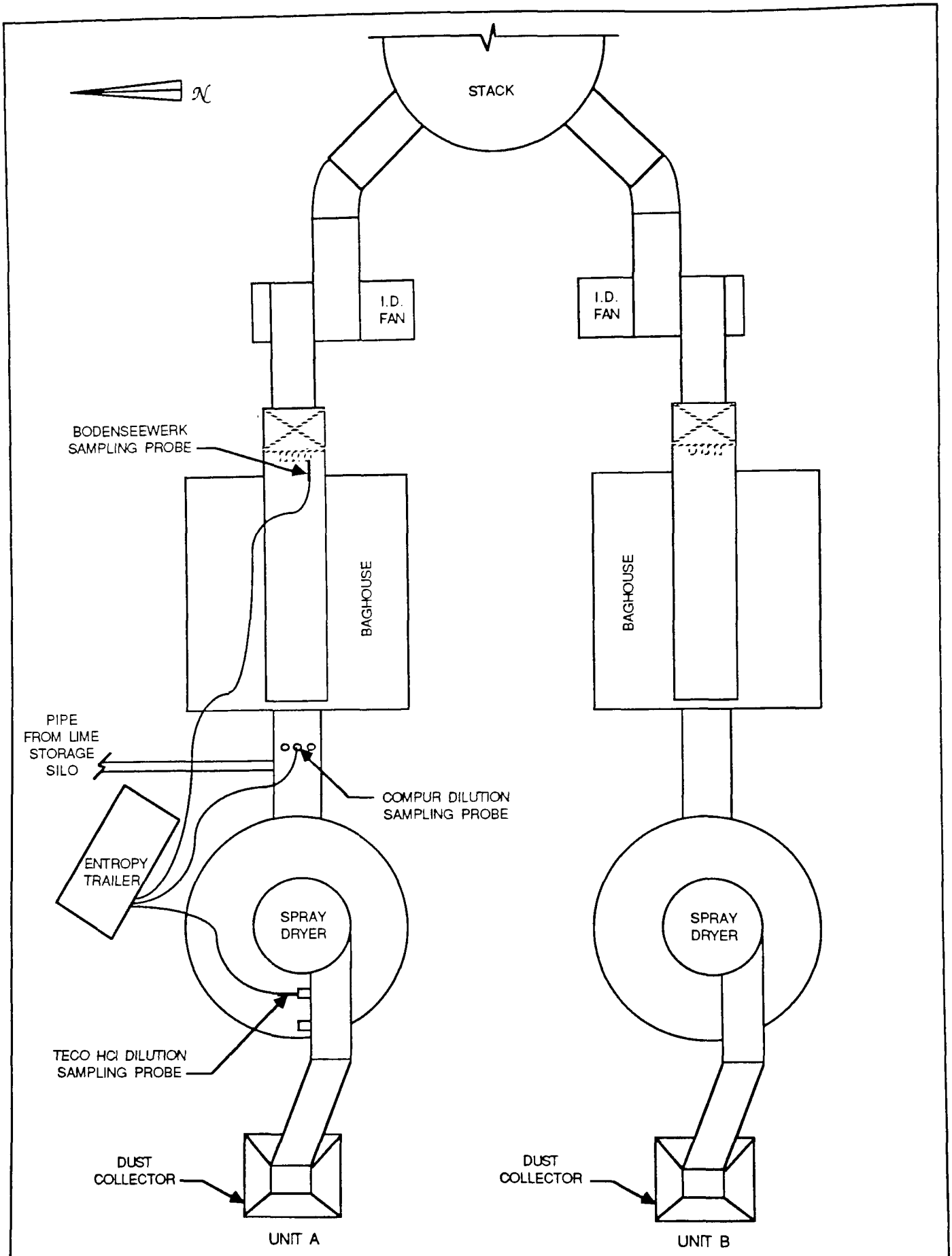

FIGURE 5.1. LOCATION OF TESTING TRAILER AND SAMPLE LINES

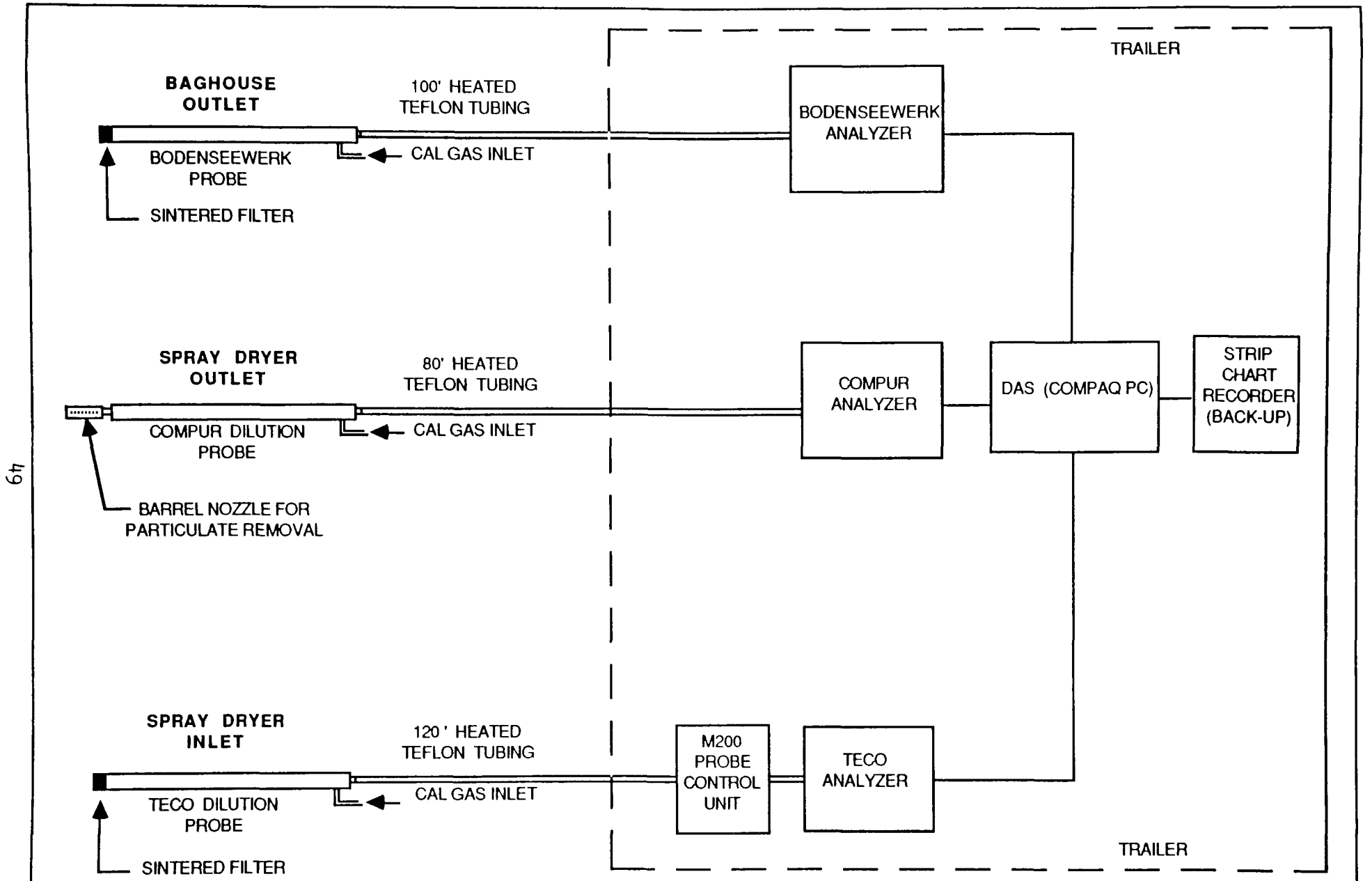

FIGURE 5.2. FIELD EVALUATION SET- UP.

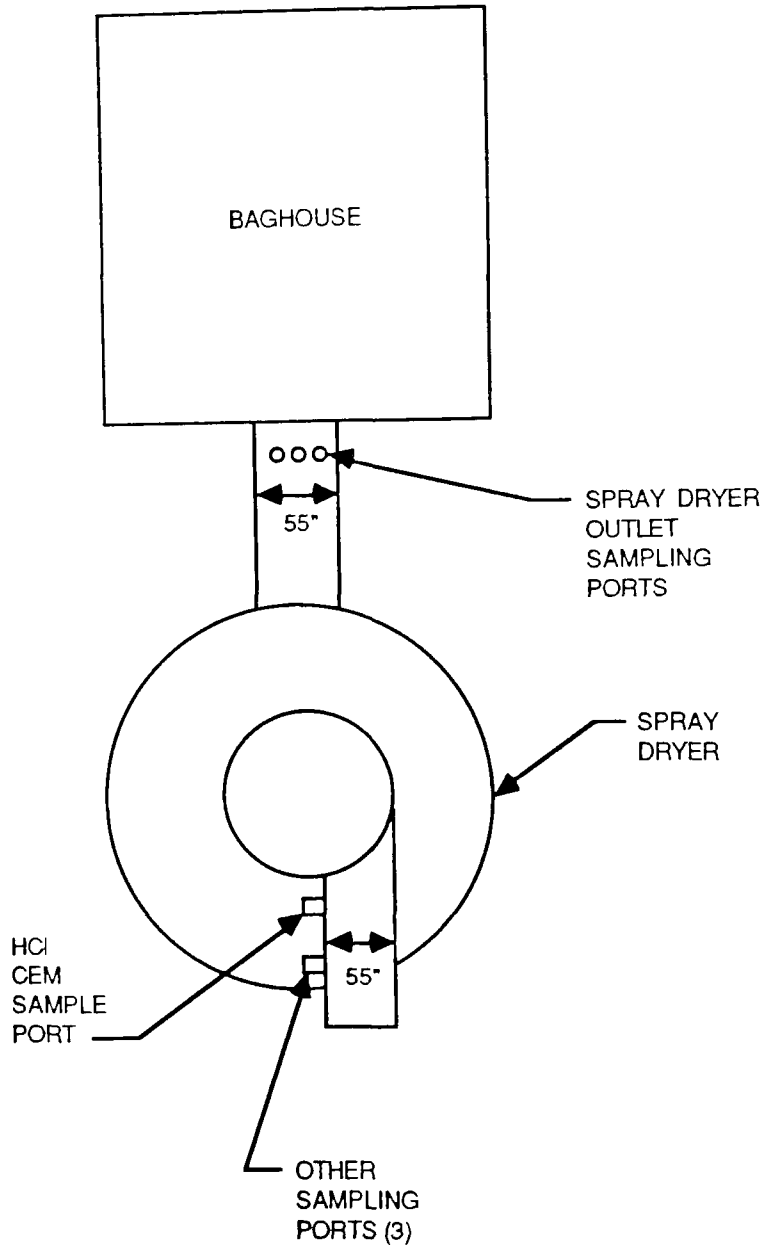

FIGURE 5.3. TOP VIEW OF SPRAY DRYER INLET AND OUTLET SAMPLING LOCATIONS.

outlet (midpoint) location (see Figures 5.2 and 5.3). The operating range of the Compur monitoring system was 0 - 268 ppm. Collection of representative samples at the spray dryer outlet location was particularly difficult because of the high particulate matter concentration in the effluent stream upstream of the baghouse. The particulate matter consisted of both fly ash and evaporated lime slurry, which reacts with the sample gas stream to remove HCl, thereby resulting in lower than actual HCl gas concentration measurements. To minimize these effects, specialized sampling approaches were developed to separate the reactive particulate from the sample gas stream.

Unexpected delays encountered during the equipment set-up and plant process operating problems reduced the available time to investigate each of the four specialized sampling approaches proposed in the work plan. The only approach investigated (due to these time constraints) relied on a barrel nozzle attached to the end of the Compur dilution probe (see Figures 5.2, 5.4, and 5.5). The barrel nozzle is a totally passive device that minimizes the amount of particulate that accumulates on the filters within the Compur probe. The barrel nozzel attached to the Compur probe was used during the set-up of the spray dryer outlet HCl monitoring system and for acquiring preliminary measurements. This system was operated over a four hour sampling period and was found to be reliable and able to provide particulate separation which resulted in the accumulation of only a minimum amount of particulate. The orientation of the holes in the barrel was 90° to the angle of effluent flow. HCl calibration gas was then introduced into the sampling system immediately upstream of the glass wool in the probe tip to determine if the collected particulate would react with the HCl calibration gas and create a low bias in the measurement. A typical response to the calibration gas injection was observed with no apparent increase in the response time of the measurement system to reach the expected value, thus indicating that the particulate may be unreactive by the time it reaches the glass wool.

At the conclusion of each test day, the probe was removed from the duct and disassembled for inspection and cleaning.

A three-point linearity check was performed at the beginning of the test program using the following gases: 0 ppm, 94 ppm, and 221 ppm HCl. Prior to each test run, a two-point calibration was performed utilizing a zero gas and one upscale HCl gas concentration (94 ppm). The gases were injected through the entire sample handling system, which includes the dilution probe. At the conclusion of the test run, the same two gases were again injected through the measurement system to check for drift; no adjustments to the system were made. The calibration drift corrections to the HCl measurement data were made according to the procedures in Method 6C.

The Compur probe dilution ratio was verified at the beginning of the test program by flowing a CO calibration gas (Protocol No. 1 certification) through the dilution system and recording the response displayed by a calibrated CO analyzer.

The analyzer output signal was recorded by a computerized data acquisition system. Since the Compur system measures HCl on a wet basis, the results were corrected to a dry basis using Method 4 results provided by MRI.

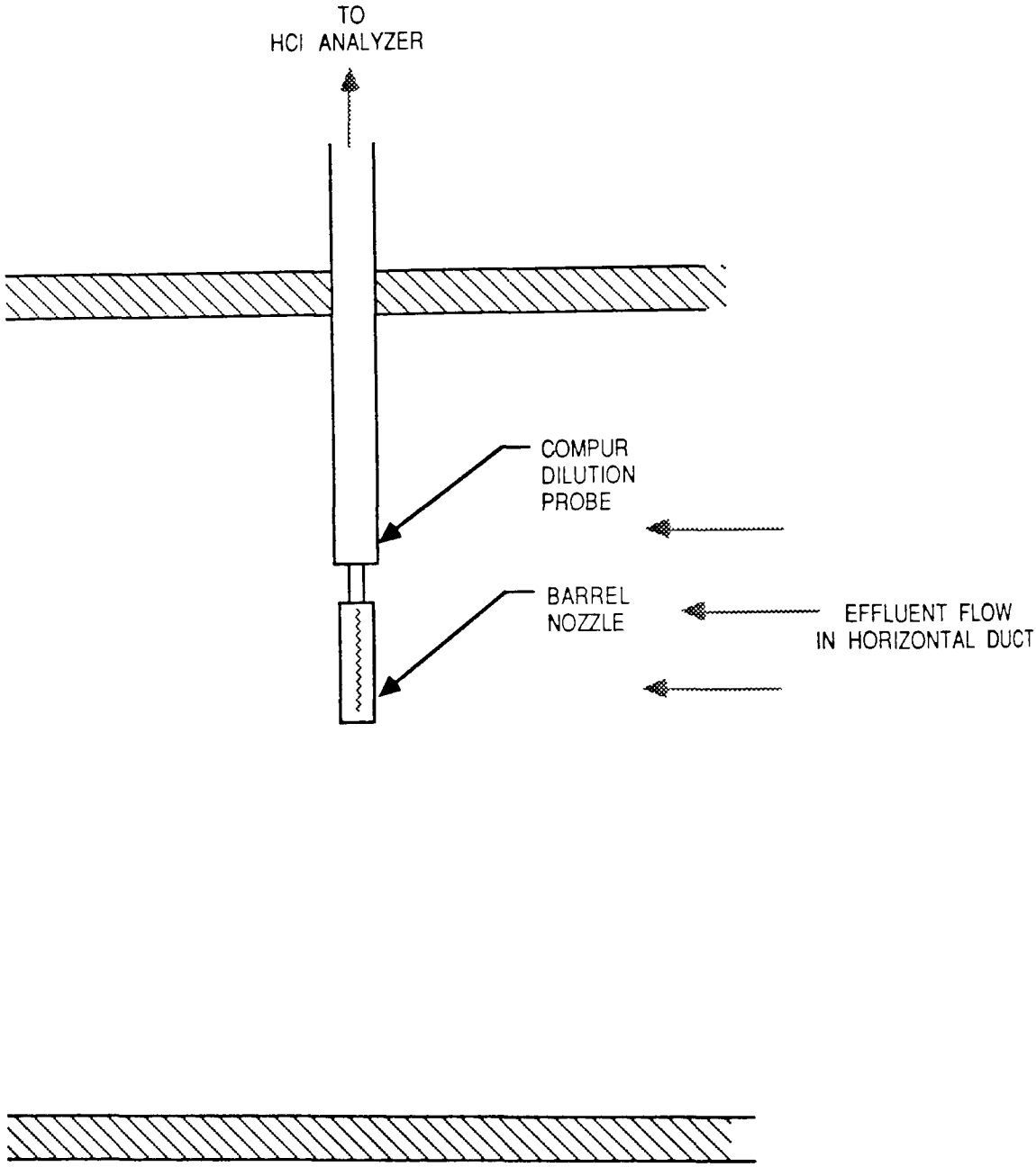

FIGURE 5.4 SPRAY DRYER OUTLET SAMPLING SYSTEM; PASSIVE NOZZLE

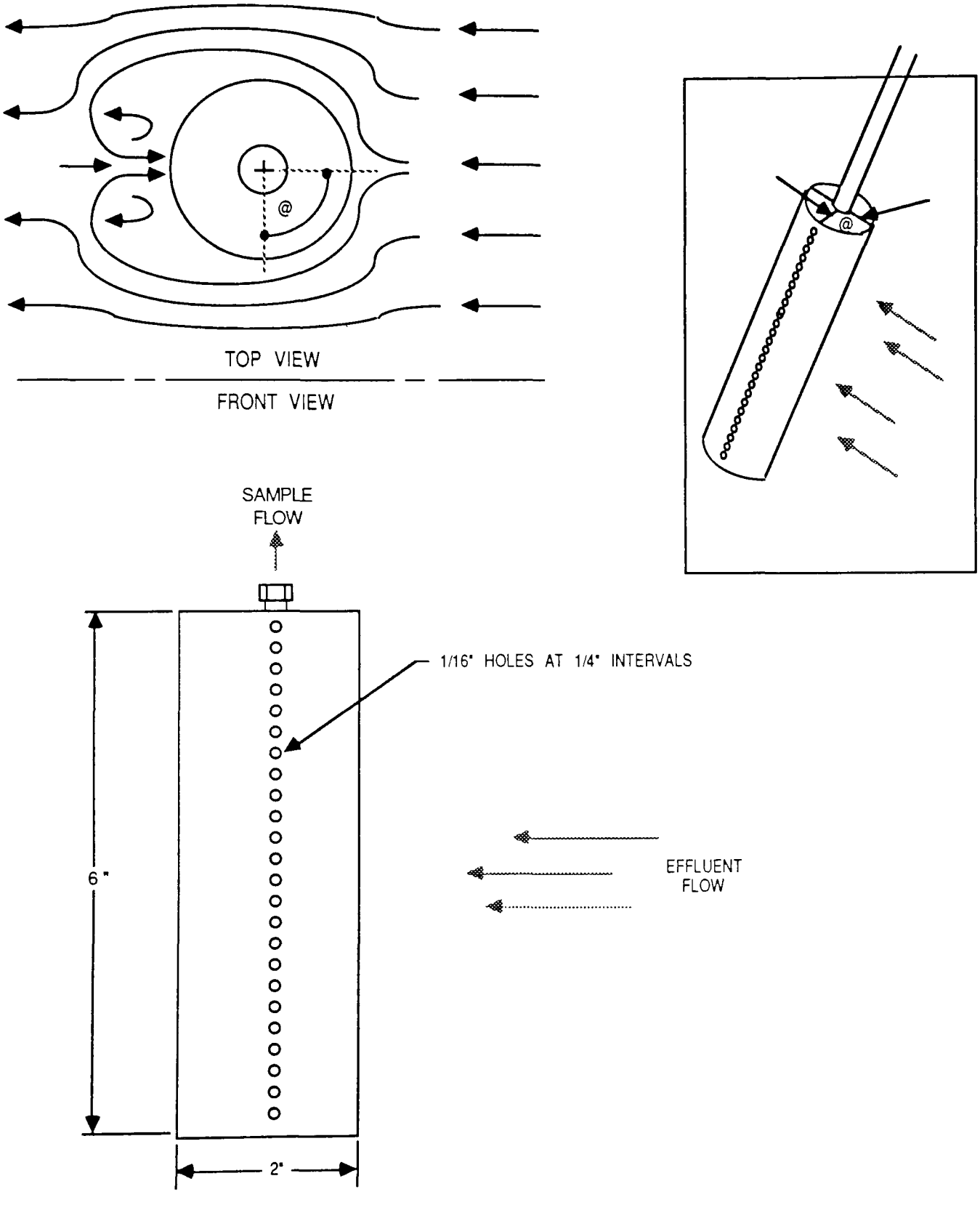

FIGURE 5.5 BARREL NOZZLE

5.3 BAGHOUSE OUTLET - BODENSEEWERK HCl MONITORING SYSTEM

The Bodenseewerk Model 677 IR HCl analyzer was employed to meaure HCl concentrations within a range of 0-250 ppm HCl at the baghouse outlet location (see Figures 5.2 and 5.6) A three point linearity check was performed at the beginning of the test program using the following gases: 0 ppm, 47 ppm, and 94 ppm HCl. Prior to each test run, a two point calibration was performed utilizing a zero gas and one upscale HCl gas concentration (47 ppm). The gases were injected through the entire sample handling system. At the conclusion of the test run, the same two gases were again injected through the measurement system to check for drift; no adjustments to the system were made. The calibration drift corrections to the HCl measurement data were made according to the procedures in Method 6C.

The analyzer output signal was recorded by a computerized data acquisition system.

5.4 DATA ACQUISITION SYSTEM

The data acquisition system (DAS) developed by Entropy uses a Compaq Portable Personal Computer with a 10 MB hard disk and an internal 12-bit analog-to-digital converter with a 16 channel multiplexer. Surge supressors are provided to minimize data loss in the event of electrical disturbances. In addition to providing an instantaneous display of analyzer responses, the DAS averaged the measurement data and documented analyzer calibrations. The test results and calibrations were stored on the hard disk and printed on an Epson dot matrix printer. Strip chart recorders were employed as a backup system. The HCl emissions from the three HCl analyzer measurement locations were recorded as 1-minute, 30-minute, and hourly averages.

Each day, the stored measurement data generated by Entropy's testing were provided to MRI on a floppy disk.

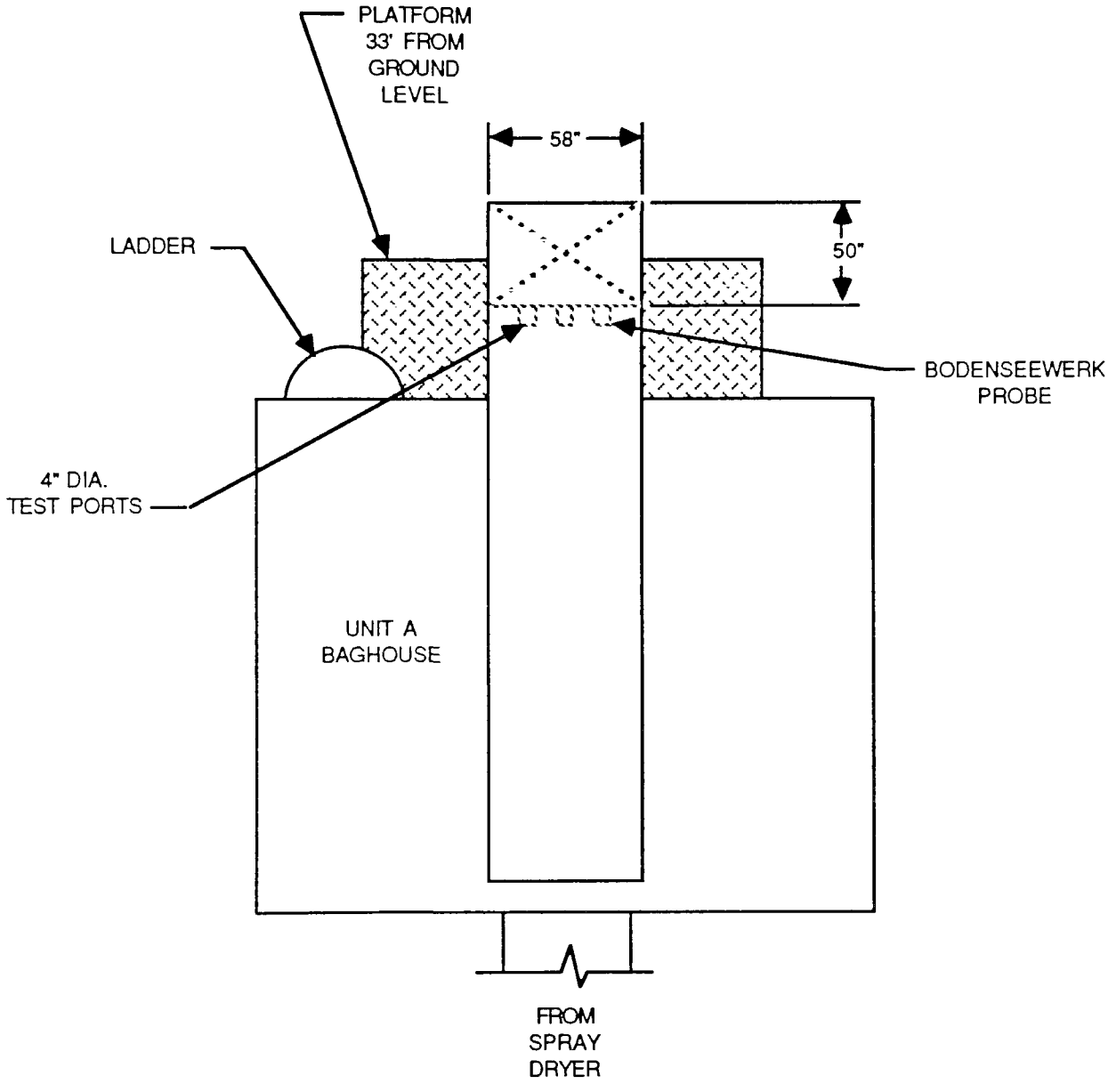

FIGURE 5.6. LOCATION OF SAMPLING PROBE AT THE BAGHOUSE OUTLET

6.0 QUALITY ASSURANCE/QUALITY CONTROL

The quality assurance/quality control (QA/QC) activities for this test program were previously described in detail in the "QA/QC Project Plan." The goals of the quality assurance activities were to quantify data accuracy and precision and to maximize data capture. Presently, there are no EPA test methods or performance specifications for operating HCl monitoring systems or for conducting wet-chemical sampling for HCl. Only recently have relatively stable HCl calibration gases become available. The results of the QA/QC activities performed are described below.

6.1 HCl SAMPLING SYSTEM INSPECTION

At the start of each test day, an inspection of each component of the HCl sampling systems was conducted. The daily check lists that were filled out are contained in Appendix C. Due to a build-up of particulate matter in the midpoint sampling system, the barrel nozzle device on the Compur dilution probe was cleaned daily and the glass wool was replaced. The TECO dilution probe glass critical orifice was also inspected and the glass wool in the probe tip replaced daily.

6.2 LINEARITY CHECKS AND MIDRANGE QC CHECKS

A three-point linearity check was performed on each of the three monitoring systems at the beginning of the test program. These linearity checks produced results that were all within the ≥ 0.995 correlation coefficient (r) acceptance criterion. The calibration gas concentrations and the monitor responses are presented in Table 6.1.

The midrange QC checks proposed in the QA/QC Project Plan to be performed at various times during the test program were not conducted because there were no independent HCl audit calibration gases provided.

6.3 CALIBRATIONS AND DRIFT CALCULATIONS

The zero and span calibration drift was calculated for each HCl monitoring system for each test run. The results of the calibration drift checks are presented in Table 6.2. All of the results were less than the 20% of span drift limit specified in the Quality Assurance Project Plan. Prior to each test run, a two-point calibration was performed utilizing a zero gas and one upscale HCl calibration gas. The gases were injected through the entire sample handling system which includes the probe. At the conclusion of the test run, the same two gases were injected through the measurement system to check for drift; no adjustments to the system were made. The calibration drift corrections to the HCl measurement data were made according to the procedures in Method 6C.

The calibration summary sheets for each test run are contained in Appendix B.

TABLE 6.1.

HCl CEM LINEARITY CHECK (3-Point)

TECO (12/9/87)			Compur (12/8/87)			Bodenseewerk (12/6/87)		
Gas Conc. (ppm HCl)	CEM Response (ppm HCl)	Correlation* Coefficient	Gas Conc. (ppm HCl)	CEM Response (ppm HCl)	Correlation* Coefficient	Gas Conc. (ppm HCl)	CEM Response (ppm HCl)	Correlation* Coefficient
0	4		0	1		0	0	
428	438	r = 0.999	94	93	r = 0.998	47	42	r = 0.998
881	890		221	248		94	95	

*Acceptance criteria is $r \geq 0.9950$

TABLE 6.2.
CALIBRATION DRIFT RESULTS FOR EACH TEST RUN

Run No.	TECO Spray Dryer Inlet		Compur Spray Dryer Outlet		Bodenseewerk Baghouse Outlet	
	Zero (% span)	Span (% span)	Zero (% span)	Span (% span)	Zero (% span)	Span (% span)
1	6.0	8.9	0.7	1.9	0	1.6
2	1.1	2.1	0.4	-7.1	-0.2	1.2
3	0.8	2.7	0.7	6.3	-0.4	0.8

Note: Measurement data were adjusted assuming linear drift, as long as drift was less than 20% of span. If drift exceeded 20% of span, the measurement data were rejected.

6.4 WET CHEMICAL SAMPLING FOR PERFORMANCE EVALUATION AUDITS

Entropy plannned to conduct performance evaluation audits to determine the accuracy of each measurement system prior to the test program. These relative accuracy audits were to be performed on each of the three HCl monitoring systems by conducting three runs of wet chemical impinger sampling for HCl simultaneously with HCl monitoring during preliminary testing. However, several problems reduced the available time to perform all of the proposed pre-test checks/audits prior to the start of the test program. Unexpected delays were encountered during the equipment set-up/start-up period (the electrical contractor was slow to connect electrical power to the Entropy equipment), the plant was not operating for 1-1/2 days during the scheduled three-day preliminary testing period, and numerous process difficulties caused delays throughout the test program. These problems were discussed with the EPA Task Manager, and he in turn informed Entropy that it would be acceptable to perform the relative accuracy audits during the testing program when time permitted.

The relative accuracy audits on the HCl CEMSs at the spray dryer inlet and outlet locations could only be performed after each test program run because all the available sample ports were being used during these test runs. Also, the areas around the sample locations were too small to accomodate testing personnel and equipment while both MRI and Entropy were working simultaneously.

The process operating problems that delayed and disrupted the test program sampling runs also prohibited the performance of the performance audits at the spray dryer inlet and outlet locations.

The relative accuracy audit was performed at the baghouse outlet location. The wet chemical impinger sampling was performed exactly as specified in the work plan (see Appendix I for the sampling/analytical procedures), with a sampling period of 20 minutes. The impinger results, however, are questionable. The impinger sample results for each run were 1 ppm HCl, while the averaged Bodenseewerk measurements over the same three sampling periods were 6 ppm, 11 ppm, and 43 ppm.

On-site titration analyses were not performed on these outlet samples because the HCl effluent concentrations at this location were expected to be below the quantifiable detection limit of 20 ppm HCl for the mercuric nitrate titration. Therefore, the low results were not discovered until the IC analysis of the split samples was performed at the Entropy laboratory after the test program was completed. The reason for the low impinger measurements is not known.

Previous testing conducted at similar municipal waste incinerators has revealed excellent agreement between the impinger sample results and Bodenseewerk measurements, even at the low effluent concentrations (<10 ppm HCl). Since the impinger results are questionable, they cannot be used to validate the Bodenseewerk measurement data. The previous comparative measurements indicate there should be no reason to suspect the validity or accuracy of the Bodenseewerk measurements.

APPENDIX A.

Test Program One-Minute Data Printouts

- Run 1
- Run 2
- Run 3

CONTINUOUS EMISSIONS MONITORING SET--UP

SOURCE: HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY

DATE: 12-09-1997 TIME: 09:44

A/D CHAN	DESCRIP	UNITS	SPAN	INPUT VOLTAGE	ZERO OFFSET
1	INLET	wetHCl	700	10.00 V	0%
2	MID	wetHCl	268	0.93 V	0%
3	OUTLET	dryHCl	250	0.21 V	0%

AVERAGING PERIODS: 30 MINUTES,
NO EMISSION RATE CALCULATIONS

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
10:32	5.7	2.5	0.3
10:33	2.1	2.1	-0.1
10:34	4.6	2.1	0.1
10:35	1.8	1.9	0.4
10:36	3.9	1.8	0.5
10:37	3.3	1.7	0.2
10:38	3.5	1.6	0.6
10:39	7.5	1.6	0.1
10:40	10.9	1.6	0.1
10:41	14.9	1.7	-0.3
10:42	14.9	1.7	-0.5
10:43	9.7	1.7	0.2
10:44	11.1	1.8	-0.4
10:45	-1.8	1.8	-0.4
10:46	2.4	1.8	0.7
10:47	-3.6	1.8	0.7
10:48	-1.7	2.0	0.8
10:49	-0.5	2.2	72.2
10:50	4.3	2.2	12.0
10:51	1.8	2.1	0.6
10:52	5.6	2.1	-0.0
10:53	3.1	2.0	0.3
10:54	3.4	1.9	1.1
10:55	6.3	2.0	1.0
10:56	22.[illegible]	2.0	0.1
10:57	122.7	1.9	2.5
10:58	225.3	1.9	1.2
10:59	275.3	1.9	1.1
11:00	317.4	1.9	0.8

Zero air

K-9983

428 ppm HCl

AVERAGE VALUES FOR THE LAST HOUR: 29 MINUTES OF VALID DATA

11:00	[illegible]	1.9	[illegible]
11:01	335.2	1.9	0.6
11:02	358.0	2.0	-0.1
11:03	372.4	2.0	-0.4
11:04	383.1	2.0	0.6
11:05	388.6	2.0	0.7
11:06	401.2	2.0	0.9
11:07	404.5	2.0	0.9
11:08	407.1	2.0	1.1
11:09	412.3	2.0	0.4
11:10	422.6	2.0	0.5
11:11	415.7	2.0	98.0
11:12	426.4	2.0	101.3
11:13	424.2	2.0	-0.4
11:14	426.7	2.0	0.2
11:15	429.4	2.0	3.5
11:16	434.7	2.0	44.3
11:17	438.4	2.0	48.8
11:18	431.9	2.0	49.2
11:19	438.7	2.0	48.3
11:20	439.8	2.0	48.4
11:21	383.4	2.0	16.4

Bodenseewerk auto cal sequence 30 minutes

Zero

internal span cell

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerke CHAN 3 OUTLET dryHCl
11:22	213.2	2.0	-6.7
11:23	150.4	2.0	0.2
11:24	159.6	2.0	-0.2
11:25	457.3	2.1	0.2
11:26	466.4	2.0	-0.2
11:27	570.0	2.1	1.4
11:28	689.8	2.0	4.2
11:29	763.1	2.1	5.0
11:30	795.9	2.1	5.6
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
11:30	428.0	2.0	15.7
11:31	811.6	2.1	5.1
11:32	826.8	2.1	5.1
11:33	833.9	2.1	5.2
11:34	840.3	2.2	5.3
11:35	848.3	2.2	4.8
11:36	856.2	2.2	5.3
11:37	863.6	2.2	5.0
11:38	861.5	2.2	5.2
11:39	868.5	2.1	5.1
11:40	870.6	2.1	4.4
11:41	872.0	2.2	4.3
11:42	875.3	2.1	4.2
11:43	878.7	2.1	4.9
11:44	879.4	2.2	5.1
11:45	879.3	2.2	5.1
11:46	880.4	2.2	5.0
11:47	886.9	2.1	4.3
11:48	884.9	2.0	4.6
11:49	890.2	2.0	4.8
11:50	886.1	2.0	4.9
11:51	894.0	2.0	5.2
11:52	811.6	1.9	5.1
11:53	518.1	1.7	5.6
11:54	185.9	1.6	5.8
11:55	115.4	1.6	3.9
11:56	73.9	1.7	0.5
11:57	57.0	1.8	1.0
11:58	47.9	1.8	0.1
11:59	46.7	1.8	-0.2
12:00	39.2	1.9	3.9
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
12:00	669.5	2.0	4.3
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
12:00	548.7	2.0	10.0
12:01	33.0	1.8	19.3
12:02	38.6	1.9	32.5
12:03	28.9	1.9	40.9
12:04	32.1	1.8	44.6

K-9860 881 ppm HCl

zero air

end internal cal

baghouse outlet effluent sample

dynamic cal check ~~44~~ 47 ppm HCl (K-9933)

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
12:05	33.4	1.8	47.9
12:06	23.7	1.7	49.2
12:07	23.5	1.7	50.5
12:08	27.8	1.7	50.7
12:09	27.6	1.5	51.3
12:10	25.5	1.4	50.6
12:11	27.0	1.2	50.8
12:12	24.4	1.1	50.8
12:13	20.9	1.1	[illegible]
12:14	20.1	1.1	21.0
12:15	25.1	1.1	9.8
12:16	19.6	1.1	6.9
12:17	20.8	1.1	5.0
12:18	21.8	1.1	4.4
12:19	26.0	1.1	3.2
12:20	20.6	1.1	3.1
12:21	20.8	1.1	2.6
12:22	22.6	1.0	1.1
12:23	18.1	1.0	2.2
12:24	18.4	1.0	1.5
12:25	18.3	0.9	1.5
12:26	22.9	1.0	1.3
12:27	25.6	1.1	1.3
12:28	21.7	1.4	1.2
12:29	15.4	1.6	1.3
12:30	13.5	1.9	1.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
12:30	23.9	1.3	21.6
12:31	12.2	2.2	0.7
12:32	15.8	201.7	0.9
12:33	18.4	225.4	0.6
12:34	10.6	200.1	0.8
12:35	19.1	194.8	0.7
12:36	17.3	190.5	1.0
12:37	10.2	187.3	1.4
12:38	16.3	184.9	1.0
12:39	15.4	184.2	0.9
12:40	12.5	209.8	0.9
12:41	17.3	217.6	0.2
12:42	12.7	222.4	-0.0
12:43	12.7	226.0	0.2
12:44	16.2	228.9	1.1
12:45	20.2	229.1	0.7
12:46	17.1	188.6	0.4
12:47	20.1	183.4	0.7
12:48	16.3	181.1	0.7
12:49	10.5	179.7	0.3
12:50	17.7	178.6	0.6
12:51	13.8	177.9	-0.7
12:52	12.9	206.0	-0.6
12:53	18.9	221.7	0.6
12:54	16.0	227.3	0.3
12:55	10.3	230.5	0.7

Zero air

Zero air

Cont. 47 ppm HCl cal gas injection

Zero air

internal cal

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
12:56	13.2	232.3	0.7
12:57	16.0	233.6	0.8
12:58	18.0	193.4	0.5
12:59	12.3	181.6	0.5
13:00	12.0	179.3	0.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
13:00	15.1	196.7	0.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
13:00	19.5	99.0	11.1
13:01	17.1	177.9	-0.3
13:02	18.2	177.2	-0.4
13:03	18.2	181.1	0.7
13:04	16.2	213.1	0.5
13:05	12.1	221.4	0.5
13:06	14.2	226.6	1.2
13:07	16.3	53.4	0.2
13:08	19.1	51.7	0.3
13:09	16.1	80.9	0.2
13:10	15.1	95.3	0.2
13:11	22.2	107.3	0.1
13:12	20.8	93.7	0.3
13:13	9.2	204.5	0.2
13:14	16.0	226.0	0.3
13:15	16.4	230.9	-0.6
13:16	15.7	233.2	0.5
13:17	11.5	234.4	0.7
13:18	12.5	235.2	0.3
13:19	18.3	186.3	0.0
13:20	18.9	176.1	0.5
13:21	11.2	208.5	0.7
13:22	14.1	80.1	4.7
13:23	12.8	85.2	5.6
13:24	20.1	100.0	5.9
13:25	14.6	103.3	5.9
13:26	12.6	152.4	5.8
13:27	21.0	233.8	6.1
13:28	11.4	236.1	6.6
13:29	15.4	187.9	6.4
13:30	12.1	176.5	6.3
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
13:30	15.6	165.7	2.0
13:31	18.7	175.8	10.7
13:32	13.9	216.3	8.7
13:33	13.5	112.3	8.5
13:34	18.9	66.8	8.4
13:35	18.3	96.3	8.0
13:36	13.1	108.2	8.2
13:37	14.0	107.1	8.7
13:38	21.2	108.1	10.8

zero air

internal auto cal

zero air

effluent sample

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
13:39	16.2	43.6	12.3
13:40	14.9	9.7	14.6
13:41	17.1	63.7	16.2
13:42	21.4	234.2	17.6
13:43	18.8	224.4	19.7
13:44	15.2	178.7	23.4
13:45	17.3	176.8	23.4
13:46	12.5	176.0	13.7
13:47	17.5	216.4	13.9
13:48	18.9	107.4	12.4
13:49	17.3	1.8	11.2
13:50	24.6	0.8	14.3
13:51	21.0	0.1	19.3
13:52	21.2	0.2	16.6
13:53	15.8	0.1	17.1
13:54	19.5	0.1	18.3
13:55	18.2	0.2	17.1
13:56	20.3	0.2	14.6
13:57	19.3	96.0	13.8
13:58	20.9	235.8	13.0
13:59	19.5	175.7	12.2
14:00	18.0	173.1	11.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:00	17.9	103.5	14.0
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
14:00	16.8	134.6	8.0
14:01	13.8	44.2	12.1
14:02	20.2	94.5	11.4
14:03	18.3	104.2	10.4
14:04	16.2	112.9	10.1
14:05	19.4	111.7	9.4
14:06	23.7	115.1	9.0
14:07	22.2	141.7	9.1
14:08	18.8	118.4	9.5
14:09	20.8	90.4	11.7
14:10	20.3	0.1	15.6
14:11	17.1	0.2	14.6
14:12	11.2	0.2	13.9
14:13	18.5	0.1	14.2
14:14	20.6	0.1	13.7
14:15	12.3	70.3	12.6
14:16	12.5	237.3	11.6
14:17	13.2	180.9	10.8
14:18	10.9	173.6	10.9
14:19	15.8	26.1	9.2
14:20	15.6	87.1	8.1
14:21	15.4	94.9	7.8
14:22	12.4	100.1	7.8
14:23	19.7	99.7	9.3
14:24	13.1	99.4	12.6
14:25	16.5	110.9	11.7

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
14:26	9.9	105.4	12.9
14:27	20.7	89.9	14.1
14:28	16.4	87.9	14.1
14:29	20.0	86.0	14.0
14:30	20.9	86.2	13.6
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:30	16.9	89.0	11.5
14:31	15.2	87.2	13.0
14:32	21.4	87.4	10.8
14:33	20.1	87.1	10.2
14:34	18.3	87.0	10.1
14:35	16.5	88.1	9.3
14:36	23.2	88.6	8.8
14:37	19.1	89.7	8.7
14:38	23.2	89.1	9.1
14:39	25.5	88.3	9.2
14:40	17.1	89.3	9.6
14:41	18.0	26.0	10.9
14:42	24.1	12.1	11.5
14:43	26.8	7.2	11.9
14:44	28.2	5.2	12.6
14:45	23.5	4.2	12.5
14:46	25.2	3.6	11.1
14:47	20.7	3.2	9.7
14:48	20.9	4.2	9.3
14:49	35.2	14.0	8.3
14:50	122.8	19.0	8.0
14:51	233.4	25.2	9.0
14:52	297.4	41.3	8.2
14:53	313.9	60.9	7.6
14:54	316.8	72.9	8.7
14:55	301.1	72.7	9.1
14:56	323.2	76.8	9.2
14:57	350.6	80.7	10.9
14:58	395.4	99.3	4.8
14:59	428.1	109.6	10.3
15:00	446.1	102.5	12.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:00	131.7	56.7	9.8
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
15:00	74.3	72.9	10.7
15:01	458.9	84.8	11.8
15:02	466.4	61.1	11.0
15:03	453.2	42.0	9.7
15:04	463.6	34.1	11.2
15:05	447.4	27.3	15.9
15:06	402.1	24.1	11.8
15:07	389.1	20.2	10.1
15:08	367.0	17.6	10.7

Zero air

Cont. 94 ppm HCl cal gas

baghouse outlet effluent

94 ppm HCl

effluent

effluent

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
15:09	356.6	20.5	8.5
15:10	357.6	33.9	7.7
15:11	411.2	57.6	7.5
15:12	431.0	64.4	7.9
15:13	444.7	54.0	8.5
15:14	451.1	34.9	7.9
15:15	483.0	22.0	7.3
15:16	480.2	15.9	7.2
15:17	505.2	12.7	7.4
15:18	502.2	10.8	6.9
15:19	476.6	9.7	6.6
15:20	447.6	9.4	6.4
15:21	451.8	10.4	7.1
15:22	447.9	15.4	7.1
15:23	425.1	26.0	7.8
15:24	436.0	41.7	8.8
15:25	445.7	63.7	8.5
15:26	468.3	78.4	8.1
15:27	478.2	81.6	8.2
15:28	461.4	67.1	8.1
15:29	436.4	43.9	7.9
15:30	438.7	26.7	7.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:30	442.8	37.1	8.7
15:31	458.8	18.9	6.6
15:32	457.0	14.4	7.0
15:33	468.7	11.6	6.6
15:34	510.1	10.7	6.4
15:35	529.1	11.6	82.0
15:36	533.4	17.7	18.4
15:37	501.4	32.0	8.3
15:38	493.1	54.6	7.6
15:39	471.2	76.4	8.0
15:40	458.3	80.2	9.3
15:41	468.1	78.3	10.6
15:42	466.2	61.6	9.5
15:43	458.6	42.7	8.1
15:44	443.0	30.2	7.8
15:45	425.5	23.4	7.5
15:46	431.2	20.6	7.0
15:47	444.2	17.2	7.2
15:48	458.2	16.0	8.5
15:49	433.3	17.4	8.2
15:50	444.1	21.4	7.9
15:51	457.2	29.7	9.5
15:52	453.6	44.9	10.9
15:53	432.0	62.4	12.3
15:54	448.1	82.0	11.0
15:55	456.5	91.9	11.1
15:56	463.4	85.9	10.9
15:57	471.2	68.8	11.3
15:58	470.9	47.7	10.1
15:59	475.5	36.7	9.2

Run #1
Started @ 1530

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
16:00	500.9	31.5	7.8
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:00	466.1	41.3	11.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
16:00	454.4	39.2	10.1
16:01	490.0	26.3	8.3
16:02	513.8	26.9	7.9
16:03	544.7	28.5	8.2
16:04	589.1	35.5	7.8
16:05	583.5	56.1	8.6
16:06	549.8	79.1	9.1
16:07	550.6	120.3	10.6
16:08	537.4	121.2	12.6
16:09	503.2	103.8	12.8
16:10	474.4	81.0	13.7
16:11	455.8	55.3	11.5
16:12	454.7	38.8	10.2
16:13	505.2	32.6	8.5
16:14	552.9	33.9	7.5
16:15	561.4	35.2	7.7
16:16	589.3	42.2	7.4
16:17	592.6	53.5	7.8
16:18	573.4	60.1	8.7
16:19	574.8	78.8	10.0
16:20	563.0	109.6	12.0
16:21	548.5	128.5	13.6
16:22	547.1	148.4	13.0
16:23	540.7	146.1	12.8
16:24	552.3	127.1	12.4
16:25	548.9	101.4	12.2
16:26	531.1	69.2	10.7
16:27	504.7	47.7	8.8
16:28	523.3	40.5	8.7
16:29	516.3	35.6	8.6
16:30	519.9	31.5	7.9
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:30	536.4	69.8	10.0
16:31	545.2	31.8	8.2
16:32	534.5	37.2	8.6
16:33	514.4	43.2	9.7
16:34	488.1	51.1	9.8
16:35	469.1	60.5	11.1
16:36	479.5	75.4	10.7
16:37	480.4	90.9	10.0
16:38	478.4	92.5	9.6
16:39	488.2	90.1	10.0
16:40	494.3	80.6	10.2
16:41	496.6	68.5	9.8
16:42	505.2	51.5	9.2

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
16:43	501.9	42.5	8.6
16:44	499.3	39.0	8.3
16:45	518.4	36.3	7.4
16:46	513.9	37.4	7.6
16:47	485.1	40.5	8.1
16:48	471.6	46.0	8.7
16:49	463.0	53.9	9.3
16:50	463.7	67.9	11.2
16:51	479.8	91.5	11.2
16:52	498.1	107.7	10.6
16:53	490.1	114.9	11.1
16:54	512.3	136.5	11.2
16:55	552.5	108.4	10.5
16:56	587.6	99.5	10.3
16:57	621.7	91.5	9.6
16:58	680.4	105.0	8.4
16:59	775.4	134.3	8.6
17:00	887.2	183.3	8.4
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:00	532.5	77.0	9.5
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
17:00	534.5	73.4	9.8
17:01	791.6	192.2	9.3
17:02	669.2	145.2	9.3
17:03	631.3	124.3	9.2
17:04	692.3	174.9	10.1
17:05	753.7	264.7	12.6
17:06	790.2	268.7	17.2
17:07	751.6	268.7	22.9
17:08	687.6	260.5	23.3
17:09	622.8	176.5	21.0
17:10	602.2	119.4	16.7
17:11	598.4	98.9	13.3
17:12	584.0	77.5	11.2
17:13	603.3	77.5	10.1
17:14	621.6	87.4	10.3
17:15	652.3	106.6	10.2
17:16	724.5	161.1	11.0
17:17	735.9	204.1	13.5
17:18	744.7	255.7	16.8
17:19	690.9	262.1	19.7
17:20	633.0	226.4	21.7
17:21	687.3	224.8	20.6
17:22	750.6	159.8	18.4
17:23	736.5	122.4	15.0
17:24	679.2	86.6	13.8
17:25	626.5	62.2	12.8
17:26	595.5	50.9	32.6
17:27	563.1	40.4	14.2
17:28	567.4	37.2	11.8
17:29	570.6	38.6	12.8

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
17:30	561.9	40.4	11.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:30	664.0	147.2	15.1
17:31	535.9	43.9	10.6
17:32	508.9	47.4	10.4
17:33	484.4	48.7	10.7
17:34	496.8	52.3	9.7
17:35	511.9	57.0	8.9
17:36	520.2	56.8	9.4
17:37	525.2	53.7	9.1
17:38	503.2	47.9	8.5
17:39	480.6	38.6	8.3
17:40	490.7	32.8	8.3
17:41	524.3	31.6	7.8
17:42	595.8	35.1	7.9
17:43	642.3	42.0	8.6
17:44	643.0	52.0	9.1
17:45	557.0	52.1	9.0
17:46	460.7	43.2	8.8
17:47	432.2	39.4	9.5
17:48	428.9	38.4	10.6
17:49	414.6	37.1	9.5
17:50	440.2	37.8	7.6
17:51	471.5	38.8	7.8
17:52	499.3	33.6	8.2
17:53	552.1	31.5	8.4
17:54	615.9	30.0	9.5
17:55	639.0	26.6	8.9
17:56	647.8	27.0	8.3
17:57	646.8	28.3	7.7
17:58	653.8	31.8	7.4
17:59	644.7	37.5	7.3
18:00	632.0	41.9	7.4
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:00	540.0	40.5	8.8
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
18:00	602.0	93.8	11.9
18:01	607.8	42.9	8.2
18:02	565.2	41.7	9.6
18:03	535.1	37.6	9.8
18:04	503.8	31.6	8.8
18:05	458.3	25.3	7.6
18:06	480.3	21.8	6.9
18:07	483.7	20.2	6.5
18:08	469.5	18.3	6.4
18:09	456.5	17.6	6.2
18:10	445.7	18.0	6.2
18:11	438.8	19.4	6.3
18:12	449.0	21.1	6.8

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
18:13	442.1	23.6	7.4
18:14	434.2	26.4	6.9
18:15	410.8	27.8	6.5
18:16	407.8	28.2	6.4
18:17	417.0	28.1	6.2
18:18	420.5	26.3	5.7
18:19	413.0	23.4	5.6
18:20	378.4	19.6	5.4
18:21	404.0	17.7	4.5
18:22	427.8	17.7	5.1
18:23	432.0	18.8	5.7
18:24	427.0	20.6	5.8
18:25	425.6	21.0	6.1
18:26	409.5	21.1	6.0
18:27	446.9	23.2	10.1
18:28	457.2	25.2	7.0
18:29	449.6	25.7	6.0
18:30	431.5	24.6	6.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:30	451.0	24.5	6.7
18:31	401.9	21.9	6.8
18:32	384.6	19.3	6.3
18:33	388.1	18.1	6.2
18:34	390.5	17.1	6.3
18:35	403.6	17.2	6.8
18:36	415.7	16.8	7.6
18:37	441.7	15.5	7.1
18:38	463.3	16.7	6.7
18:39	465.2	18.4	5.9
18:40	454.8	20.6	6.1
18:41	470.5	24.2	6.6
18:42	475.4	25.9	7.0
18:43	304.2	17.6	6.7
18:44	191.1	11.9	6.5
18:45	165.1	9.5	7.6
18:46	141.8	8.7	7.1
18:47	127.8	8.8	5.9
18:48	116.0	8.7	4.3
18:49	110.5	10.9	3.7
18:50	106.8	13.4	3.4
18:51	97.9	15.0	3.4
18:52	95.7	16.0	3.6
18:53	96.1	16.4	4.1
18:54	88.0	16.4	5.0
18:55	82.9	16.2	4.4
18:56	80.2	16.0	4.7
18:57	82.8	15.5	5.3
18:58	77.8	14.9	5.3
18:59	76.8	14.5	5.6
19:00	71.2	14.1	5.1

lost Side A FD fan @ 1840

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
19:00	242.3	15.9	5.7
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
19:00	346.6	20.2	6.2
19:01	75.4	13.6	5.1
19:02	74.5	12.9	7.0
19:03	71.1	9.0	6.0
19:04	68.7	5.6	5.9
19:05	65.2	4.5	5.4
19:06	65.2	3.9	2.3
19:07	65.2	3.6	0.3
19:08	62.7	3.4	0.3
19:09	61.5	3.2	0.5
19:10	60.0	3.1	0.2
19:11	59.9	3.0	-0.3
19:12	57.5	3.5	-0.2
19:13	60.0	4.2	-0.3
19:14	56.2	4.0	-0.2
19:15	56.7	3.3	0.2
19:16	52.5	3.0	1.3
19:17	53.8	2.9	18.7
19:18	59.1	2.9	36.3
19:19	52.7	2.9	43.7
19:20	56.8	2.9	46.5
19:21	54.8	2.9	48.1
19:22	50.0	2.8	48.7
19:23	54.8	2.8	50.1
19:24	53.5	2.8	50.7
19:25	50.0	2.8	50.9
19:26	59.4	2.8	50.7
19:27	52.7	2.7	50.4
19:28	54.6	2.7	42.4
19:29	58.1	2.5	11.5
19:30	54.9	2.2	4.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
19:30	59.3	4.1	19.6
19:31	53.3	2.1	3.3
19:32	58.4	2.0	28.2
19:33	56.1	1.9	13.4
19:34	54.7	1.9	3.4
19:35	52.5	1.8	1.6
19:36	54.1	1.8	0.9
19:37	51.0	1.8	0.3
19:38	56.0	1.8	0.0
19:39	55.6	2.8	0.2
19:40	57.4	34.0	0.7
19:41	52.5	75.2	0.5
19:42	54.4	90.5	0.6
19:43	53.6	93.8	0.6

zero air

zero air

zero air

dynamic cal 47 ppm HCl cal gas (K-9933)

auto cal sequence manually initiated

94 ppm HCl

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-09-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
19:44	57.7	93.7	0.3
19:45	55.8	94.7	0.3
19:46	59.5	95.9	38.8
19:47	56.3	97.4	162.6
19:48	52.0	97.5	-0.2
19:49	55.2	98.7	0.7
19:50	58.2	97.7	2.6
19:51	54.7	98.8	54.4
19:52	53.4	99.6	49.1
19:53	54.0	99.4	48.8
19:54	54.8	54.0	48.9
19:55	57.7	16.3	48.8
19:56	58.7	8.5	45.9
19:57	47.0	6.0	5.6
19:58	57.0	4.7	0.5
19:59	51.5	3.7	0.5
20:00	56.7	3.0	0.6

cont. 94 ppm HCl (K-9908)

zero comp.

47 ppm span cell

AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES

20:00	55.1	46.0	18.7

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

20:00	57.2	25.1	19.1

20:01	60.3	2.8	-0.1
20:02	74.3	2.8	-0.1
20:03	217.5	2.7	53.5
20:04	330.2	2.6	57.6
20:05	380.8	2.6	55.0
20:06	414.1	2.7	49.7
20:07	440.2	2.7	45.5
20:08	456.7	2.6	41.1
20:09	464.3	2.5	38.2
20:10	479.4	2.5	36.2
20:11	485.7	112.7	34.0
20:12	487.0	237.8	29.4
20:13	493.2	236.7	9.7
20:14	499.7	188.1	2.4
20:15	499.1	174.7	1.2
20:16	498.2	204.8	0.9
20:17	505.4	206.3	0.8
20:18	507.0	2.1	0.5
20:19	507.2	2.1	0.6
20:20	504.8	2.1	0.3
20:21	510.8	2.0	-0.0
20:22	509.4	2.3	0.5
20:23	329.8	2.5	-0.6
20:24	133.8	2.4	0.3
20:25	104.8	2.2	0.5

428 ppm HCl (K-9983)

COMMENTS: End of Test No. 1 and post-test calibration check.
(CONTINUED ON THE NEXT PAGE)

CONTINUOUS EMISSIONS MONITORING SET-UP

SOURCE: HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY

DATE: 12-10-1987 TIME: 09:02

A/D CHAN	DESCRIP	UNITS	SPAN	INPUT VOLTAGE	ZERO OFFSET
1	INLET	wetHCl	900	10.00 V	0%
2	MID	wetHCl	268	0.95 V	0%
3	OUTLET	dryHCl	250	9.21 V	0%

AVERAGING PERIODS: 30 MINUTES,
NO EMISSION RATE CALCULATIONS

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl	
09:09	79.7	0.8	0.2	
09:10	83.3	0.8	0.4	
09:11	89.3	0.8	10.3	
09:12	87.9	0.8	23.6	
09:13	86.8	0.8	14.5	
09:14	82.7	0.7	7.4	
09:15	87.0	0.7	4.3	
09:16	83.5	0.7	2.5	
09:17	82.5	0.7	1.1	
09:18	41.1	0.7	0.5	
09:19	8.4	0.7	0.7	
09:20	4.4	0.7	0.7	
09:21	4.7	0.8	0.6	
09:22	4.3	0.8	-0.0	
09:23	4.9	0.8	-0.0	
09:24	-0.7	0.9	0.5	
09:25	6.9	1.0	0.6	
09:26	3.2	1.0	32.8	
09:27	4.2	1.0	169.8	
09:28	3.4	1.0	0.3	
09:29	5.9	1.0	0.1	
09:30	4.5	1.1	0.4	
09:31	6.0	1.1	52.1	
09:32	4.6	1.1	49.2	
09:33	2.6	1.1	48.8	
09:34	1.7	1.1	49.2	
09:35	-20.0	1.1	49.1	
09:36	-20.7	1.1	45.6	
09:37	-20.7	1.1	-18.3	
09:38	-20.6	1.2	-0.4	
09:39	-20.6	1.2	0.0	
09:40	-20.6	1.2	-0.4	
09:41	-13.0	1.3	-1.1	
09:42	-10.4	1.3	-0.0	
09:43	-3.0	1.4	38.7	
09:44	5.1	1.4	57.5	
09:45	8.4	1.5	58.7	
09:46	1.6	1.4	57.2	
09:47	-2.9	1.5	50.8	
09:48	4.5	1.5	44.3	
09:49	30.9	1.4	37.8	
09:50	177.8	1.4	18.0	
09:51	274.1	1.4	4.4	
09:52	316.2	1.5	2.5	
09:53	346.5	1.5	1.7	
09:54	359.9	1.5	1.1	
09:55	378.1	1.5	1.0	
09:56	385.4	1.5	0.4	
09:57	395.4	1.5	0.2	
09:58	414.6	1.5	0.2	
09:59	416.4	1.6	0.8	
10:00	419.0	1.6	1.6	

Zero air

Zero air

adj. zero

blew off GFC wheel

zero

428 ppm HCl

Auto cal sequence initiated

zero

47 ppm span cell

Dynamic cal check

47 ppm HCl cal gas

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE LAST HOUR: 52 MINUTES OF VALID DATA			
10:00	89.5	1.1	17.7
10:01	423.1	1.6	0.3
10:02	426.4	1.6	0.6
10:03	426.3	1.7	0.6
10:04	435.7	1.7	0.2
10:05	438.3	1.7	0.4
10:06	442.4	1.8	0.3
10:07	446.4	1.8	0.3
10:08	435.8	1.8	0.1
10:09	438.1	1.8	0.0
10:10	365.1	1.8	-0.1
10:11	248.2	1.8	-0.1
10:12	27.8	1.7	0.6
10:13	-2.0	1.7	0.5
10:14	-14.7	1.7	0.6
10:15	-10.3	1.7	3.9
10:16	-8.1	1.7	15.1
10:17	-4.5	1.7	25.8
10:18	-0.8	146.3	34.1
10:19	-2.3	227.7	39.9
10:20	-5.6	173.6	43.1
10:21	-1.8	174.7	45.3
10:22	-1.6	224.0	47.3
10:23	0.1	159.5	48.9
10:24	-2.0	1.8	49.4
10:25	0.7	1.8	50.0
10:26	1.6	1.7	50.4
10:27	-0.9	1.7	50.7
10:28	3.1	1.6	51.3
10:29	6.5	1.7	50.6
10:30	4.6	1.7	50.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
10:30	150.5	38.3	22.0
10:31	1.8	1.6	45.0
10:32	-1.2	1.6	31.2
10:33	3.9	1.6	18.4
10:34	-1.4	1.7	10.5
10:35	-0.4	1.7	8.5
10:36	-0.2	1.7	6.9
10:37	3.4	7.2	5.7
10:38	3.6	54.3	4.7
10:39	1.4	77.6	4.2
10:40	-1.6	84.4	3.4
10:41	3.9	86.7	2.9
10:42	1.9	86.9	2.6
10:43	-0.6	86.9	1.9
10:44	-0.3	88.0	2.2
10:45	1.0	88.8	1.9
10:46	2.4	88.3	1.8
10:47	6.6	89.0	1.8

cont. 428 ppm

zero air

internal cal

94 ppm HCl

zero air

Dynamic cal check
47 ppm HCl cal gas

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
10:48	1.6	87.8	1.3
10:49	2.2	~~84.9~~	0.8
10:50	0.5	34.6 zero air	1.1
10:51	3.5	12.0	1.2
10:52	1.6	7.5	1.4
10:53	3.8	5.5	1.1
10:54	1.8	4.4	0.8
10:55	2.9	3.7	1.1
10:56	6.5	3.3	0.7
10:57	7.1	3.0	0.7
10:58	6.7	2.7	0.4
10:59	8.1	2.5	0.8
11:00	-6.5	2.4	1.0
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
11:00	2.1	36.7	5.5
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
11:00	76.3	37.5	13.8
11:01	-20.7	2.2	0.8
11:02	-13.1	2.0	0.6
11:03	0.3	1.9	0.8
11:04	-1.3	1.8	0.9
11:05	0.5	1.8	1.1
11:06	3.0	1.7	0.3
11:07	8.3	1.7	0.4
11:08	14.6	1.7	0.5
11:09	9.0	1.7	0.1
11:10	14.8	1.7	0.5
11:11	8.9	1.7	0.6
11:12	14.1	1.7	0.0
11:13	20.0	1.7	0.5
11:14	17.6	1.7	0.9
11:15	12.0	1.7	0.0
11:16	22.3	1.7	0.5
11:17	19.2	1.7	0.5
11:18	23.0	1.7	0.7
11:19	24.1	1.7	0.7
11:20	18.7	1.7	0.6
11:21	12.4	1.7	0.1
11:22	12.6	1.7	0.1

COMMENTS: Waiting for proper process operating conditions for Test #2.

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
12:31	-3.6	1.5	16.7
12:32	-3.7	1.5	14.6
12:33	-2.9	1.5	13.3
12:34	-3.7	1.5	12.9
12:35	-3.7	1.5	12.1
12:36	-5.4	1.5	11.7
12:37	-1.7	1.5	10.9
12:38	0.2	1.6	11.0
12:39	1.0	1.6	10.4
12:40	2.6	1.6	9.7
12:41	23.1	1.6	9.5
12:42	123.9	1.7	9.2
12:43	226.2	1.7	9.3
12:44	279.6	1.7	8.8
12:45	309.4	1.7	9.2
12:46	341.4	1.7	8.9
12:47	357.3	1.7	8.7
12:48	356.5	2.2	8.9
12:49	358.1	3.6	7.6
12:50	331.9	4.2	8.3
12:51	320.6	4.4	7.4
12:52	316.2	4.4	6.7
12:53	334.8	4.6	7.1
12:54	350.7	4.8	7.6
12:55	384.1	4.9	7.4
12:56	392.1	5.5	7.7
12:57	420.9	6.4	7.4
12:58	425.5	7.2	7.4
12:59	409.5	7.3	7.8
13:00	411.2	6.8	7.8
AVERAGE VALUES FOR THE LAST HOUR: 30 MINUTES OF VALID DATA			
13:00	215.1	3.1	9.5
13:01	396.7	5.8	7.7
13:02	380.7	5.2	8.0
13:03	402.7	4.9	7.7
13:04	429.6	4.7	7.6
13:05	413.4	4.5	7.2
13:06	421.8	4.8	7.2
13:07	432.9	5.8	6.9
13:08	449.4	8.1	6.9
13:09	433.5	11.4	7.1
13:10	427.3	15.4	7.1
13:11	437.8	18.7	6.8
13:12	450.9	21.6	7.2
13:13	459.9	20.4	7.0
13:14	456.3	17.1	7.5
13:15	444.8	13.8	7.6
13:16	411.1	11.2	7.1
13:17	410.7	9.7	6.3
13:18	414.9	8.5	6.2
13:19	414.7	7.8	6.5
13:20	424.7	7.6	5.8

put Compur probe back in duct - waiting for probe temp. to get up to at least 146 °C before switching to effluent sample

Start Run #2 at 1245

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY

12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
13:21	439.0	8.2	5.2
13:22	424.6	9.9	5.2
13:23	429.2	13.6	6.0
13:24	454.2	18.6	5.8
13:25	453.1	24.8	6.0
13:26	463.7	30.6	6.2
13:27	457.9	31.2	6.4
13:28	464.6	29.2	6.4
13:29	466.0	25.4	6.4
13:30	461.3	20.8	6.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
13:30	434.3	14.0	6.7
13:31	462.0	17.7	6.5
13:32	463.8	15.2	6.4
13:33	455.6	13.3	6.2
13:34	450.7	11.7	6.2
13:35	474.4	10.4	6.0
13:36	482.5	10.5	5.7
13:37	481.2	11.8	5.2
13:38	477.3	13.9	6.0
13:39	487.3	16.2	5.3
13:40	509.6	15.9	5.3
13:41	485.4	14.7	5.5
13:42	468.4	12.7	5.9
13:43	465.6	10.9	5.2
13:44	482.7	9.8	5.3
13:45	485.3	8.8	5.4
13:46	479.3	8.0	8.9
13:47	493.5	7.3	9.1
13:48	516.9	6.8	5.3
13:49	506.4	6.4	5.1
13:50	485.7	6.1	4.9
13:51	478.0	6.0	5.2
13:52	469.6	6.0	5.0
13:53	453.1	6.2	4.9
13:54	449.7	6.4	4.7
13:55	477.9	6.6	5.1
13:56	470.7	6.8	4.8
13:57	496.3	7.1	5.1
13:58	509.6	7.4	5.0
13:59	530.6	7.8	5.3
14:00	536.7	8.0	5.3
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:00	482.9	9.9	6.7 5.4
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
14:00	458.6	11.9	6.7 6.1
14:01	530.6	7.8	4.6
14:02	505.5	7.6	4.5
14:03	475.1	7.5	4.9

slurry feed doubled

radio interference

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
14:04	476.0	7.2	5.2
14:05	463.8	6.8	5.2
14:06	489.0	6.6	4.8
14:07	499.6	5.8	5.6
14:08	515.0	5.4	4.9
14:09	541.3	5.2	4.5
14:10	541.2	5.2	4.3
14:11	543.5	5.3	4.2
14:12	536.5	5.5	4.8
14:13	519.7	5.8	4.5
14:14	494.3	6.1	4.5
14:15	480.6	6.3	4.6
14:16	502.3	6.6	4.5
14:17	492.8	6.6	4.9
14:18	415.2	6.1	4.9
14:19	358.9	5.7	4.6
14:20	371.8	6.1	3.5
14:21	473.7	7.6	3.7
14:22	558.0	8.1	4.3
14:23	562.3	8.3	4.5
14:24	542.5	8.7	4.9
14:25	533.6	8.6	5.0
14:26	541.8	8.4	5.8
14:27	542.4	7.9	5.3
14:28	533.7	7.8	4.9
14:29	534.2	8.0	5.0
14:30	508.2	7.2	4.8
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:30	502.8	6.9	4.7
14:31	519.8	6.8	4.5
14:32	528.0	6.7	4.5
14:33	532.6	6.7	4.5
14:34	538.1	6.8	4.4
14:35	545.5	6.9	4.5
14:36	535.5	7.1	4.9
14:37	526.8	7.3	4.0
14:38	498.2	7.5	4.9
14:39	475.9	7.6	4.9
14:40	484.4	7.7	4.4
14:41	510.3	7.7	4.2
14:42	507.7	7.8	4.0
14:43	499.7	7.5	4.2
14:44	499.9	7.5	4.3
14:45	513.9	7.1	4.8
14:46	506.1	6.4	5.3
14:47	500.0	6.0	5.1
14:48	470.4	5.6	4.9
14:49	468.9	5.4	4.3
14:50	478.9	5.3	4.4
14:51	451.6	5.0	4.0
14:52	463.3	5.0	3.6
14:53	473.1	5.0	3.9
14:54	467.6	5.0	4.0

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

	TECO CHAN 1 INLET	Combi CHAN 2 MID	Bodenseewerk CHAN 3 OUTLET
TIME	wetHCl	wetHCl	dryHCl
14:55	461.8	5.2	4.2
14:56	462.9	5.5	4.3
14:57	465.7	6.0	3.8
14:58	484.4	6.5	3.7
14:59	481.6	6.9	4.5
15:00	497.2	7.2	4.6
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:00	495.0	6.5	4.4
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
15:00	498.9	6.7	4.6
15:01	520.5	7.2	4.0
15:02	538.3	7.2	4.3
15:03	552.3	7.0	4.9
15:04	548.7	6.8	4.5
15:05	555.5	6.6	4.3
15:06	521.6	6.3	4.2
15:07	495.2	5.9	4.1
15:08	505.2	5.6	3.7
15:09	507.8	5.4	4.3
15:10	488.4	5.3	3.9
15:11	477.8	5.3	4.1
15:12	490.4	5.4	3.8
15:13	496.0	5.5	4.2
15:14	489.2	5.8	4.0
15:15	512.1	6.0	4.5
15:16	524.8	6.4	4.1
15:17	512.5	6.9	4.0
15:18	516.4	6.9	3.3
15:19	543.2	7.0	3.2
15:20	524.2	7.1	3.9
15:21	529.4	7.1	3.9
15:22	553.0	7.1	4.1
15:23	526.2	6.9	4.2
15:24	520.1	6.5	4.2
15:25	521.1	6.3	3.9
15:26	515.0	6.2	3.9
15:27	515.5	6.1	4.4
15:28	524.0	6.1	3.8
15:29	523.2	6.1	3.4
15:30	520.0	6.3	3.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:30	518.9	6.3	4.0
15:31	534.5	6.6	3.6
15:32	524.2	6.8	3.7
15:33	515.1	7.0	4.1
15:34	505.8	7.0	3.8
15:35	493.2	7.0	3.9
15:36	494.2	6.8	4.2
15:37	475.0	6.4	4.0

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
15:38	465.6	6.1	3.5
15:39	457.0	5.7	3.2
15:40	465.6	5.5	3.2
15:41	470.2	5.4	3.1
15:42	457.5	5.2	3.5
15:43	472.8	5.3	3.1
15:44	504.2	5.5	3.3
15:45	559.4	5.9	3.3
15:46	575.0	6.2	3.4
15:47	552.6	6.3	3.8
15:48	533.8	6.5	3.8
15:49	525.0	6.6	4.0
15:50	539.9	6.9	4.1
15:51	555.6	7.2	4.0
15:52	544.3	7.3	4.0
15:53	533.4	7.4	4.4
15:54	510.9	7.7	4.5
15:55	510.0	7.9	4.2
15:56	502.3	7.1	4.2
15:57	489.6	6.8	4.1
15:58	474.7	6.4	3.9
15:59	452.5	5.8	3.9
16:00	448.4	5.4	4.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:00	504.7	6.5	3.8
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
16:00	511.8	6.4	3.9
16:01	456.9	5.2	4.5
16:02	469.3	5.0	4.2
16:03	496.1	5.0	4.3
16:04	502.8	5.0	3.3
16:05	502.7	5.2	3.4
16:06	493.7	5.3	3.1
16:07	511.5	5.4	3.8
16:08	524.9	5.5	3.7
16:09	517.3	5.5	3.9
16:10	513.9	5.8	4.3
16:11	521.6	6.2	4.3
16:12	529.0	6.5	4.5
16:13	520.8	6.7	4.3
16:14	517.5	6.5	4.1
16:15	494.4	6.2	3.8
16:16	472.8	6.0	3.8
16:17	463.3	5.9	3.3
16:18	475.5	6.0	3.4
16:19	488.9	5.9	3.8
16:20	503.5	5.8	3.5
16:21	498.0	5.7	4.2
16:22	494.2	5.5	26.1
16:23	510.4	5.6	4.0
16:24	538.5	6.1	3.3

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
16:25	537.4	5.8	3.6
16:26	533.2	5.6	3.2
16:27	517.0	5.5	3.1
16:28	503.3	5.4	3.2
16:29	486.0	5.3	3.6
16:30	478.9	5.3	3.9
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:30	502.4	5.7	4.5
16:31	475.1	5.2	3.4
16:32	486.4	5.3	3.6
16:33	493.7	5.4	3.9
16:34	510.8	5.5	3.7
16:35	500.9	5.5	3.5
16:36	505.9	5.6	3.3
16:37	480.4	5.5	3.6
16:38	472.5	5.5	3.0
16:39	502.5	5.6	3.3
16:40	521.9	5.7	3.7
16:41	539.2	6.0	3.6
16:42	538.9	6.1	4.1
16:43	543.2	6.3	3.8
16:44	535.2	6.0	3.6
16:45	527.1	5.9	4.1
16:46	531.2	5.9	3.4
16:47	530.8	5.9	3.0
16:48	508.6	5.6	3.6
16:49	458.9	5.1	3.3
16:50	463.3	4.9	4.0
16:51	500.8	4.8	4.1
16:52	512.4	4.6	3.6
16:53	523.4	4.5	3.5
16:54	538.0	4.6	3.0
16:55	532.0	4.5	3.5
16:56	531.8	4.6	3.6
16:57	549.6	4.7	4.0
16:58	555.6	4.9	3.5
16:59	544.2	5.1	3.7
17:00	539.5	5.3	3.8
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:00	515.1	5.3	3.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
17:00	508.8	5.5	4.0
17:01	535.3	5.6	3.5
17:02	544.7	5.8	3.7
17:03	529.0	6.0	4.4
17:04	519.1	6.2	3.8
17:05	514.1	6.0	4.2
17:06	532.3	6.4	3.8
17:07	560.0	5.9	3.2

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
17:08	570.3	5.7	3.2
17:09	545.8	5.5	3.2
17:10	553.6	5.2	3.2
17:11	554.0	5.0	3.3
17:12	535.6	4.9	3.5
17:13	534.0	4.9	3.6
17:14	538.4	4.9	3.3
17:15	537.1	4.8	3.8
17:16	538.8	4.7	3.3
17:17	514.2	4.5	3.1
17:18	461.4	4.5	3.1
17:19	461.3	5.2	2.5
17:20	473.7	5.7	3.1
17:21	452.3	6.4	2.8
17:22	438.6	7.1	2.8
17:23	434.3	7.4	3.1
17:24	412.9	7.4	3.4
17:25	403.7	7.5	3.0
17:26	490.8	7.6	2.9
17:27	562.7	7.3	2.3
17:28	570.7	6.8	3.0
17:29	520.3	6.2	3.9
17:30	471.0	5.9	4.4
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:30	510.3	5.9	3.3
17:31	471.5	5.7	3.5
17:32	466.3	6.4	3.6
17:33	467.4	9.6	3.1
17:34	501.9	9.6	4.3
17:35	511.9	7.0	4.3
17:36	541.0	5.1	4.1
17:37	566.2	4.0	3.9
17:38	557.5	3.4	3.4
17:39	562.5	3.2	3.5
17:40	550.6	3.2	3.4
17:41	508.7	3.3	3.9
17:42	494.8	3.6	4.1
17:43	505.6	4.0	3.4
17:44	483.6	4.4	2.9
17:45	467.0	4.7	3.2
17:46	454.1	5.0	3.8
17:47	472.2	5.4	3.6
17:48	492.1	5.8	3.0
17:49	486.2	6.0	3.2
17:50	506.0	6.2	3.2
17:51	540.0	6.6	3.7
17:52	552.4	6.8	4.0
17:53	551.0	6.9	4.2
17:54	550.7	7.8	3.8
17:55	542.1	7.0	4.0
17:56	521.1	6.4	4.2
17:57	491.5	6.0	3.8
17:58	457.4	5.4	3.6

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseewerk CHAN 3 OUTLET dryHCl
17:59	433.6	4.9	3.4
18:00	422.6	4.7	3.0
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:00	504.3	5.6	3.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
18:00	507.3	5.7	3.5
18:01	432.2	4.4	2.6
18:02	427.9	4.3	2.9
18:03	423.5	4.3	3.0
18:04	425.3	4.4	2.3
18:05	415.8	4.6	2.9
18:06	352.5	3.9	2.9
18:07	146.2	2.8	3.0
18:08	99.0	2.3	2.6
18:09	81.2	2.1	2.7
18:10	73.4	1.9	3.1
18:11	69.9	1.8	3.1
18:12	63.8	1.8	3.3
18:13	58.6	1.7	3.0
18:14	62.6	1.6	3.1
18:15	64.8	1.6	3.1
18:16	57.6	1.5	2.7
18:17	42.7	1.5	2.7
18:18	39.4	1.4	2.4
18:19	31.4	1.4	2.1
18:20	30.3	1.3	1.6
18:21	30.1	1.3	1.5
18:22	28.9	1.4	1.7
18:23	31.0	16.3	1.6
18:24	29.0	47.5	2.1
18:25	33.1	59.5	1.9
18:26	25.5	63.7	2.3
18:27	20.0	65.7	2.6
18:28	17.5	67.4	3.0
18:29	15.8	69.5	2.9
18:30	19.4	70.8	3.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:30	~~121.8~~	~~47.1~~	~~2.6~~
18:31	24.7	71.5	2.9
18:32	19.5	72.9	3.4
18:33	23.2	73.2	3.5
18:34	17.9	73.6	4.4
18:35	14.5	73.0	4.3
18:36	14.0	73.3	5.1
18:37	13.4	75.5	5.1
18:38	13.0	75.4	5.7
18:39	18.5	75.6	5.9
18:40	13.7	74.7	5.8
18:41	12.6	~~73.5~~	5.9

END Run

zero air

zero air

cont. effluent sample

94 ppm HCl

zero air

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	TECO CHAN 1 INLET wetHCl	Compur CHAN 2 MID wetHCl	Bodenseawerke CHAN 3 OUTLET dryHCl
18:42	13.3	68.4	6.0
18:43	17.0	35.2	5.6
18:44	13.5	20.8	5.5
18:45	11.2	15.7	5.0
18:46	10.5	11.9	0.8
18:47	10.1	9.5	-0.3
18:48	14.7	8.0	-0.1
18:49	14.7	6.5	-0.5
18:50	9.4	1.6	-0.4
18:51	11.5	5.5	1.6
18:52	13.8	3.9	18.9
18:53	10.8	2.8	35.1
18:54	8.1	2.4	42.8
18:55	6.9	2.2	45.7
18:56	8.7	2.0	47.7
18:57	7.0	2.0	49.3
18:58	15.3	1.9	50.1
18:59	13.3	1.8	50.0
19:00	8.8	1.8	50.0

cont. zero air

zero air

zero air

dynamic cal check 47 ppm HCl (K-9933)

AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES

19:00	17.5	37.9	15.5

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

19:00	67.5	25.5	9.0
19:01	9.4	1.7	28.6
19:02	11.8	1.8	8.5
19:03	9.7	1.7	4.6
19:04	7.0	1.3	3.0
19:05	11.6	0.1	1.8
19:06	78.6	0.1	1.5
19:07	220.9	0.2	7.1
19:08	316.2	237.0	14.0
19:09	364.9	191.0	6.6
19:10	389.0	176.2	3.5
19:11	405.0	175.2	1.9
19:12	412.1	144.6	1.3
19:13	421.8	0.2	0.7
19:14	430.5	0.2	0.8
19:15	436.1	0.2	0.6
19:16	437.5	0.2	0.5
19:17	440.4	0.2	0.0
19:18	441.9	0.2	-0.4
19:19	446.8	0.2	0.1
19:20	446.6	0.2	-0.4
19:21	452.2	0.2	0.1
19:22	438.0	0.2	193.7
19:23	314.5	0.2	11.5
19:24	107.9	0.1	-0.5
19:25	61.7	0.1	-1.9
19:26	48.2	0.1	18.2
19:27	41.9	0.1	47.2
19:28	31.9	0.2	48.0

428 ppm HCl

internal cal routine

auto cal sequence initiated

zero air

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-10-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
19:29	34.8	0.1	48.3
19:30	30.2	0.1	48.4
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
19:30	243.3	31.1	16.6
19:31	30.5	0.2	48.0
19:32	23.7	0.2	25.3
19:33	17.0	0.1	0.1
19:34	21.5	0.1	-1.5
19:35	15.7	0.1	-1.4
19:36	17.1	0.1	-2.0
19:37	14.5	0.1	-1.5
19:38	14.1	0.1	4.9
19:39	13.7	0.1	3.7
19:40	12.9	0.1	0.9

COMMENTS: End Test #2 and calibration checks.

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
08:22	1.9	136.6	48.7
08:23	-5.3	210.4	48.7
08:24	5.7	214.0	48.7
08:25	0.8	218.4	48.1
08:26	-0.8	223.2	45.0
08:27	74.6	226.4	1.9
08:28	206.1	201.0	-0.3
08:29	265.2	176.3	-0.3
08:30	308.9	174.7	-0.7
08:31	328.1	173.9	-0.2
08:32	348.4	192.0	4.3
08:33	363.5	217.0	14.2
08:34	371.1	222.7	15.5
08:35	383.0	226.1	14.9
08:36	393.5	229.0	15.0
08:37	393.4	230.6	15.0
08:38	395.2	203.7	14.5
08:39	404.6	175.6	12.2
08:40	405.3	174.1	10.4
08:41	410.2	180.4	8.7
08:42	411.9	219.1	8.0
08:43	410.2	89.0	7.7
08:44	416.1	0.2	7.2
08:45	416.3	0.2	7.1
08:46	423.5	0.2	7.1
08:47	423.5	84.1	6.5
08:48	420.7	217.4	6.2
08:49	430.3	173.9	5.2
08:50	430.0	179.9	4.9
08:51	431.9	226.8	4.9
08:52	431.1	207.8	5.1
08:53	432.4	1.4	5.5
08:54	265.1	2.0	2.4
08:55	81.1	1.9	0.5
08:56	52.7	1.7	0.5
08:57	42.6	1.6	0.5
08:58	36.8	1.5	-0.1
08:59	26.9	1.5	-0.8
09:00	24.0	1.5	6.2
AVERAGE VALUES FOR THE LAST HOUR: 39 MINUTES OF VALID DATA			
09:00	273.4	138.9	11.5
09:01	21.3	1.5	15.3
09:02	24.4	1.5	21.0
09:03	19.9	1.5	24.3
09:04	19.9	1.5	28.5
09:05	10.5	1.5	32.7
09:06	15.0	1.5	34.9
09:07	15.6	1.5	37.6
09:08	15.7	1.5	38.6
09:09	12.0	1.5	37.9
09:10	15.4	1.5	36.5
09:11	4.1	1.5	44.5

Cal sequence

47 ppm span cell

428 ppm HCl

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
09:12	8.5	1.5	26.1
09:13	9.2	1.5	31.8
09:14	3.7	1.5	37.7
09:15	6.8	1.5	40.6
09:16	8.7	1.6	42.8
09:17	5.9	1.6	44.4
09:18	4.5	1.6	45.2
09:19	4.1	1.6	46.1
09:20	6.5	1.6	47.0
09:21	6.3	1.5	47.1
09:22	13.1	1.4	47.9
09:23	5.5	1.4	42.6
09:24	4.0	1.3	23.0
09:25	2.4	1.3	9.8
09:26	3.1	1.3	6.6
09:27	10.1	1.2	6.4
09:28	62.3	1.1	8.3
09:29	115.5	1.2	10.0
09:30	170.9	10.5	10.4

cont. zero air

cont. zero air

dynamic cal check 47 ppm HCl cal gas K-9933

effluent

effluent

AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES

09:30	21.1	1.8	30.3
09:31	196.5	35.9	12.2
09:32	226.1	52.2	9.6
09:33	285.0	57.9	7.7
09:34	343.4	61.3	7.4
09:35	417.8	65.3	10.9
09:36	452.7	66.5	10.0
09:37	475.5	68.7	8.4
09:38	516.5	69.8	7.7
09:39	479.5	70.7	-36.5
09:40	451.0	76.2	-1.4
09:41	427.1	81.8	6.1
09:42	368.8	85.8	6.4
09:43	322.6	87.7	6.3
09:44	284.3	87.7	5.3
09:45	230.7	88.3	5.0
09:46	164.1	44.8	5.2
09:47	135.2	8.8	4.2
09:48	127.0	3.5	3.8
09:49	125.0	2.6	3.1
09:50	111.5	8.1	2.8
09:51	110.5	9.9	2.9
09:52	104.7	7.5	2.0
09:53	101.0	6.2	2.2
09:54	96.4	5.6	2.5
09:55	90.5	5.4	1.9
09:56	101.1	4.9	2.0
09:57	106.1	4.6	1.7
09:58	101.7	4.5	1.1
09:59	98.6	4.3	1.4
10:00	103.1	4.2	1.9

94 ppm HCl

effluent

process problems - start of test delayed

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
10:00	238.5	39.4	3.5
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
10:00	129.8	20.6	17.0
10:01	115.4	4.4	1.4
10:02	148.4	4.4	1.4
10:03	163.3	4.2	1.9
10:04	147.4	4.0	1.8
10:05	132.8	3.8	1.8
10:06	110.1	3.5	2.1
10:07	101.5	3.4	2.3
10:08	81.9	3.4	2.3
10:09	87.2	3.4	2.4
10:10	79.1	3.3	1.9
10:11	78.0	3.3	2.4
10:12	73.6	3.3	2.1
10:13	79.6	3.2	1.8
10:14	78.8	3.2	2.1
10:15	76.6	3.1	1.8
10:16	76.2	3.1	2.5
10:17	61.1	2.9	2.7
10:18	44.4	2.6	2.4
10:19	25.5	2.4	2.9
10:20	23.8	2.3	5.8
10:21	15.2	2.2	7.4
10:22	24.3	2.2	7.1
10:23	10.7	2.1	6.5
10:24	10.1	2.1	5.5
10:25	14.3	2.0	5.3
10:26	13.3	2.0	5.8
10:27	6.0	1.9	5.6
10:28	10.1	1.8	4.5
10:29	14.2	1.8	3.5
10:30	7.9	1.7	3.2
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
10:30	63.7	2.9	3.3
10:31	12.9	1.6	3.2
10:32	7.5	1.7	3.4
10:33	4.6	1.5	3.5
10:34	3.5	1.3	3.3
10:35	8.5	1.3	3.6
10:36	13.2	1.3	3.6
10:37	76.5	1.3	2.6
10:38	113.7	1.2	1.7
10:39	160.0	1.3	1.5
10:40	191.1	1.3	2.5
10:41	218.7	1.4	2.6
10:42	242.8	1.4	4.1
10:43	267.3	1.4	4.5

effluent

effluent

effluent

zero air

zero air

— advised that testing delayed until ~1100

effluent

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
10:46	288.2	1.8	4.5
10:47	294.9	1.6	4.9
10:48	342.1	2.1	4.1
10:49	337.5	2.0	5.6
10:50	332.9	1.9	10.2
10:51	319.4	1.8	8.8
10:52	322.6	1.8	9.7
10:53	313.3	1.9	12.6
10:54	324.2	2.2	10.8
10:55	309.6	2.5	9.2
10:56	314.0	2.5	8.9
10:57	309.6	2.6	8.7
10:58	321.7	2.6	7.4
10:59	338.3	2.7	7.1
11:00	334.9	2.6	6.4

effluent ↓ (CHAN 1) · Cont. zero air ↓ (CHAN 2) · effluent ↓ (CHAN 3)

AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES

11:00	224.7	1.8	5.5

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

11:00	144.2	2.4	4.4

11:01	331.9	2.5	6.7
11:02	318.5	2.4	6.4
11:03	320.0	2.3	5.7
11:04	342.8	11.2	5.6
11:05	374.7	34.9	5.5
11:06	376.9	53.7	9.5
11:07	382.9	66.3	12.9
11:08	380.4	77.2	11.5
11:09	380.1	83.6	10.4
11:10	377.2	88.8	10.0
11:11	329.7	91.8	10.9
11:12	359.9	68.3	9.2

cal check ↓ 44 ppm cal gas (CHAN 2)

COMMENTS: Ready to start Run #3 at 11:15.

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl		CHAN 2 MID wetHCl		CHAN 3 OUTLET dryHCl	
11:16	441.4		20.6		7.5	← Start Run#3 @ 1115
11:17	435.0		16.2		6.6	
11:18	399.1		13.2		6.8	
11:19	382.5		11.0		6.0	
11:20	400.0		9.6		6.1	
11:21	418.1		8.4		5.7	
11:22	405.1		7.4		6.2	
11:23	412.6		6.3		5.6	
11:24	434.7		5.6		5.7	
11:25	465.1		5.2		5.6	
11:26	502.3		4.9		5.3	
11:27	467.7	397	4.7	6.6	5.0	5.3
11:28	432.2		4.6		4.8	
11:29	414.8		4.6		4.9	
11:30	424.4		4.6		4.8	
11:31	374.5		4.4		4.6	
11:32	345.8		4.3		4.2	
11:33	323.8		4.0		5.0	
11:34	332.7		3.8		4.8	
11:35	324.1		3.6		4.5	
11:36	335.8		3.3		4.6	
11:37	353.6		3.0		4.7	
11:38	350.7		2.8		4.7	
11:39	340.6		2.7		4.0	
11:40	344.4		2.5		3.7	
11:41	415.5		2.4		3.5	
11:42	422.2		2.3		3.2	
11:43	415.9		2.3		3.7	
11:44	349.1		2.3		4.0	
11:45	262.7		2.2		3.8	
11:46	239.0		2.1		3.4	
11:47	292.7		2.1		3.1	
11:48	347.6		2.3		4.3	
11:49	359.0		2.4		4.1	
11:50	365.6		2.4		3.8	
11:51	332.3		2.2		3.4	
11:52	309.3		2.1		3.8	
11:53	304.1		2.0		3.9	
11:54	337.6		1.9		3.7	
11:55	379.1		1.9		3.8	
11:56	372.4		1.8		3.3	
11:57	354.2		1.9		3.4	
11:58	359.9		1.9		3.4	
11:59	378.6		2.1		2.9	
12:00	374.9		2.2		2.2	
12:01	401.7		2.3		2.7	
12:02	434.8		2.5		2.6	
12:03	429.2		2.5		3.3	
12:04	420.4		2.4		3.2	
12:05	420.0		2.4		3.7	
12:06	430.3		2.3		3.2	
12:07	420.6	430	2.2	2	4.2	4
12:08	423.4		2.1		3.5	
12:09	401.8		2.0		3.8	
12:10	412.2		2.0		3.3	

unit has lost feed line

x = 24 (8581.8) inlet
(52.6) mid
(83.0) outlet

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
12:11	419.0	2.0	3.8
12:12	456.8	2.0	5.0
12:13	455.1	2.1	5.1
12:14	449.1	2.1	4.3
12:15	453.7	2.2	4.2
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
12:15	387.7	3.9	4.3
12:16	468.7	2.2	4.3
12:17	482.2	2.2	4.4
12:18	479.6	2.3	4.1
12:19	442.8	2.2	4.0
12:20	429.7	2.1	3.5
12:21	433.7	2.1	3.8
12:22	420.5	2.0	3.8
12:23	424.2	1.9	3.5
12:24	430.4	1.8	3.6
12:25	438.9	1.8	3.6
12:26	460.1	1.8	3.7
12:27	460.7	1.9	3.5
12:28	450.0	1.9	3.5
12:29	442.6	2.0	3.3
12:30	457.3	2.0	2.8
12:31	448.6	2.0	2.6
12:32	445.7	2.0	2.5
12:33	433.8	2.0	3.3
12:34	445.1	2.0	3.4
12:35	461.6	2.0	3.0
12:36	453.6	2.0	3.1
12:37	472.5	2.0	3.7
12:38	454.1	2.0	3.6
12:39	430.9	1.9	3.5
12:40	427.4	1.8	3.2
12:41	438.7	1.8	2.9
12:42	449.0	1.9	3.1
12:43	457.0	1.9	3.5
12:44	437.3	2.0	3.8
12:45	407.8	2.0	3.9
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
12:45	446.1	2.0	3.5
12:46	389.6	1.9	2.8
12:47	361.1	1.8	2.5
12:48	393.7	1.8	2.4
12:49	419.7	1.8	2.5
12:50	444.6	1.8	2.6
12:51	422.5	1.8	2.4
12:52	420.1	1.8	2.5
12:53	446.0	1.8	2.7
12:54	465.9	1.8	2.8
12:55	473.4	1.8	2.7
12:56	477.7	1.9	2.7

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
12:57	491.0	1.9	2.9
12:58	464.0	1.9	3.0
12:59	450.3	1.9	3.1
13:00	434.8	1.9	2.7
13:01	434.8	2.0	2.0
13:02	431.2	2.0	2.6
13:03	433.0	2.0	2.4
13:04	443.6	2.0	2.7
13:05	425.2	2.0	2.6
13:06	447.3	2.0	2.7
13:07	462.7	2.0	3.1
13:08	464.7	2.0	3.3
13:09	455.4	2.0	3.2
13:10	434.8	1.9	3.0
13:11	458.6	2.0	2.8
13:12	457.2	2.0	2.8
13:13	458.4	2.0	3.0
13:14	434.3	2.0	2.7
13:15	418.1	1.9	2.9
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
13:15	440.5	1.9	2.7
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
13:15	443.3	1.9	3.1
13:16	419.8	1.8	3.0
13:17	436.6	1.8	3.0
13:18	420.1	1.8	2.8
13:19	412.9	1.8	2.8
13:20	420.4	1.8	2.8
13:21	423.6	1.8	2.4
13:22	454.0	1.8	2.3
13:23	468.0	1.9	2.9
13:24	485.2	2.1	3.4
13:25	495.0	2.1	3.6
13:26	483.7	2.2	3.8
13:27	477.2	2.1	3.2
13:28	449.7	2.0	3.5
13:29	437.8	2.0	3.7
13:30	430.0	1.9	3.6
13:31	424.8	1.9	3.2
13:32	406.6	1.8	3.2
13:33	390.3	1.8	3.0
13:34	403.3	1.8	3.0
13:35	412.5	1.7	3.1
13:36	426.5	1.8	2.9
13:37	431.4	1.8	2.8
13:38	467.2	1.9	2.8
13:39	481.6	2.0	2.6
13:40	506.3	2.0	2.7
13:41	517.9	2.0	2.3
13:42	528.0	2.0	2.3
13:43	531.8	2.0	2.6

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
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TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
13:44	537.1	2.0	2.4
13:45	541.7	2.0	3.0
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
13:45	457.4	1.9	3.0
13:46	520.8	1.9	3.0
13:47	509.1	1.9	2.7
13:48	484.7	1.8	3.1
13:49	482.1	1.7	3.1
13:50	458.6	1.7	2.6
13:51	448.6	1.6	2.1
13:52	454.7	1.6	2.2
13:53	464.3	1.6	2.1
13:54	463.8	1.6	2.6
13:55	493.3	1.7	3.0
13:56	495.1	1.8	2.5
13:57	512.8	1.8	2.9
13:58	532.6	1.8	2.9
13:59	524.2	1.8	2.9
14:00	512.1	1.8	2.8
14:01	488.3	1.7	2.6
14:02	448.4	1.6	2.7
14:03	439.5	1.5	2.4
14:04	455.8	1.4	2.3
14:05	476.0	1.4	2.6
14:06	410.0	1.4	3.4
14:07	426.9	1.4	2.8
14:08	442.4	1.4	2.3
14:09	518.4	1.6	2.3
14:10	566.3	1.9	2.6
14:11	550.1	2.1	2.7
14:12	503.1	2.2	2.8
14:13	458.6	2.2	2.3
14:14	464.4	2.3	2.4
14:15	478.6	2.3	2.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:15	482.8	1.7	2.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
14:15	470.1	1.8	2.8
14:16	510.9	2.3	3.0
14:17	546.6	2.2	2.7
14:18	569.8	2.1	2.9
14:19	578.9	2.0	2.8
14:20	593.8	1.9	3.0
14:21	668.9	1.8	2.8
14:22	696.7	1.7	1.9
14:23	714.0	1.7	2.0
14:24	729.1	1.7	2.3
14:25	727.3	1.8	3.1
14:26	658.8	1.8	3.7

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
14:27	689.8	1.8	3.2
14:28	714.9	1.8	3.2
14:29	680.4	1.9	3.5
14:30	606.3	1.8	3.5
14:31	548.7	1.7	3.3
14:32	523.3	1.6	3.0
14:33	490.2	1.6	3.7
14:34	492.9	1.5	3.6
14:35	471.4	1.5	3.7
14:36	482.5	1.6	3.3
14:37	495.9	1.7	3.5
14:38	486.3	1.9	3.5
14:39	440.9	2.0	3.2
14:40	448.7	2.0	3.1
14:41	479.8	2.1	3.4
14:42	470.6	2.2	3.9
14:43	472.7	2.3	3.1
14:44	433.2	2.3	2.8
14:45	416.8	2.2	2.6
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
14:45	561.3	1.9	3.1
14:46	416.7	2.0	2.5
14:47	426.0	2.0	3.1
14:48	440.2	1.9	3.0
14:49	459.0	1.9	2.8
14:50	460.5	1.9	3.4
14:51	455.2	2.0	3.8
14:52	461.5	2.0	3.1
14:53	471.9	2.0	3.1
14:54	505.2	2.1	3.2
14:55	509.4	2.1	3.0
14:56	507.0	2.1	2.9
14:57	513.8	2.1	2.9
14:58	502.4	2.0	3.2
14:59	490.4	2.0	3.2
15:00	472.5	1.9	3.1
15:01	443.9	1.8	2.5
15:02	439.1	1.7	2.7
15:03	430.6	1.6	3.1
15:04	431.6	1.6	2.9
15:05	444.8	1.7	3.3
15:06	481.3	1.7	2.3
15:07	512.1	1.8	2.1
15:08	506.3	1.9	2.5
15:09	501.1	2.0	2.5
15:10	493.2	2.0	2.5
15:11	464.9	2.0	2.9
15:12	462.8	2.0	2.4
15:13	457.5	1.9	2.6
15:14	455.5	1.8	2.9
15:15	462.4	1.8	3.1

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:15	469.3	1.9	2.9
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
15:15	515.3	1.9	3.0
15:16	453.7	1.7	2.7
15:17	453.3	1.6	2.2
15:18	452.2	1.6	1.9
15:19	472.8 469	1.6 2	2.3 2
15:20	466.7	1.6	2.6
15:21	490.5	1.7	2.6
15:22	497.9	1.8	2.2
15:23	476.7	1.9	2.7
15:24	460.6	1.9	2.4
15:25	313.5	1.8	3.2
15:26	178.5	1.6	3.7
15:27	117.0	1.5	1.5
15:28	96.3	1.5	-0.0
15:29	69.5	1.4	-0.5
15:30	68.5	1.4	0.4
15:31	60.2	1.3	1.0
15:32	50.8	1.3	0.8
15:33	46.6	1.3	1.2
15:34	42.4	1.2	0.3
15:35	50.0	1.2	1.2
15:36	47.2	1.2	1.5
15:37	44.8	1.2	1.3
15:38	36.0	1.1	0.6
15:39	37.8	1.1	1.1
15:40	34.6	1.1	0.4
15:41	38.0	1.1	0.2
15:42	31.4	1.1	0.3
15:43	36.7	1.1	0.8
15:44	33.5	1.1	0.1
15:45	27.7	1.1	-0.0
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
15:45	189.5	1.4	1.4
15:46	32.3	1.1	0.5
15:47	21.7	1.2	0.1
15:48	29.7	1.2	0.4
15:49	17.0	1.2	0.7
15:50	24.5	1.2	0.4
15:51	23.3	1.2	1.3
15:52	26.8	1.2	1.8
15:53	21.7	1.2	1.5
15:54	22.7	1.2	1.6
15:55	28.9	1.2	0.5
15:56	21.0	1.2	-40.6
15:57	23.0	1.2	-1.1
15:58	23.1	1.2	0.6

process down

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
15:59	22.1	1.3	0.3
16:00	29.1	1.3	0.0
16:01	21.5	1.2	0.1
16:02	28.4	1.3	0.4
16:03	18.4	1.3	0.4
16:04	30.0	1.3	0.7
16:05	18.9	1.3	0.5
16:06	28.1	1.3	0.7
16:07	26.0	1.3	1.0
16:08	24.8	1.3	1.4
16:09	26.0	1.3	0.6
16:10	17.1	1.3	0.8
16:11	25.3	1.3	0.9
16:12	14.7	1.3	1.1
16:13	32.2	1.3	1.5
16:14	24.0	1.3	1.0
16:15	28.4	1.3	1.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:15	24.4	1.3	-0.7
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
16:15	106.9	1.3	0.4
16:16	29.2	1.3	0.9
16:17	21.6	1.3	0.6
16:18	29.7	1.4	0.7
16:19	23.3	1.5	0.8
16:20	29.8	1.7	0.3
16:21	33.5	1.9	0.8
16:22	58.9	2.2	1.0
16:23	66.4	2.7	1.0
16:24	93.5	3.2	1.4
16:25	89.8	3.2	1.3
16:26	109.3	3.2	1.7
16:27	124.9	3.0	2.2
16:28	112.7	3.1	3.7
16:29	117.2	3.3	6.8
16:30	113.9	3.2	8.2
16:31	117.3	3.3	9.6
16:32	119.3	3.8	9.8
16:33	118.6	6.2	9.8
16:34	134.6	12.0	10.5
16:35	123.7	19.5	12.7
16:36	121.3	25.9	15.2
16:37	113.9	31.8	17.1
16:38	120.7	33.2	18.3
16:39	103.9	29.1	18.0
16:40	102.9	22.6	15.7
16:41	90.7	16.2	14.1
16:42	68.1	11.5	10.1
16:43	53.3	8.4	5.9
16:44	57.5	7.0	6.0
16:45	63.2	6.3	7.8

process down

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
16:45	85.4	9.1	7.1
16:46	67.8	6.5	11.7
16:47	104.7	11.9	20.8
16:48	109.4	26.1	22.7
16:49	120.1	40.9	22.2
16:50	135.1	51.0	26.5
16:51	146.3	32.3	20.0
16:52	150.3	16.8	16.6
16:53	155.9	12.5	17.0
16:54	190.0	11.3	13.1
16:55	223.7	10.9	8.4
16:56	310.6	9.4	5.8
16:57	320.4	7.9	4.8
16:58	309.2	6.9	5.2
16:59	331.0	6.2	5.4
17:00	365.4	5.5	5.6
17:01	382.7	5.2	5.2
17:02	394.6	4.6	5.2
17:03	385.3	4.1	4.6
17:04	369.3	3.6	6.8
17:05	369.2	3.2	6.7
17:06	352.0	3.1	5.6
17:07	339.0	3.0	4.9
17:08	335.9	3.0	4.2
17:09	341.2	3.0	4.7
17:10	348.0	3.1	4.8
17:11	371.3	3.2	4.1
17:12	423.0	3.4	4.1
17:13	449.8	3.7	4.4
17:14	492.4	3.9	8.9
17:15	499.6	3.7	8.8
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:15	296.4	10.3	9.6
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
17:15	190.9	9.7	8.3
17:16	532.2	3.4	7.8
17:17	536.3	3.0	6.9
17:18	490.7	3.4	6.2
17:19	460.2	3.7	6.1
17:20	420.4	2.8	5.8
17:21	411.9	2.3	5.4
17:22	410.8	2.1	5.2
17:23	419.5	2.1	6.8
17:24	398.8	2.0	7.5
17:25	392.7	2.1	6.1
17:26	379.5	2.2	5.4
17:27	365.4	2.2	4.4
17:28	398.4	2.3	4.5

process down

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
17:29	424.9	2.3	4.0
17:30	452.7	2.4	4.0
17:31	434.7	2.5	4.6
17:32	444.0	2.5	4.1
17:33	443.8	2.4	4.2
17:34	436.9	2.2	4.7
17:35	424.6	2.2	4.0
17:36	398.7	2.2	4.2
17:37	407.8	2.1	4.1
17:38	391.9	2.0	3.7
17:39	436.5	2.2	3.2
17:40	473.4	2.6	3.5
17:41	482.5	2.8	3.7
17:42	492.6	2.9	3.6
17:43	492.0	2.8	3.8
17:44	486.7	2.7	3.5
17:45	451.0	2.5	3.6
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
17:45	439.7	2.5	4.8
17:46	434.3	2.3	2.9
17:47	394.8	2.4	1.1
17:48	376.6	2.3	3.3
17:49	343.9	2.2	3.1
17:50	328.1	2.2	2.9
17:51	325.7	2.1	2.7
17:52	329.0	2.0	3.0
17:53	334.0	2.0	3.2
17:54	373.0	2.1	3.2
17:55	399.9	2.2	2.8
17:56	364.8	2.2	3.5
17:57	337.7	2.2	3.6
17:58	309.0	2.1	3.0
17:59	295.7	2.0	3.3
18:00	234.8	1.8	2.9
18:01	267.9	1.9	2.1
18:02	388.8	2.1	1.9
18:03	403.2	2.4	3.1
18:04	398.8	2.9	3.4
18:05	396.9	3.5	3.5
18:06	390.7	3.6	3.6
18:07	404.2	3.2	3.4
18:08	395.6	3.0	3.1
18:09	378.0	2.8	3.1
18:10	370.4	2.8	3.3
18:11	388.7	2.6	2.6
18:12	384.7	2.5	3.0
18:13	438.5	2.6	2.9
18:14	456.5	2.6	3.0
18:15	464.0	2.5	2.7
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:15	370.3	2.4	3.0

process down

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
18:15	405.0	2.5	3.9
18:16	455.1	2.5	3.2
18:17	456.5	2.7	3.2
18:18	457.4	2.7	6.8
18:19	452.6	2.5	7.2
18:20	428.9	2.3	7.0
18:21	406.7	2.1	5.7
18:22	356.0	1.8	5.5
18:23	379.6	1.9	4.3
18:24	434.3	2.1	4.8
18:25	472.0 435	2.2	4.9
18:26	488.9	2.4	5.0 5
18:27	468.6	2.4 2	4.9
18:28	460.8	2.5	4.8
18:29	455.4	2.7	4.5
18:30	398.2	2.4	4.3
18:31	414.9	2.3	3.8
18:32	446.8	2.3	3.4
18:33	453.8	2.4	3.7
18:34	439.6	2.2	4.1
18:35	381.1	1.8	3.9
18:36	322.3	1.8	3.8
18:37	222.2	2.5	3.7
18:38	175.5	2.7	3.4
18:39	175.2	3.2	2.8
18:40	199.8	3.2	2.4
18:41	202.8	3.2	2.5
18:42	195.0	2.9	2.3
18:43	160.5	2.8	2.5
18:44	126.8	2.7	2.5
18:45	117.7	2.7	3.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
18:45	353.5	2.5	4.1
18:46	101.9	2.7	4.7
18:47	96.5	2.8	5.0
18:48	81.9	2.9	4.9
18:49	79.2	3.1	4.7
18:50	72.5	3.4	3.8
18:51	63.1	3.6	3.8
18:52	69.2	3.6	4.4
18:53	59.7	3.7	4.9
18:54	68.0	4.3	6.3
18:55	52.3	4.9	5.7
18:56	58.4	5.3	3.8
18:57	49.5	5.2	2.7
18:58	45.3	4.5	1.8
18:59	49.8	4.0	1.7
19:00	43.3	3.5	1.6
19:01	43.7	3.1	1.3
19:02	37.7	2.8	1.2

process down again

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
19:03	41.8	2.7	1.0
19:04	33.9	2.6	0.8
19:05	37.7	2.5	-0.0
19:06	37.9	2.4	-0.0
19:07	31.9	2.4	0.4
19:08	34.8	2.5	0.6
19:09	34.5	2.6	1.0
19:10	38.3	2.7	0.8
19:11	28.0	2.7	0.8
19:12	39.3	2.7	0.8
19:13	37.4	2.7	1.2
19:14	32.0	2.6	1.0
19:15	31.5	2.5	1.4
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
19:15	51.0	3.2	2.4
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
19:15	202.3	2.8	3.3
19:16	38.0	2.4	1.0
19:17	44.1	2.4	1.0
19:18	36.6	2.6	0.8
19:19	41.0	2.3	0.6
19:20	36.5	2.2	0.2
19:21	34.3	2.1	0.3
19:22	34.2	2.1	0.4
19:23	36.3	2.1	0.9
19:24	43.6	2.1	0.9
19:25	32.5	2.2	1.4
19:26	35.3	2.3	1.3
19:27	27.9	2.2	0.3
19:28	36.7	2.2	20.7
19:29	30.3	2.2	1.1
19:30	37.1	2.3	0.6
19:31	30.4	2.1	0.9
19:32	30.9	2.0	0.7
19:33	34.0	2.0	0.5
19:34	31.0	2.0	0.6
19:35	25.3	2.0	0.6
19:36	25.2	2.0	-0.0
19:37	32.4	2.1	-0.1
19:38	23.1	2.0	-0.1
19:39	30.7	2.0	0.1
19:40	28.9	2.0	-0.0
19:41	30.0	2.0	0.4
19:42	26.9	1.9	0.4
19:43	15.8	1.9	0.4
19:44	23.2	1.9	0.3
19:45	22.5	1.8	0.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
19:45	31.8	2.1	1.2

radio interference

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
19:46	25.6	1.7	0.8
19:47	18.9	1.7	1.2
19:48	22.3	1.7	0.4
19:49	29.7	1.7	-0.2
19:50	19.3	1.7	-0.1
19:51	24.9	1.7	-0.0
19:52	18.6	1.6	-0.2
19:53	22.5	1.7	0.2
19:54	28.5	1.7	0.2
19:55	32.0	1.7	0.5
19:56	21.1	1.7	0.3
19:57	23.3	1.7	0.7
19:58	22.6	1.7	0.7
19:59	21.5	1.7	0.8
20:00	28.4	1.7	-0.3
20:01	24.1	1.6	-0.2
20:02	24.3	1.6	0.2
20:03	20.2	1.6	1.0
20:04	21.6	1.6	0.6
20:05	19.1	1.6	0.8
20:06	21.0	1.6	0.9
20:07	24.6	1.6	0.8
20:08	20.0	1.7	0.5
20:09	19.7	1.6	0.7
20:10	18.7	1.7	-0.2
20:11	20.1	1.7	0.3
20:12	12.2	1.8	0.7
20:13	19.7	1.9	0.4
20:14	11.5	1.9	0.4
20:15	12.4	1.9	0.8

zero air

zero air

zero air

AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES

20:15	21.6	1.7	0.4

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

20:15	26.7	1.9	0.8
20:16	14.8	1.9	0.9
20:17	8.7	1.9	-0.7
20:18	6.7	1.9	-2.0
20:19	14.8	1.8	-1.4
20:20	5.3	4.7	-0.8
20:21	11.7	8.0	-1.4
20:22	6.7	5.6	-1.7
20:23	11.9	5.7	-1.1
20:24	7.9	22.8	-2.0
20:25	12.9	43.4	-1.8
20:26	12.5	57.8	-1.4
20:27	17.9	72.3	-0.8
20:28	13.7	98.4	-0.4
20:29	3.5	105.0	-0.5
20:30	8.5	108.9	-1.2
20:31	8.6	110.8	-2.0
20:32	13.8	110.8	-2.0

94 ppm HCl

HCl CHARACTERIZATION TEST PROGRAM / MAINE ENERGY RECOVERY COMPANY
12-12-1987

TIME	CHAN 1 INLET wetHCl	CHAN 2 MID wetHCl	CHAN 3 OUTLET dryHCl
20:33	8.0	110.3	-2.0
20:34	8.0	105.6	-2.1
20:35	9.9	104.0	-1.4
20:36	14.8	99.6	-1.3
20:37	3.1	33.8	-0.5
20:38	9.7	7.1	-0.4
20:39	5.0	4.3	-0.4
20:40	7.7	3.3	3.2
20:41	9.1	2.9	24.2
20:42	12.6	2.7	38.2
20:43	14.4	2.4	43.4
20:44	10.4	25.5	46.3
20:45	5.2	233.7	47.1
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
20:45	9.9	49.9	5.8
20:46	8.5	209.8	48.2
20:47	5.4	177.1	48.8
12.2	175.6	17.6	
20:49	5.6	183.8	49.6
20:50	12.8	217.1	49.7
20:51	9.6	224.5	49.3
20:52	10.7	227.8	49.0
20:53	0.6	183.6	32.9
20:54	5.0	0.2	9.8
20:55	7.5	0.2	5.4
20:56	5.4	0.2	3.2
20:57	18.6	0.2	2.5
20:58	147.2	0.2	3.8
20:59	275.1	0.2	3.5
21:00	324.9	0.2	1.9
21:01	361.9	0.2	0.3
21:02	373.8	0.2	-0.0
21:03	393.5	0.2	-0.0
21:04	413.1	0.2	-0.1
21:05	420.6	0.2	-0.1
21:06	426.0	0.2	-0.2
21:07	430.6	0.2	-0.1
21:08	443.4	0.2	-0.0
21:09	445.2	0.2	-0.3
21:10	447.2	0.2	-2.3
21:11	444.1	0.2	-0.6
21:12	451.6	0.2	60.9
21:13	450.0	0.2	137.4
21:14	445.7	0.2	0.3
21:15	459.9	0.2	0.5
AVERAGE VALUES FOR THE PREVIOUS 30 MINUTES			
21:15	242.1	53.5	20.1
AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA			
21:15	126.0	31.7	12.9

dynamic cal checks 47 ppm HCl

auto cal routine initiated

428 ppm cal gas

HCl CALIBRATION TEST PROGRAM MAINE ENERGY RECOVERY COMPANY 12-12-19

TIME	CHAN 1 INLET ppm	CHAN 2 MID ppm	CHAN 3 OUTLET ppm
21:16	445.7	0.2	-12.4
21:17	402.7	0.2	22.6
21:18	215.8	0.2	49.0
21:19	91.2	0.2	48.8
21:20	77.5	0.2	49.4
21:21	76.4	0.2	49.4
21:22	71.7	0.2	48.9
21:23	65.1	0.2	7.0
21:24	65.2	0.2	0.4
21:25	58.5	0.2	0.0
21:26	58.0	0.2	-0.1
21:27	61.0	0.1	0.2
21:28	59.0	0.1	0.3

47 ppm span cal

COMMENTS: End Run #3 and calibration checks.

APPENDIX B.

Sample Calculations

SAMPLE CALCULATIONS

I. Calibration Corrections

From EPA Method 6C:

$$C_{gas} = (\bar{C} - C_o)\frac{C_{ma}}{C_m - C_o}$$

where:

C_{gas} Effluent gas concentration (corrected)

$\bar{C}$ - Average gas concentration indicated by gas analyzer

C_o - Average of initial and final calibration resonses for zero gas

C_m = Average of initial and final calibration responses for upscale calibration gas

C_{ma} = Actual concentration of upscale calibration gas

For Run 1 (Inlet Location) from 15:30 to 16:30:

C_{gas} = (501 - 29)(428)/(473 - 29)
= 455 ppm HCl (wet basis)

II. Moisture Corrections

For Run 1 (Inlet Location) from 15:30-16:30:

moisture content = 14.7% H_2O
HCl concentration = 501 ppm (wet basis)

Proportion of water vapor, by volume (B_{ws}):

B_{ws} = % H_2O/100

Dry basis HCl concentration (C_o) from wet basis concentration (C_w):

$C_o = C_w/(1-B_{ws})$

From Test Condition 1 (Inlet) from 15:30-16:30:

B_{ws} = 14.7/100
= 0.147

C_o = 501/(1 - 0.147)
= 533 ppm HCl (dry basis)

III. Percent Reduction

$$PR = 1 - \frac{C_{OUT}\ V_{OUT}}{C_{IN}\ V_{IN}} \times 100$$

where:

PR = percent reduction of HCl

C_{IN} = concentration of HCl at the inlet (dry basis)

V_{IN} = volumetric flow rate at the inlet (DSCFM)

C_{OUT} = concentration of HCl at the outlet (dry basis)

V_{OUT} = volumetric flow rate at the outlet (DSCFM)

For Test Condition 1 from 15:30 to 16:30

$$PR = 1 - \frac{66(39,700)}{533(39,900)} \times 100$$

$$= 87.7\% \text{ (see Table 2.4)}$$

APPENDIX C.

Daily Calibration Sheets

HCL CALIBRATION DRIFT
DAILY WORKSHEET

Run # 1 Pre-test

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/9/87 TIME ~1445 PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0-250 ppm	0-268 ppm		0-900 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	0 ppm / 51 ~~48~~ ppm	1 ppm / 89 ppm		4 ppm / 438 ppm	
DIFFERENCE (RESPONSE-CAL GAS VALUE)	0 ppm / 4 ppm	1 ppm / -5 ppm		4 ppm / 10 ppm	
PERCENT SPAN (PASS/FAIL)	0% / 1.6 ~~0.9~~ %	0.4% / 1.9%		0.4% / 1.1%	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) 48 ppm conducted prior to dynamic cal	LIQUID STANDARD (Values in mV) SLOPE = -50.9 mV U0 = -46.7 mV U1 = 154.1 mV U2 = 60.3 mV conducted prior to dynamic cal	NA	NA	
COMMENTS					

4112DR15

Pre and Post Test Calibration Check Worksheet

HCL CALIBRATION DRIFT

DAILY WORKSHEET

Run # 1 Post-test

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/9/87 TIME 1910 - PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0-250 ppm	0-268 ppm		0-500 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	0 ppm / 51 ppm	2 ppm / 99 ppm		54 ppm / 508 ppm	
DIFFERENCE (RESPONSE - CAL GAS VALUE)	0 ppm / 4 ppm	2 ppm / 5 ppm		54 ppm / 80 ppm	
PERCENT SPAN (PASS/FAIL)	0 % / 1.6 %	0.7 % / 1.9 %		6.0 % / 8.9 %	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) 49 ppm conducted after the dynamic cal	LIQUID STANDARD (Values in mV) SLOPE = -50.1 mV U0 = -45.4 mV U1 = 152.1 mV U2 = 59.8 mV conducted after dynamic cal	NA	NA	
COMMENTS					

4112DR15

HCL CALIBRATION DRIFT

DAILY WORKSHEET

Run # 2 Pre-test

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/10/87 TIME 0910 - 1050 PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0 - 250 ppm	0 - 268 ppm		0 - 900 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	0 ppm / 51 ppm	2 ppm / 89 ppm		5 ppm / 440 ppm	
DIFFERENCE (RESPONSE - CAL GAS VALUE)	0 ppm / 4 ppm	2 ppm / -5 ppm		5 ppm / 12 ppm	
PERCENT SPAN (PASS/FAIL)	0% / 1.6%	0.7% / 1.9%		0.6% / 1.3%	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) 49 ppm performed ~~appear~~ prior to dynamic cal check	LIQUID STANDARD (Values in mV) SLOPE = -51.6 UO = -51.7 U1 = 152.2 U2 = 56.9 performed prior to dynamic cal check	NA	NA	
COMMENTS					

4112DR15

Pre and Post Test Calibration Check Worksheet

HCL CALIBRATION DRIFT

Run #2 Post-test

DAILY WORKSHEET

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/10/87 TIME 1805- PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0-250 ppm	0-268 ppm		0-900 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	-0.5 ppm / 50 ppm	1 ppm / 75 ppm		10 ppm / 447 ppm	
DIFFERENCE (RESPONSE-CAL GAS VALUE)	~~-0.5 ppm~~ / 3 ppm -0.5 ppm / 3 ppm	1 ppm / -19 ppm		10 ppm / 19 ppm	
PERCENT SPAN (PASS/FAIL)	-0.2% / 1.2%	0.4% / -7.1%		1.1% / 2.1%	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) _____	LIQUID STANDARD (Values in mV) SLOPE = -50.7 U0 = -46.0 U1 = 153.9 U2 = 60.5	NA	NA	
COMMENTS					

C-6

4112DR15

Pre and Post Test Calibration Check Worksheet

HCL CALIBRATION DRIFT Run #3 Pre-test

DAILY WORKSHEET

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/12/87 TIME 0815 - 0950 PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0-250 ppm	0-268 ppm		0-900 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	0 ppm / 48 ppm	1 ppm / 88 ppm		3 ppm / 432 ppm	
DIFFERENCE (RESPONSE-CAL GAS VALUE)	0 ppm / 1 ppm	1 ppm / -6 ppm		3 ppm / 4 ppm	
PERCENT SPAN (PASS/FAIL)	0% / 0.4%	0.4% / -2.2%		0.3% / 0.4%	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) 48 ppm ↳ conducted prior to dynamic cal check	LIQUID STANDARD (Values in mV) SLOPE = -51.4 U0 = -50.3 U1 = 152.8 U2 = 57.9 ↳ conducted prior to dynamic cal check	NA	NA	
COMMENTS					

4112DR15

Pre and Post Test Calibration Check Worksheet

HCL CALIBRATION DRIFT

DAILY WORKSHEET

Run #3 Post-test

SOURCE AND LOCATION Maine Energy Recovery Company - Biddeford, Maine Side A

DATE 12/12/87 TIME 2010 - 2130 PERSON CONDUCTING TEST Shanklin

	BODENSEEWERK	COMPUR	~~LEAR SIEGLER~~	TECO	~~(OTHER)~~
OPERATING RANGE	0 - 250 ppm	0 - 268 ppm		0 - 900 ppm	
CALIBRATION GAS VALUE	0 ppm / 47 ppm	0 ppm / 94 ppm		0 ppm / 428 ppm	
MONITOR RESPONSE TO CAL GAS	-1 ppm / 49 ppm	2 ppm / 111 ppm		7 ppm / 452 ppm	
DIFFERENCE (RESPONSE - CAL GAS VALUE)	-1 ppm / 2 ppm	2 ppm / 17 ppm		7 ppm / 24 ppm	
PERCENT SPAN (PASS/FAIL)	-0.4% / 0.8%	0.7% / 6.3%		0.8% / 2.7%	
MONITOR RESPONSE TO INTERNAL STANDARD	GAS CELL VALUE (47 ppm) 49 ppm	LIQUID STANDARD (Values in mV) SLOPE = -48.4 U0 = -41.0 U1 = 150.1 U2 = 60.8	NA	NA	
COMMENTS	performed after the dynamic cal checks				

4112DR15

Pre and Post Test Calibration Check Worksheet

APPENDIX D.

Daily System Checklists

HCl CEMS DAILY INSPECTION CHECK LIST

Characterization Test - Marion County Facility

Date 12/9/87

Initials SAS

Run 1

TECO Model 15 Analyzer/Model 200 Dilution System

M200 Control Unit		
Aspirator Air Pressure	50	psi
Orifice Vacuum	- 20 inHg ~~psi~~	
Zero Air Flow Rate	4	scfh
Calibration Gas Flow Rate	4	scfh
TECO 15		
Sample Flow Rate	1.0	lpm
Zero Pot Setting	476	
Span Pot Setting	360	

Compur 4150 ZGSM/4330 Dilution System

4330 Dilution Control Unit		
Aspirator Air Delivery Pressure	60	psi
Orifice Vacuum	-8.2	psi
Probe Temperature	187	°C
4150 ZGSM		
Analyzer Sample Flow Rate	450	lph (3.1 bar)
Analyzer Inlet Pressure	45	psi
System Vacuum	-140 mbar ~~psi~~	
Printer Paper Supply Adequate	Yes ✓ No	
Absorbing Solution Tank Level (Capacity, 20 l)	7	l
Waste Tank Level (Capacity, 20 l)	12	l
Calibration Solution Tank Level (Capacity, 2 l)	0.75	l

Bodenseewerk

Sampling System Flow Rate	500 lph ~~lpm~~	
System Blow Back Air Pressure	2.3 bar ~~psi~~	
Strip Chart Recorder Paper Supply OK	Yes ✓ No	
Strip Chart Recorder Pens Inking	Yes ✓ No	
Heater Temperatures Within Limits	Yes ✓ No	

Auxiliary Checks

Compressor Delivery Air Pressure	100	psi
Compressor Air Line Leaks Detected	Yes No ✓	
Electrical Power Supply Adequate	Yes ✓ No	

HCl CEMS DAILY INSPECTION CHECK LIST

Characterization Test - Marion County Facility

Date 12/10/87

Initials SAS

Run 2

TECO Model 15 Analyzer/Model 200 Dilution System

M200 Control Unit

Aspirator Air Pressure	50	psi
Orifice Vacuum	-20 in. Hg	~~psi~~
Zero Air Flow Rate	4	scfh
Calibration Gas Flow Rate	4	scfh

TECO 15

Sample Flow Rate	1.0	lpm
Zero Pot Setting	616	adjusted after blowing out SFC with compress
Span Pot Setting	360	

Compur 4150 ZGSM/4330 Dilution System

4330 Dilution Control Unit

Aspirator Air Delivery Pressure	60	psi (4.1 bar)
Orifice Vacuum	-8.1	psi (-0.56 bar)
Probe Temperature	188	°C

4150 ZGSM

Analyzer Sample Flow Rate	440 ~~500~~	lph
Analyzer Inlet Pressure	47	psi
System Vacuum	-142 mbar	~~psi~~
Printer Paper Supply Adequate	Yes ✓ No	
Absorbing Solution Tank Level (Capacity, 20 l)	6	l
Waste Tank Level (Capacity, 20 l)	14	l
Calibration Solution Tank Level (Capacity. 2 l)	0.6	l

Bodenseewerk

Sampling System Flow Rate	500 lph	~~lpm~~
System Blow Back Air Pressure	2.1 bar	~~psi~~
Strip Chart Recorder Paper Supply OK	Yes ✓ No	
Strip Chart Recorder Pens Inking	Yes ✓ No	
Heater Temperatures Within Limits	Yes ✓ No	

Auxiliary Checks

Compressor Delivery Air Pressure	100	psi
Compressor Air Line Leaks Detected	Yes No ✓	
Electrical Power Supply Adequate	Yes ✓ No	

HCl CEMS DAILY INSPECTION CHECK LIST

Characterization Test - Marion County Facility

Date 12/12/87

Initials SAS

Run 3

TECO Model 15 Analyzer/Model 200 Dilution System

M200 Control Unit

Aspirator Air Pressure	50	psi
Orifice Vacuum	-19.5 in Hg ~~psi~~	
Zero Air Flow Rate	4	scfh
Calibration Gas Flow Rate	4	scfh

TECO 15

Sample Flow Rate	1.0	lpm
Zero Pot Setting	612	
Span Pot Setting	360	

Compur 4150 ZGSM/4330 Dilution System

4330 Dilution Control Unit

Aspirator Air Delivery Pressure	55	psi (3.8 bar)
Orifice Vacuum	-7.5	psi (-0.52 bar)
Probe Temperature	188	°C

4150 ZGSM

Analyzer Sample Flow Rate	450	lph
Analyzer Inlet Pressure	46	psi (3.1 bar)
System Vacuum	-150 mbar	~~psi~~
Printer Paper Supply Adequate	Yes ✓ No ___	
Absorbing Solution Tank Level (Capacity, 20 l)	4	l
Waste Tank Level (Capacity, 20 l)	16	l
Calibration Solution Tank Level (Capacity, 2 l)	0.5	l

Bodenseewerk

Sampling System Flow Rate	500 lph	~~lpm~~
System Blow Back Air Pressure	2.1 bar	~~psi~~
Strip Chart Recorder Paper Supply OK	Yes ✓ No ___	
Strip Chart Recorder Pens Inking	Yes ✓ No ___	
Heater Temperatures Within Limits	Yes ✓ No ___	

Auxiliary Checks

Compressor Delivery Air Pressure	100	psi
Compressor Air Line Leaks Detected	Yes ___ No ✓	
Electrical Power Supply Adequate	Yes ✓ No ___	

APPENDIX E.

Quality Assurance Data

EPA REFERENCE METHOD 6 (SO_2)
SAMPLING DATA

PLANT/LOCATION MIRC JOB# _____

SAMPLING LOCATION Baghouse Outlet

RUN # 1 ANALYST IC/CM DATE 12/7/87

STACK TEMPERATURE _____ °F METER BOX # Singer 13

AMBIENT TEMPERATURE _____ °F METER BOX FACTOR, Y 0.970

BAROMETRIC PRESSURE, P 30.3 in. Hg

CLOCK TIME	DRY GAS METER READING (~~ft³~~ ℓ)	ROTAMETER SETTING (cfh)	DRY GAS METER TEMPERATURE (°F)
16 20	3158.433	1 ℓ/m	50
16 26	3161.500		50
16 30	3165.000		50
16 35	3169.520		50
16 40	3174.858		50
TOTAL VOLUME = V_m	18.425 (~~ft³~~ ℓ)	AVG. TEMP = $t_{m\,(avg)}$	50 (°F)

AVERAGE METER TEMP., T_m = (460 + $t_{m\,(avg)}$) = _____ °R

STD GAS METER VOLUME, $V_{m(std)}$ 18.731 dscf

$$V_{m(std)} = (V_m)\,(Y)\,(17.64\ °R/in.\ Hg)\,(P_{bar}/T_m)$$

COMMENTS:

EPA REFERENCE METHOD 6 (SO_2)
SAMPLING DATA

PLANT/LOCATION MIRC JOB# _____

SAMPLING LOCATION BAghouse outlet

RUN # 2 ANALYST C.L.H DATE 12/7/87

STACK TEMPERATURE _____ °F METER BOX # Singer 13

AMBIENT TEMPERATURE _____ °F METER BOX FACTOR, # 0.970

BAROMETRIC PRESSURE, P ~~29.3~~ 30.3 in. Hg

CLOCK TIME	DRY GAS METER READING (ft^3)	ROTAMETER SETTING (cfh)	DRY GAS METER TEMPERATURE (°F)
10 53	3174.957	1 cfm	50
17 00	3178.500		51
17 05	3182.600		52
17 10	3186.600		52
17 15	3190.439		52
TOTAL VOLUME = V_m	15.488 (ft^3)	AVG. TEMP = $t_{m\,(avg)}$	51 (°F)

AVERAGE METER TEMP., T_m = (460 + $t_{m\,(avg)}$) = _____ °R

STD GAS METER VOLUME, $V_{m(std)}$ 15.714 dscf

$$V_{m(std)} = (V_m)\,(Y)\,(17.64\ °R/in.\ Hg)\,(P_{bar}/T_m)$$

COMMENTS:

EPA REFERENCE METHOD 6 (SO_2)
SAMPLING DATA

PLANT/LOCATION MIRC JOB# _____

SAMPLING LOCATION Baghouse Outlet

RUN # 3 ANALYST M. Ickes DATE 12/7/87

STACK TEMPERATURE _____ °F METER BOX # Singer 13

AMBIENT TEMPERATURE _____ °F METER BOX FACTOR, ¥ 0.970

BAROMETRIC PRESSURE, P ~~29.3~~ 30.3 in. Hg

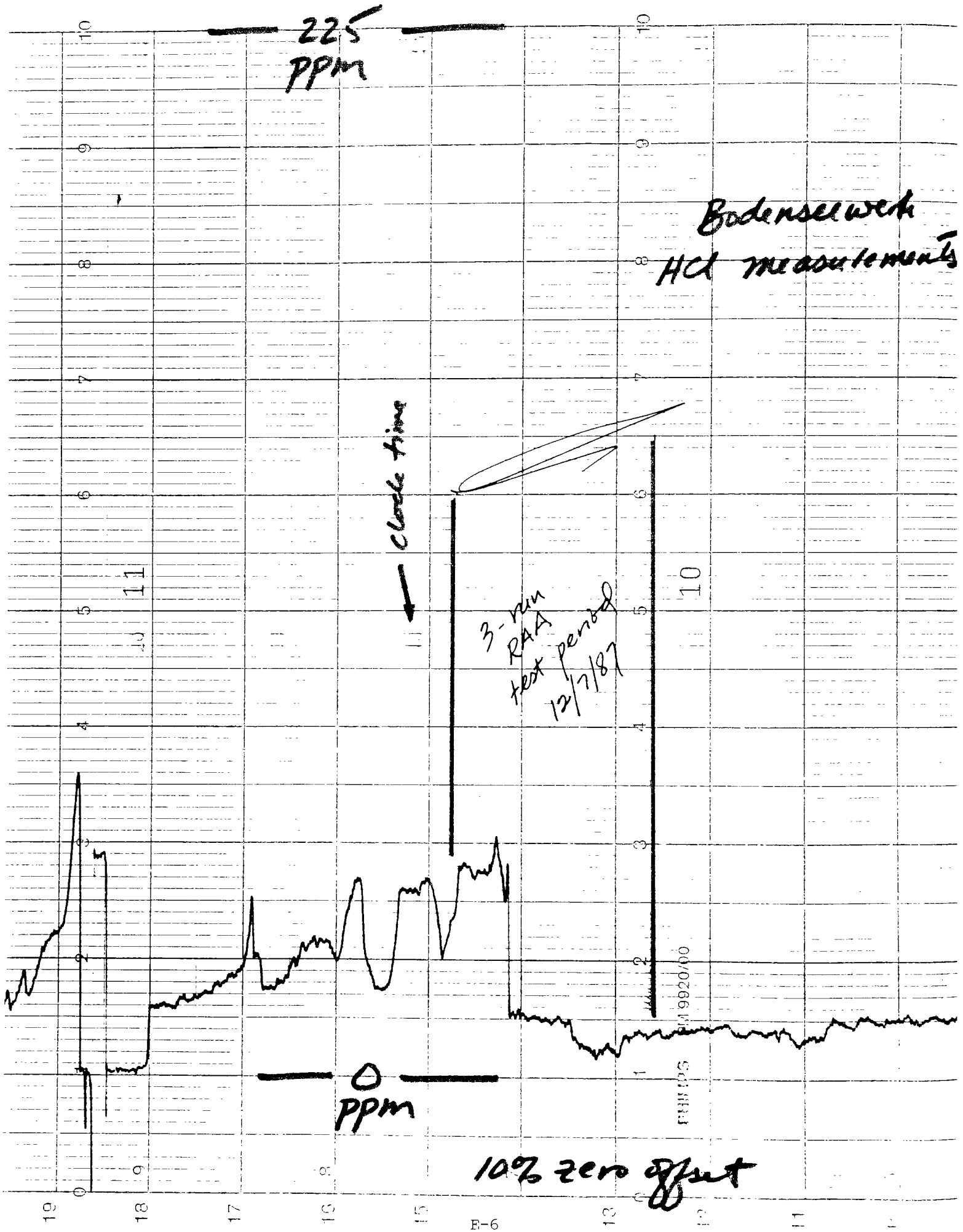
CLOCK TIME	DRY GAS METER READING (~~ft³~~ ℓ)	ROTAMETER SETTING (~~cfh~~)	DRY GAS METER TEMPERATURE (°F)
17:25	3190.506	1 ℓ/m	52
17:30	3194.600		52
17:35	3198.500		52
17:40	3204.200		52
17:45	3208.393		52
TOTAL VOLUME = V_m	14.381 (ft³)	AVG. TEMP = $t_{m\,(avg)}$	52 (°F)

AVERAGE METER TEMP., T_m = (460 + $t_{m\,(avg)}$) = _____ °R

STD GAS METER VOLUME, $V_{m(std)}$ 14.619 dscf

$V_{m(std)} = (V_m)\ (¥)\ (17.64\ °R/in.\ Hg)\ (P_{bar}/T_m)$

COMMENTS:


225 PPM
Bodenseewerk HCl measurements
clock time
3-run RAA test period 12/7/87
0 PPM
10% zero offset

CUSTODY SHEET FOR REAGENT BOX # _____

Date of Makeup _____ Initials _____ Locked? _____

Individual Tare of Reagent: _____ mls. of _____

Individual Tare of Reagent: _____ mls. of _____

PLANT NAME Maine Energy Recovery Company

SAMPLING LOCATION Side A Baghouse outlet

Run Number	Date Used	Initials	Locked?	Date Cleanup		Initials	Locked?
1	12/7/87	KH		12/7/87			
2	12/7/87	KH		12/7/87			
3	12/7/87	KH		12/7/87			

	Date	Initials	Locked?
Received in Lab	12/17/87	EMS	

Sampling Method: Ion Chromatograph using HPLC

Remarks:

APPENDIX F.

HCl Calibration Cylinder Gases

The following calibration gases were used during this test program.

HCl Calibration Gas Cylinders

Cylinder No.	Tag Value	Balance Gas
K-9933	47 ppm	Nitrogen
K-9308	94 ppm	Nitrogen
K-9841	221 ppm	Nitrogen
K-9983	428 ppm	Nitrogen
K-9860	881 ppm	Nitrogen

CO Calibration Gas Cylinders

Cylinder No.	Tag Value (EPA Protocol 1)	Balance Gas
AAL-1517	50.8 ppm	Nitrogen
AAL-5330	438.8 ppm	Nitrogen

APPENDIX G.

Bodenseewerk Operation Procedures

BODENSEEWERK OPERATIONAL PROCEDURES

The entire Bodenseewerk sampling and analytical system is heated to maintain a sample gas temperature of 180°C (356°F). When the analyzer is turned on, a warm-up period of 1 hour is necessary for all the temperatures (probe, sample transport line, pump, and sample cell) to reach their set points and stabilize. A microprocessor monitors the system's parameters; at the conclusion of the warm-up period, the system is ready for calibration.

The Model 677 employs zero air and an internal sealed gas cell for zero and upscale calibration checks. The monitoring system is also capable of accepting calibration gas; the gas injection point is located at the probe. The probe also is backflushed with compressed air during the calibration sequence.

The operator can program the time intervals desired for the automatic calibrations performed using zero air and the internal calibration cell. The duration of the calibration cycle is also selected by the operator. First, the entire sampling system is flushed with zero air to achieve a zero condition. Any drift that may be detected then is corrected by the zero compensation circuit. Then, while the zero air is still flowing through the system, a gas cell filled with a known quantity of HCl gas is positioned so that the infrared light passes through the gas cell. After the response to the gas cell is recorded, the analyzer returns to the flue gas sampling mode.

A dynamic calibration of the system is possible by putting the analyzer in the "standby" mode and replacing the zero air delivery line connected to the probe with a calibration gas transport line. A flowmeter within the analyzer cabinet indicates the rate of sample flow exiting the optical cell. The flow rate of the calibration gas through the system can be observed using that flow meter, and should be identical to the flow rate when sampling flue gas. The cylinder regulator should be adjusted to deliver the proper flow.

APPENDIX H.

Thermo Electron Operational Procedures

THERMO ELECTRON OPERATIONAL PROCEDURES

Prior to calibration of the system, it should be ascertained that the analyzer is operating properly. A check of the internal diagnostics will indicate if the condition of any component requires corrective action, i.e., an element needs to be checked, cleaned, or replaced if found to be defective.

When the power is turned on, the analyzer automatically enters the start-up mode; the source turns on, all electronics are turned on, the chopper motor and sample pump turn on, the heater in the pressure transducer turns on, and the program initializes itself. After the source stabilizes, the instrument automatically goes into the "Run - Sample" mode. The analyzer should be allowed to warm-up for one hour, then the instrument service checks should be performed.

When calibrating the instrument, three thumbwheel switches are used to set the zero reading of the instrument. There are also three thumbwheel switches available to set the instrument to the concentration of an upscale calibration gas. If the instrument is zeroed first, use of the span switches will not affect the zero setting.

A three-position switch located on the front panel of the M200 probe control unit is used to manually select flue gas sample, zero air, or calibration gas flow through the sampling system. The two flow meters visible through the front panel indicate zero air or span gas flow when in the calibration mode. A vacuum gauge indicates the vacuum at the probe downstream of the orifice. The dilution air and zero air gauges and regulators are located behind the front panel.

The calibration checks can be performed both on the analyzer and the entire monitoring system. The zero and upscale calibration gases can be injected directly into the analyzer, and the zero and span controls can be adjusted to establish the instrument's calibration. Calibration of the total monitoring system is performed by the injection of zero and calibration gas through a transport line to a point within the probe, upstream of the critical orifice. In this way, the calibration gas follows the same path through all the conditioning steps (i.e., filtering and dilution) taken by the flue gas sample.

APPENDIX I.

Compur Operation Procedures

COMPUR OPERATIONAL PROCEDURES

The instrument requires a short period of time for start-up after the system is turned on. The warm-up serves to heat the probe and internal lines through which the gas sample passes. After temperatures reach set points, time is taken for vacuum to build up in the system, since the 20 liter air volume of the empty discharge tank must also be evacuated. After stabilization of the vacuum, the sample flow rate into the analyzer is adjusted to 400 l/hr by needle valve adjustment.

The flow rate of the absorbing solution should be checked so that the targeted enrichment can be maintained throughout the operational period. Accurate adjustment of the absorbing solution feed rate and the gas sample flow rate is important for the accuracy of the measurement.

The calibration program is then initiated. The transport line for the gas sample is flushed with compressed air and the electrodes are rinsed with absorption solution. After the zero value is recorded, the calibration solution (typically 70% of the measuring range) passes between the two electrodes and the upper calibration point is determined. If either of the calibration limits are exceeded, the computer attempts the calibration a second time. If a desired result is not obtained after a third attempt, the instrument goes into a "standby" mode and the problem needs to be investigated. The entire program can be restarted by pressing INIT. After completing a successful calibration, the analyzer goes into the flue gas measuring mode, if the dilution system is ready.

The probe may be installed up to a distance of 65 feet from the control unit. (At distances greater than 65 feet, the dilution ratios provided by Compur at the various aspirator air pressures measured at the control unit cannot be used, due to the probable pressure drop through the longer length of transport tubing. The dilution ratio should be checked using non-reactive calibration gases and an appropriate, independent analyzer.) Dry controlled air at a pressure greater than 90 psi is necessary for aspirator air and zero air. The aspirator air pressure is adjusted between 40 and 80 psi with the aid of a pressure regulator and gauge located on the front panel of the probe control unit. The pressure is chosen depending on the desired dilution ratio. The vacuum gauge must indicate a pressure between -7 and -9.5 psi in order for the orifice to operate within the critical region.

The entire measurement system, including both the sampling and analytical equipment, can be calibrated by injecting calibration gas into the chamber within the dilution probe between the inlet filter and the orifice. Compressed air injected in the same manner serves not only to produce a zero condition, but also to back flush the probe tip filter.

A three-way valve serves to select zero gas or calibration gas. The delivery pressure at the regulator connected to the calibration gas cylinder should be adjusted to 15 psi in order to provide sufficient flow to the probe.

Since the dilution probe supplies approximately 33 liters/min diluted sample and the analyzer uses only 7 liter/min, a "tee" must be mounted on the sample line to exhaust the excess sample flow.

APPENDIX J.

Wet Chemical Sampling/Analytical Procedures

The wet chemical procedure used for sampling hydrogen chloride (HCl) in the MWC emissions involved absorbing the HCl into a 0.1N sodium hydroxide (NaOH) solution. The stack samples collected at MERC were transported to Entropy's laboratory for ion chromatographic (IC) analysis.

The HCl samples were collected with a sampling train similar to a Method 6 train. The first three impingers contained 15 ml each of 0.1N NaOH. The fourth impinger (a Mae West design) was filled with calcium sulfate (Drierite) to protect the meter box from moisture. The sampling rate was 2 liters per minute with a sampling time of 20 minutes. Sample recovery involved quantitatively combining the contents of all three impingers. Deionized (DI) water was used to rinse the sampling train components. The total volume for each sample and rinse was kept below 100 ml.

For analysis, the samples were quantitively transferred to 100 ml volumetric flasks and volumed to 100 ml with D.I. H_2O. The samples were split and then transported to the Entropy laboratory.

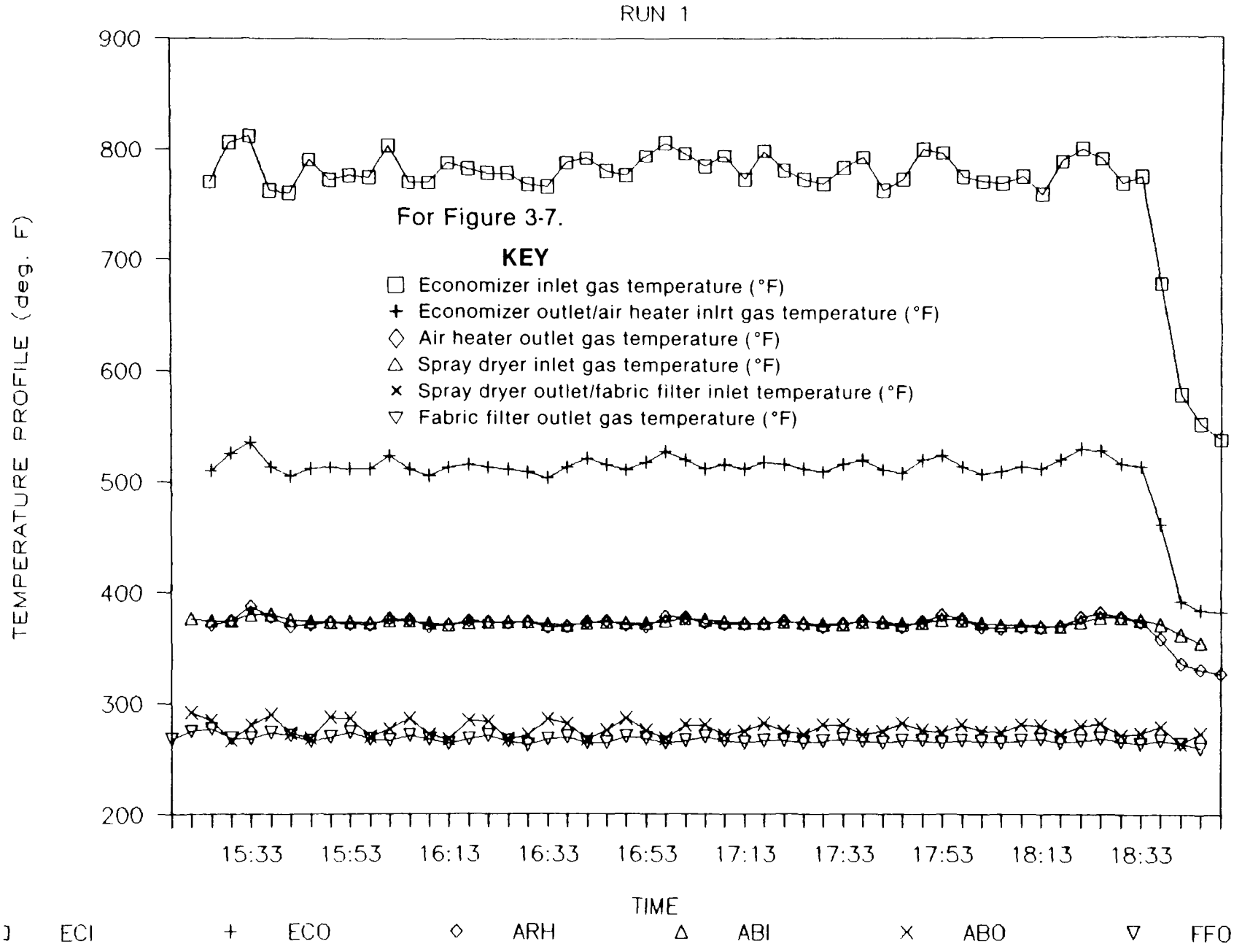
The ion chromatographic (IC) analysis was performed in Entropy's laboratory using a Perkin-Elmer high-performance liquid chromatograph (HPLC). The analysis was performed by non-suppressed ion chromatography on a low-capacity resin-based ion exchange column (Hamilton PRP-X100) using a 1.0 mM phathlate mobile phase with the pH adjusted to 4.5 with a saturated sodium borate solution. Forty (40)-ml aliquots of each sample were used for the IC analysis and did not require any pretreatment. The quantifiable detection limit for the IC analysis is 4 ppm HCl.

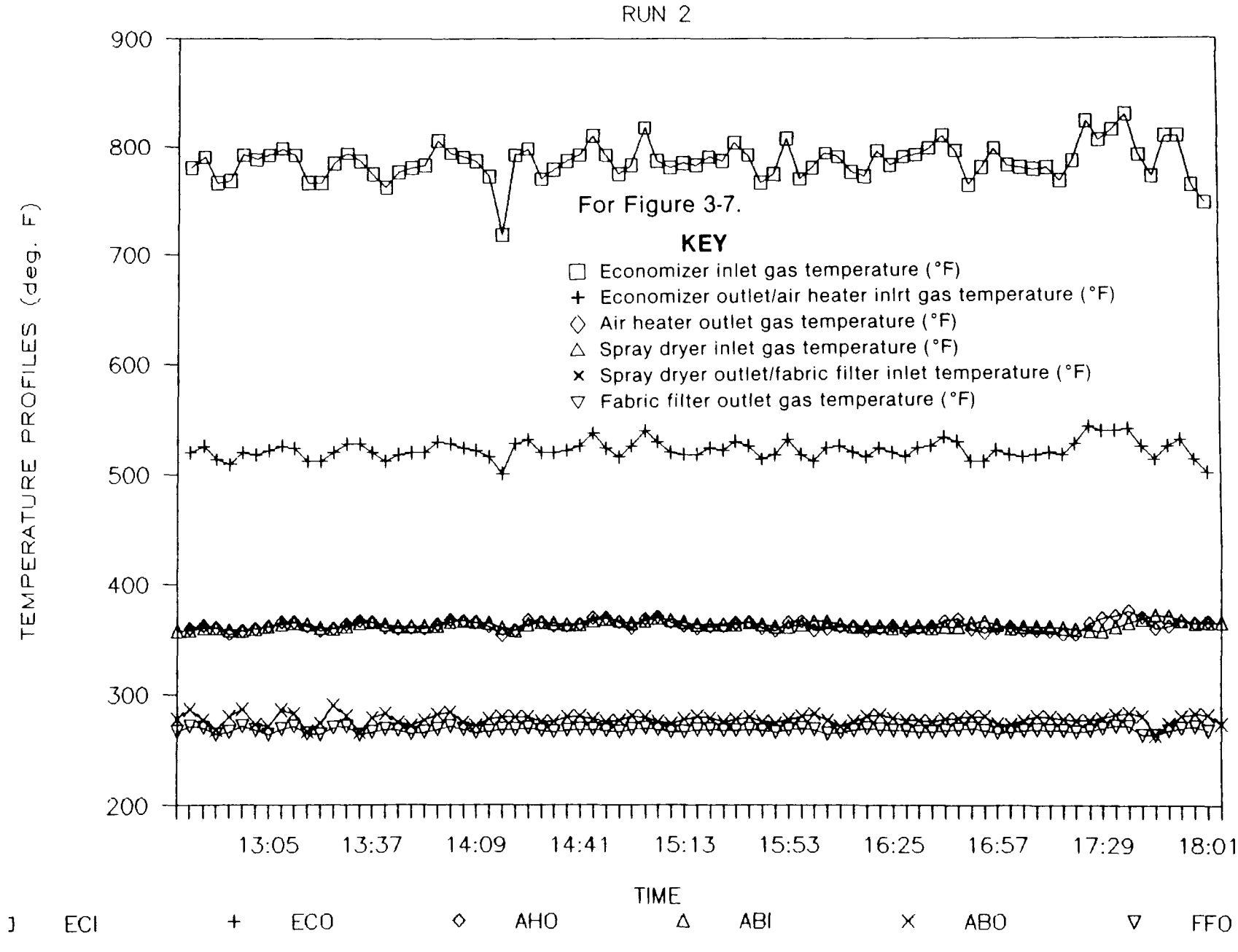
All the sampling components contacting the stack gases were constructed of glass. A glass-lined probe and glass components were used to convey the stack gas to the first impinger. A three-way glass valve was mounted in-line directly upstream of the first impinger.

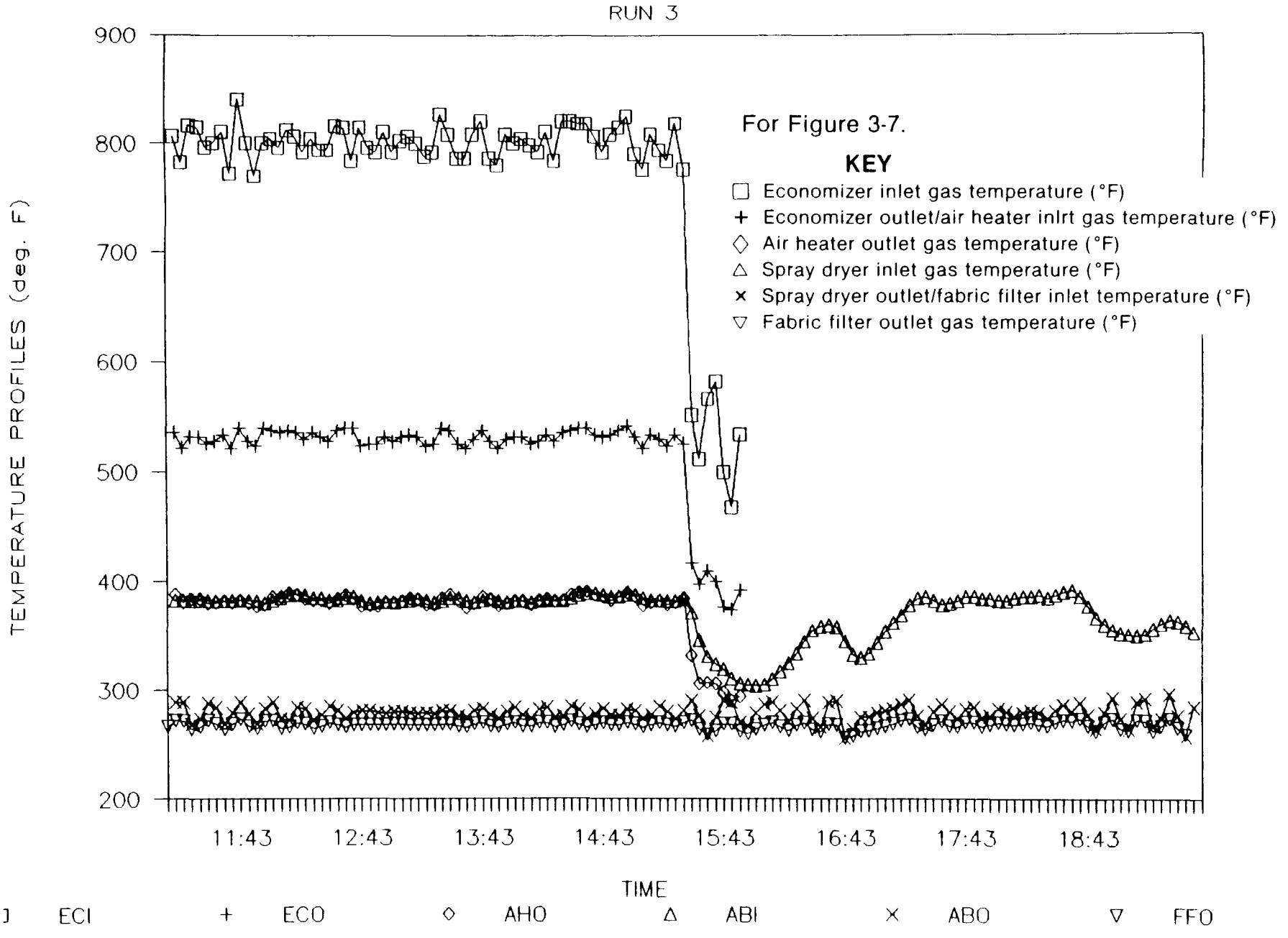
It was important to maintain the gas sample temperature above the water dew point until the sample reached the first impinger. This was accomplished by wrapping a heating element around the glass components of the train between the heated probe and the first impinger.

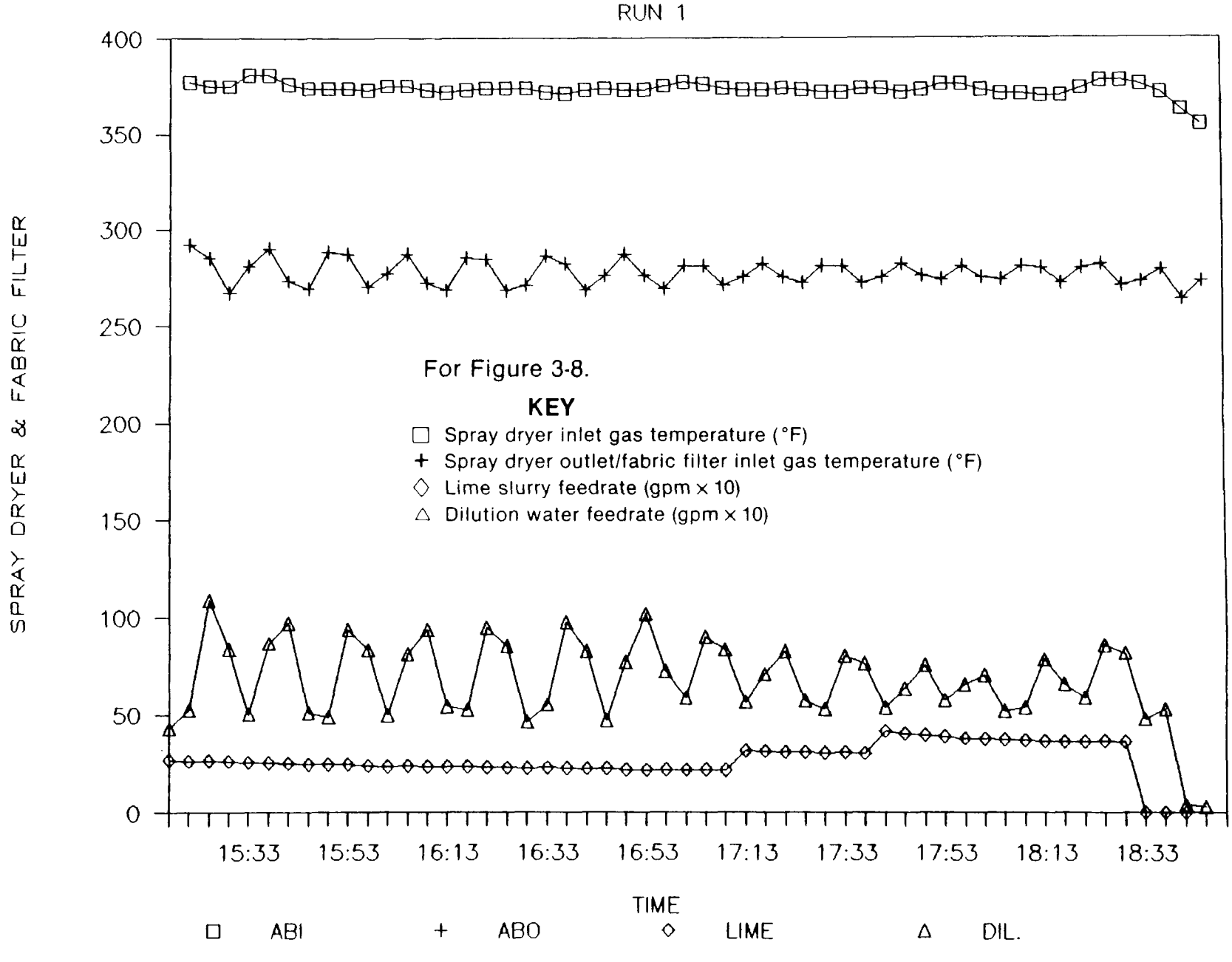
APPENDIX K.

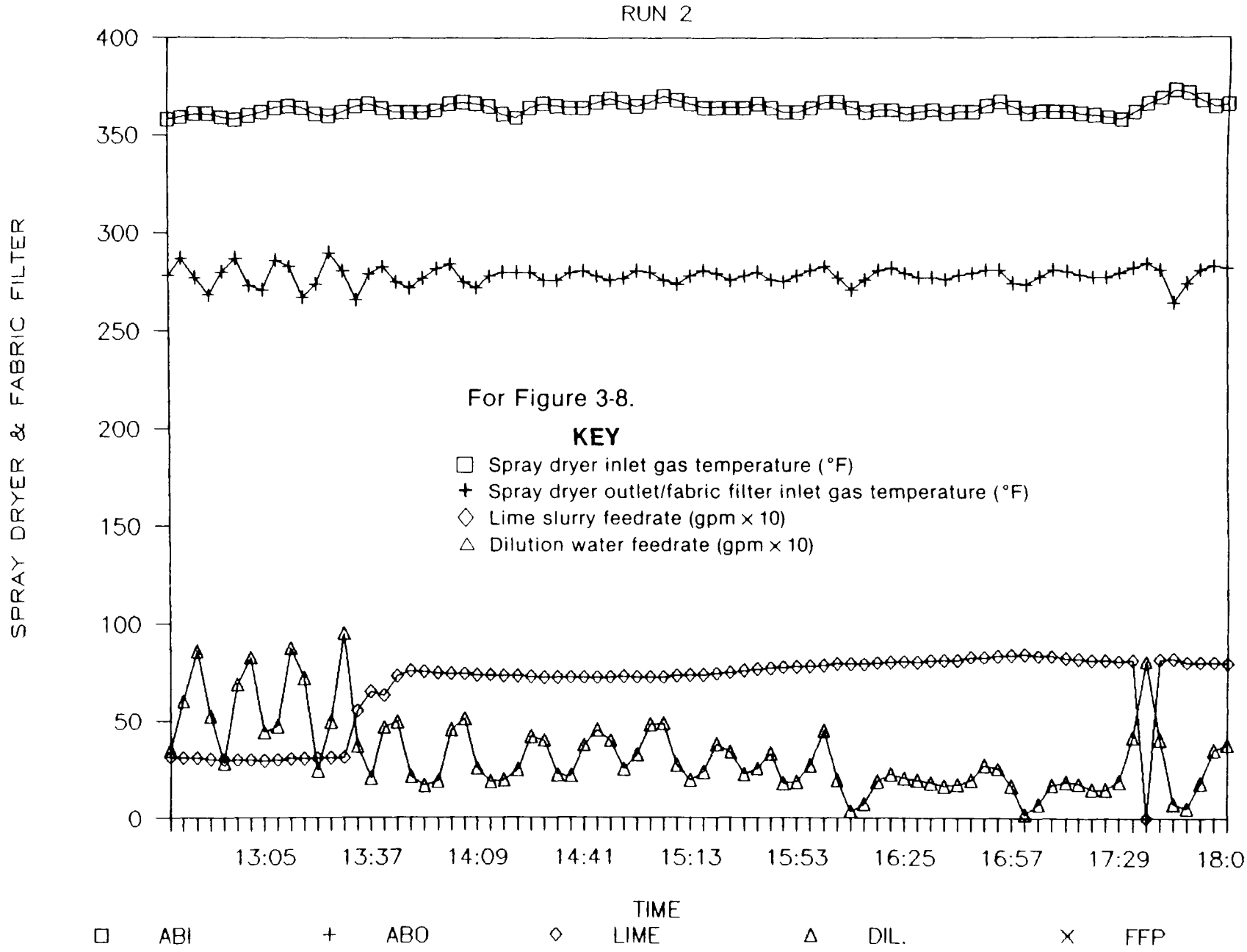
Spray Dryer Operating Data
- Full size plots of operating data
- Printouts of four-minute readings

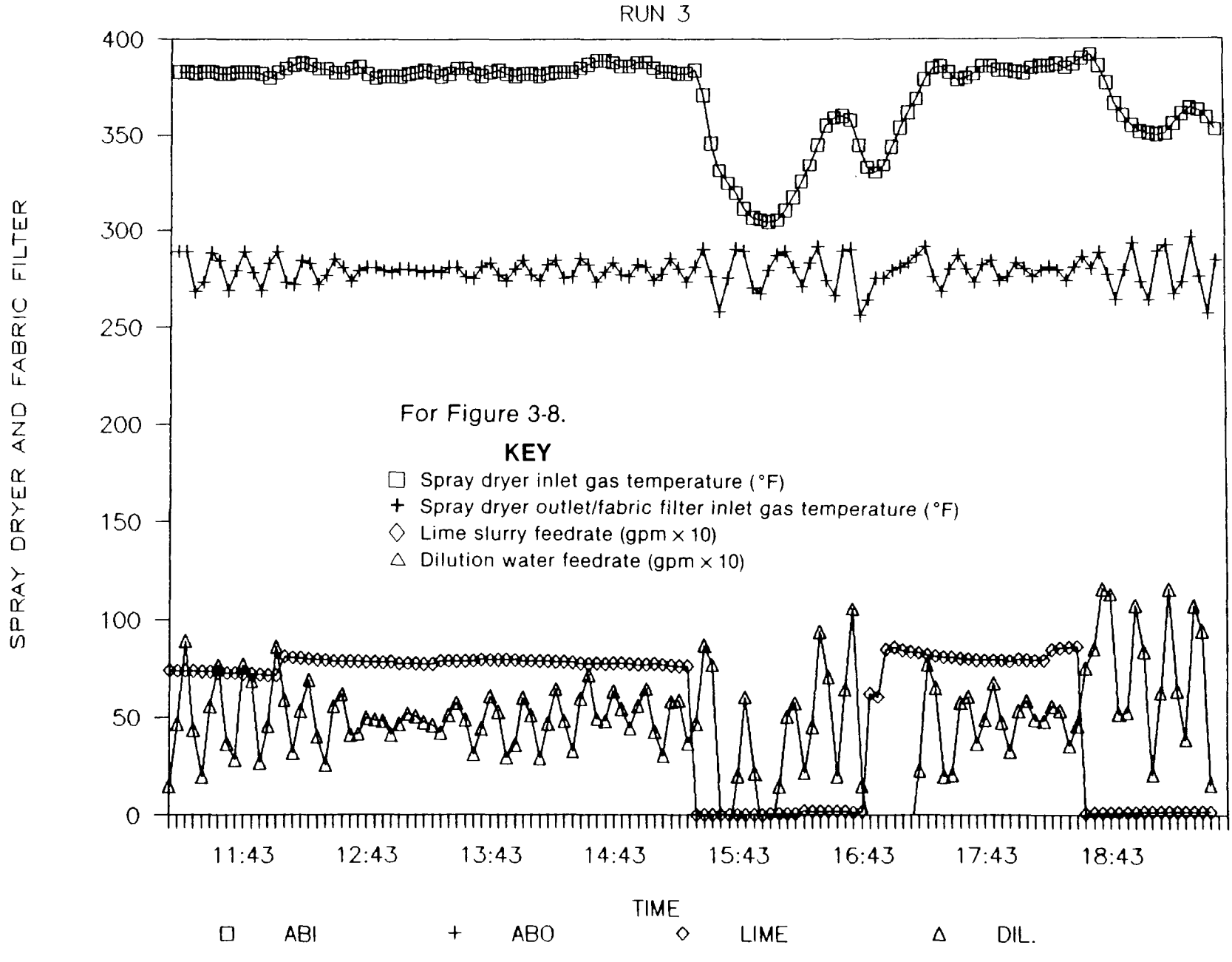

RUN 1
900
800
700
600
500
400
300
200
TEMPERATURE PROFILE (deg. F)
For Figure 3-7.
KEY
Economizer inlet gas temperature (°F)
Economizer outlet/air heater inlrt gas temperature (°F)
Air heater outlet gas temperature (°F)
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet temperature (°F)
Fabric filter outlet gas temperature (°F)
15:33
15:53
16:13
16:33
16:53
17:13
17:33
17:53
18:13
18:33
TIME
ECI
ECO
ARH
ABI
ABO
FFO

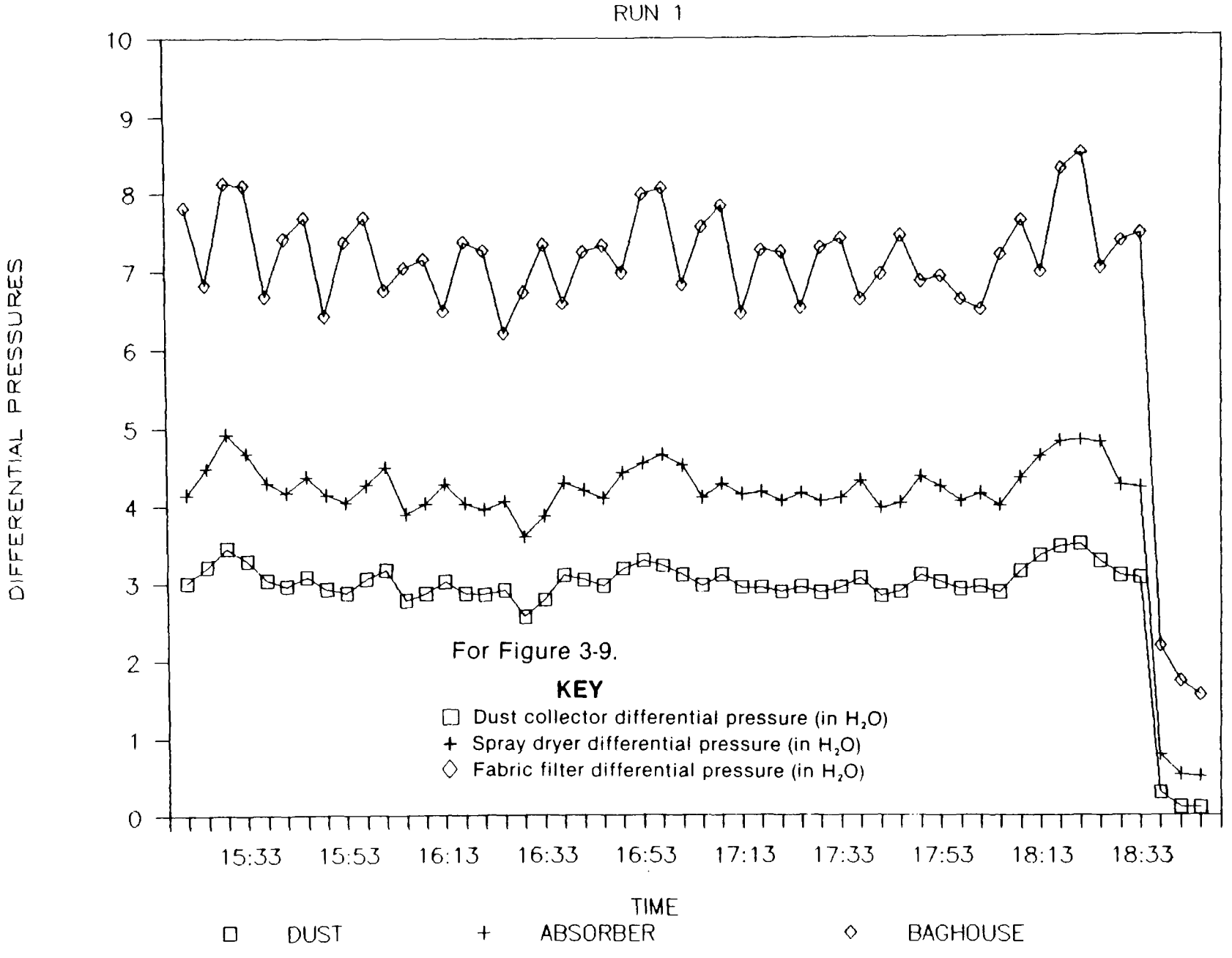

RUN 2
900
800
700
600
500
400
300
200
TEMPERATURE PROFILES (deg. F)
For Figure 3-7.
KEY
Economizer inlet gas temperature (°F)
Economizer outlet/air heater inlrt gas temperature (°F)
Air heater outlet gas temperature (°F)
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet temperature (°F)
Fabric filter outlet gas temperature (°F)
13:05
13:37
14:09
14:41
15:13
15:53
16:25
16:57
17:29
18:01
TIME
ECI
ECO
AHO
ABI
ABO
FFO


RUN 3
900
800
700
600
500
400
300
200
TEMPERATURE PROFILES (deg. F)
11:43
12:43
13:43
14:43
15:43
16:43
17:43
18:43
TIME
For Figure 3-7.
KEY
Economizer inlet gas temperature (°F)
Economizer outlet/air heater inlrt gas temperature (°F)
Air heater outlet gas temperature (°F)
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet temperature (°F)
Fabric filter outlet gas temperature (°F)
ECI
ECO
AHO
ABI
ABO
FFO


RUN 1
SPRAY DRYER & FABRIC FILTER
400
350
300
250
200
150
100
50
0
15:33
15:53
16:13
16:33
16:53
17:13
17:33
17:53
18:13
18:33
TIME
For Figure 3-8.
KEY
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet gas temperature (°F)
Lime slurry feedrate (gpm x 10)
Dilution water feedrate (gpm x 10)
ABI
ABO
LIME
DIL.


RUN 2
SPRAY DRYER & FABRIC FILTER
400
350
300
250
200
150
100
50
0
13:05
13:37
14:09
14:41
15:13
15:53
16:25
16:57
17:29
18:01
TIME
For Figure 3-8.
KEY
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet gas temperature (°F)
Lime slurry feedrate (gpm x 10)
Dilution water feedrate (gpm x 10)
ABI
ABO
LIME
DIL.
FFP

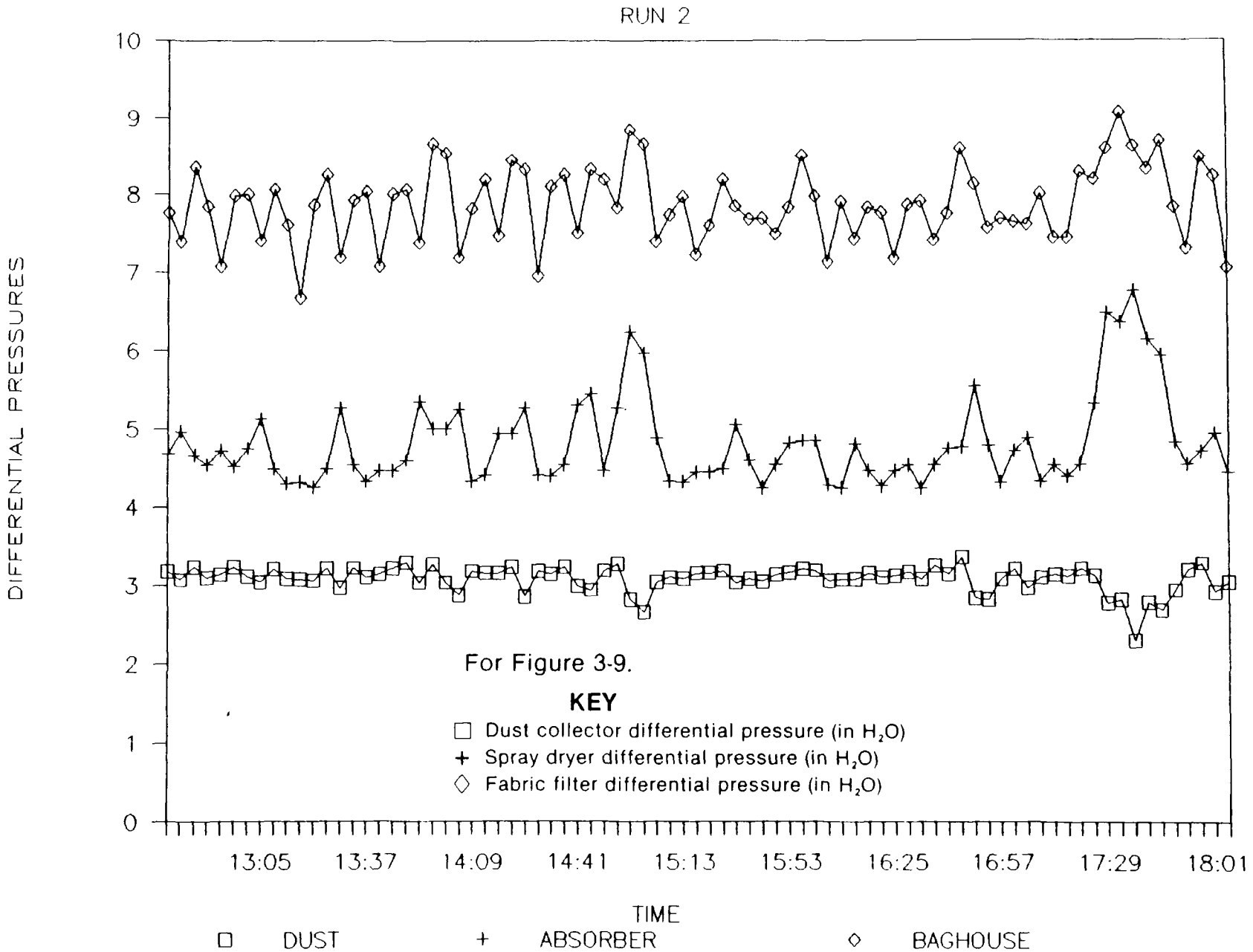

RUN 3
SPRAY DRYER AND FABRIC FILTER
400
350
300
250
200
150
100
50
0
11:43
12:43
13:43
14:43
15:43
16:43
17:43
18:43
TIME
For Figure 3-8.
KEY
Spray dryer inlet gas temperature (°F)
Spray dryer outlet/fabric filter inlet gas temperature (°F)
Lime slurry feedrate (gpm x 10)
Dilution water feedrate (gpm x 10)
ABI
ABO
LIME
DIL.



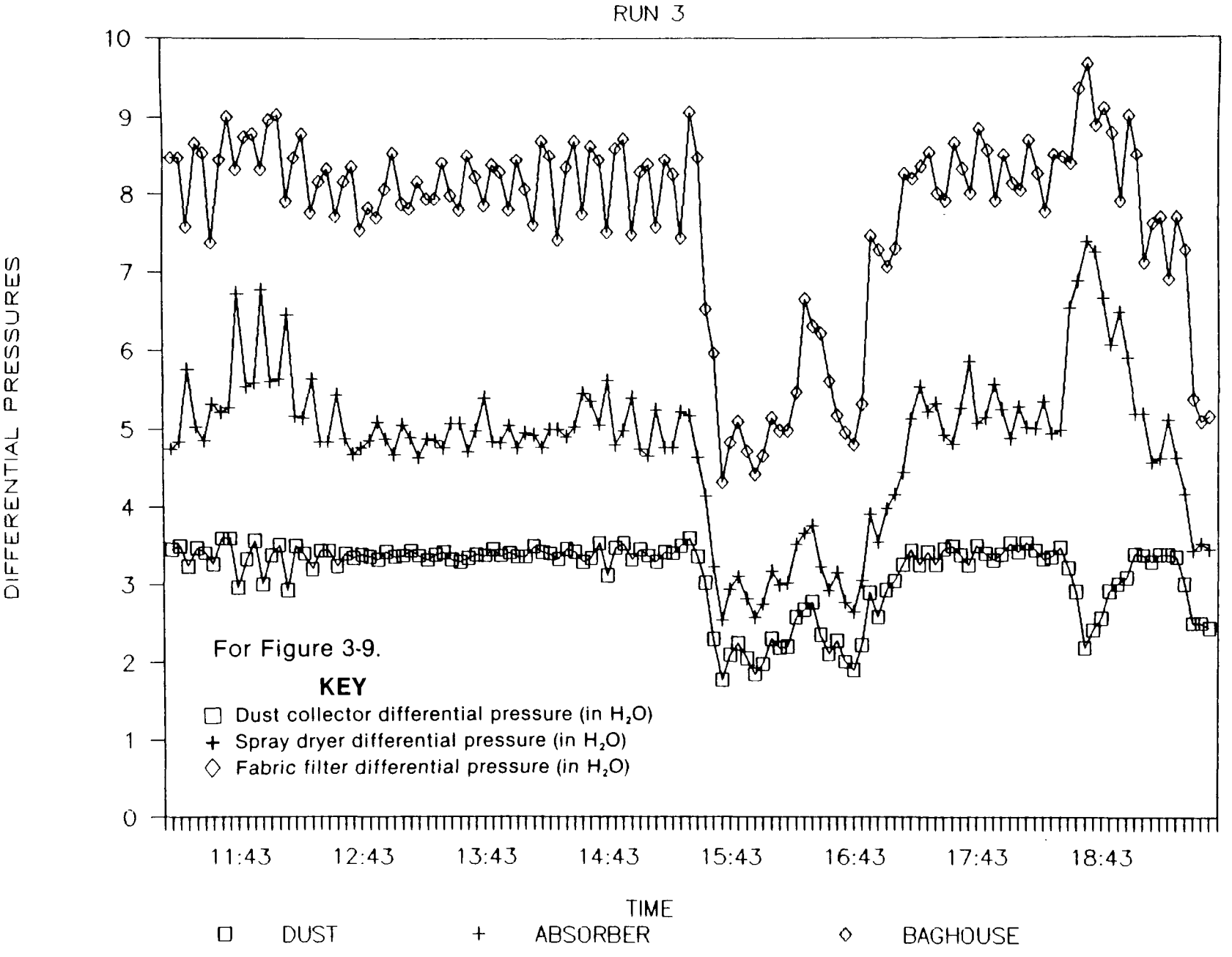
For Figure 3-9.

KEY

□ Dust collector differential pressure (in H_2O)
+ Spray dryer differential pressure (in H_2O)
◇ Fabric filter differential pressure (in H_2O)



For Figure 3-9.


RUN 3
DIFFERENTIAL PRESSURES
10
9
8
7
6
5
4
3
2
1
0
11:43
12:43
13:43
14:43
15:43
16:43
17:43
18:43
TIME
For Figure 3-9.
KEY
Dust collector differential pressure (in H2O)
Spray dryer differential pressure (in H2O)
Fabric filter differential pressure (in H2O)
DUST
ABSORBER
BAGHOUSE

TREND LOG PARAMETER IDENTIFICATION

UNIT A TREND LOG 37
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD,MAINE

CHANNEL NUMBER	HEADING DESCRIPTION	PARAMETER	UNITS
DPI371	DST CLTR GAS DF P	DUST COLLECTOR GAS DIFFERENTIAL PRESSURE	in. H20
PI371	ABSR IN GAS P	ABSORBER INLET GAS PRESSURE	in. H20
PI372	ABSR OUT DIFF P	ABSORBER OUTLET GAS PRESSURE	in. H20
DPI372	ABSR GAS DIFF P	ABSORBER GAS DIFFERENTIAL PRESSURE	in. H20
DPI373	BGHSE DIFF P	BAGHOUSE DIFFERENTIAL PRESSURE	in. H20
PI373	ID FAN SUCT P	ID FAN SUCTION PRESSURE	in. H20
TI3206	ABSR IN GAS T	ABSORBER INLET GAS TEMPERATURE	deg F
TI3228	ABSR OUT GAS T	ABSORBER OUTLET GAS TEMPERATURE	deg F
AI3804	OUTLET GAS SO2	OUTLET GAS SO2	PPMV
AI3804B	CORRTD GAS SO2	CORRECTED SO2	%
AI3804A	OUTLET GAS NOX	OUTLET GAS NOX	PPMV
FI3202	LIME SLRY FEED	LIME SLURRY FEED	GPM

TREND LOG PARAMETER IDENTIFICATION

UNIT A TREND LOG 38
MAINE ENERGY RECOVERY FACILITY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD, MAINE

CHANNEL NUMBER	HEADING DESCRIPTION	PARAMETER	UNITS
FI3200	DILUTION WATER	DILUTION WATER	GPM
PI200A	ST IN STM PRESS	STEAM TURBINE INLET STEAM PRESSURE	PSIG
FI3200	DILUTION WATER	DILUTION WATER	GPM
TI3800	BHSE OUT GAS T	BAGHOUSE OUTLET GAS TEMPERATURE	deg F
DPI3809	BGHSE DIFF P	BAGHOUSE DIFFERENTIAL PRESSURE	in. H20
AI370A	STACK CO	STACK CO	PPMV
AI370B	STACK OPACITY	STACK OPACITY	%
AI370C	STACK CO2	STACK CO2	% volume
IIL320	ID FAN CURRENT	ID FAN CURRENT	AMPS
IIH320	ID FAN CURRENT	ID FAN CURRENT	AMPS
IIL320	ID FAN CURRENT	ID FAN CURRENT	AMPS
IIL320	ID FAN CURRENT	ID FAN CURRENT	AMPS

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DP IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
		DPI371	PI371	PI372	DPI372	DPI373	PI373	TI3206	TI3228	AI3804	AI3804B	AI3804A	FI3202
09DEC87	15:22	3.01	-7.58	-11.81	4.14	7.81	-19.19	377	292	-0.90	-0.11	-0.01	2.67
09DEC87	15:26	3.22	-7.38	-11.72	4.48	6.83	-18.94	375	285	-0.90	-0.11	-0.01	2.62
09DEC87	15:30	3.45	-7.86	-12.84	4.92	8.13	-20.94	375	267	-0.90	-0.11	-0.01	2.63
09DEC87	15:34	3.30	-8.41	-12.91	4.67	8.09	-20.88	381	281	-0.90	-0.11	-0.01	2.60
09DEC87	15:38	3.04	-6.97	-11.00	4.30	6.69	-18.56	381	290	-0.90	-0.11	-0.01	2.53
09DEC87	15:42	2.97	-7.00	-11.28	4.17	7.42	-18.63	376	273	-0.90	-0.11	-0.01	2.52
09DEC87	15:46	3.09	-7.59	-11.88	4.38	7.69	-19.63	374	269	-0.90	-0.11	-0.01	2.48
09DEC87	15:50	2.93	-6.97	-11.00	4.14	6.44	-17.81	374	288	-0.02	-0.00	-0.01	2.44
09DEC87	15:54	2.88	-6.72	-10.84	4.05	7.38	-18.25	374	287	3.58	0.43	-0.01	2.42
09DEC87	15:58	3.05	-7.20	-11.63	4.27	7.69	-19.06	373	270	-0.90	-0.11	-0.01	2.42
09DEC87	16:02	3.17	-7.64	-11.81	4.50	6.77	-19.25	375	277	-0.90	-0.11	-0.01	2.38
09DEC87	16:06	2.78	-6.84	-10.81	3.90	7.05	-17.88	375	287	-0.24	-0.03	-0.01	2.34
09DEC87	16:10	2.87	-7.13	-11.22	4.03	7.16	-18.13	373	272	-0.53	-0.06	-0.01	2.36
09DEC87	16:14	3.02	-7.17	-11.41	4.28	6.50	-18.25	372	268	-0.90	-0.11	-0.01	2.31
09DEC87	16:18	2.87	-6.73	-10.66	4.03	7.38	-18.38	373	285	-0.90	-0.11	-0.01	2.32
09DEC87	16:22	2.85	-6.89	-10.88	3.95	7.27	-18.13	374	284	-0.90	-0.11	-0.01	2.34
09DEC87	16:26	2.91	-7.05	-10.97	4.06	6.22	-17.50	374	268	-0.90	-0.11	-0.01	2.30
09DEC87	16:30	2.57	-5.97	-9.66	3.61	6.73	-16.63	374	271	-0.90	-0.11	-0.01	2.27
09DEC87	16:34	2.79	-6.63	-10.56	3.88	7.34	-17.88	372	286	-0.51	-0.06	-0.01	2.25
09DEC87	16:38	3.11	-7.30	-11.53	4.30	6.59	-18.38	371	282	-0.58	-0.07	-0.01	2.27
09DEC87	16:42	3.05	-7.34	-11.53	4.20	7.25	-18.81	373	268	-0.90	-0.11	-0.01	2.24
09DEC87	16:46	2.96	-7.03	-11.03	4.09	7.33	-18.63	374	276	0.51	0.06	-0.01	2.23
09DEC87	16:50	3.19	-7.73	-12.28	4.42	6.98	-19.00	373	287	-0.90	-0.11	-0.01	2.24
09DEC87	16:54	3.30	-8.13	-12.72	4.55	7.98	-20.19	373	276	-0.90	-0.11	-0.01	2.19
09DEC87	16:58	3.23	-7.58	-12.28	4.66	8.06	-20.38	375	269	-0.02	-0.00	-0.01	2.16
09DEC87	17:02	3.11	-7.59	-11.88	4.52	6.83	-19.13	377	281	-0.15	-0.02	-0.01	2.19
09DEC87	17:06	2.97	-7.27	-11.28	4.11	7.56	-18.81	376	281	-0.90	-0.11	-0.01	2.16
09DEC87	17:10	3.11	-7.53	-11.84	4.28	7.83	-19.50	374	271	4.94	0.60	-0.01	2.17
09DEC87	17:14	2.94	-6.95	-10.91	4.14	6.47	-17.94	373	275	-0.90	-0.11	-0.01	2.13
09DEC87	17:18	2.94	-7.08	-11.34	4.17	7.27	-18.44	373	282	-0.90	-0.11	-0.01	3.12
09DEC87	17:22	2.88	-7.02	-11.16	4.06	7.23	-18.31	374	275	0.72	0.08	-0.01	3.09
09DEC87	17:26	2.95	-7.28	-11.53	4.16	6.53	-17.94	373	272	0.33	0.04	-0.01	3.05
09DEC87	17:30	2.88	-6.72	-10.78	4.06	7.30	-18.25	372	281	-0.90	-0.11	-0.01	3.06
09DEC87	17:34	2.94	-7.33	-11.41	4.09	7.41	-18.50	372	281	-0.90	-0.11	-0.01	3.02
09DEC87	17:38	3.05	-7.56	-11.88	4.31	6.64	-18.56	374	272	-0.90	-0.11	-0.01	3.05
09DEC87	17:42	2.83	-6.66	-10.66	3.97	6.95	-17.69	374	275	-0.90	-0.11	-0.01	2.98
09DEC87	17:46	2.88	-6.97	-11.09	4.03	7.44	-18.38	372	282	-0.10	-0.01	-0.01	4.13
09DEC87	17:50	3.09	-7.91	-12.31	4.36	6.86	-18.75	373	276	-0.59	-0.07	-0.01	4.00
09DEC87	17:54	3.01	-7.23	-11.50	4.23	6.92	-18.50	376	274	-0.90	-0.11	-0.01	3.92
09DEC87	17:58	2.91	-6.81	-10.81	4.05	6.63	-17.81	376	281	-0.90	-0.11	-0.01	3.84
09DEC87	18:02	2.95	-6.81	-10.97	4.14	6.50	-17.88	373	275	-0.90	-0.11	-0.01	3.76

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
09DEC87	18:06	2.87	-6.98	-11.06	3.99	7.19	-18.13	371	274	1.32	0.16	-0.01	3.73
09DEC87	18:10	3.14	-7.98	-12.47	4.34	7.63	-19.38	371	281	0.16	0.02	-0.01	3.71
09DEC87	18:14	3.34	-7.63	-12.22	4.63	6.97	-19.44	370	280	-0.90	-0.11	-0.01	3.67
09DEC87	18:18	3.47	-8.16	-13.09	4.81	8.28	-21.06	370	272	-0.90	-0.11	-0.01	3.62
09DEC87	18:22	3.49		-13.47	4.83	8.50	-21.56	374	280	-0.90	-0.11	-0.01	3.60
09DEC87	18:26	3.27		-12.34	4.80	7.02	-20.06	378	282	0.69	0.08	-0.01	3.59
09DEC87	18:30	3.09	-7.14	-11.59	4.25	7.36	-19.00	378	271	0.22	0.03	-0.01	3.62
‡09DEC87	18:34	3.06	-7.30	-11.63	4.22	7.45	-18.94	376	273	-0.74	-0.09	-0.01	3.56
‡09DEC87	18:38	0.29	-2.09	-2.77	0.78	2.18	-5.53	372	279	-0.90	-0.11	-0.01	0.00
‡09DEC87	18:42	0.11	-1.26	-1.78	0.53	1.72	-3.73	363	264	-0.90	-0.11	-0.01	0.00
‡09DEC87	18:46	0.10	-1.15	-1.65	0.50	1.54	-3.43	355	273	-0.90	-0.11	-0.01	0.00
	AVERAGE	3.02	-7.20	-11.49	4.24	7.16	-18.71	374	277	-0.43	-0.05	-0.01	2.91

‡ = NON-TEST PERIOD, NOT INCLUDED IN AVERAGE

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
		FI3200	PI200A	FI3200	TI3800	DPI3809	AI370A	AI370B	AI370C	IIL320	IIH320	IIL320	IIL320
*09DEC87	15:18	4.30	-2	4.30	268	7.81	59.25	49.88	3.18	0.01	98.75	0.01	0.01
*09DEC87	15:22	5.22	-6	5.22	275	7.83	55.50	48.63	2.89	0.01	97.25	0.01	0.01
*09DEC87	15:26	10.84	-5	10.84	277	6.83	58.00	49.88	2.98	0.01	99.00	0.01	0.01
09DEC87	15:30	8.34	-6	8.34	269	8.16	79.50	49.88	3.98	0.01	102.50	0.01	0.01
09DEC87	15:34	5.00	-7	5.00	269	8.13	68.25	49.88	3.45	0.01	100.50	0.01	0.01
09DEC87	15:38	8.63	-2	8.63	274	6.67	61.38	49.88	2.49	0.01	97.50	0.01	0.01
09DEC87	15:42	9.69	-7	9.69	271	7.44	63.88	49.88	2.69	0.01	98.00	0.01	0.01
09DEC87	15:46	5.08	-8	5.08	266	7.70	63.00	49.88	3.18	0.01	98.50	0.01	0.01
09DEC87	15:50	4.84	-3	4.84	270	6.41	54.88	49.88	2.66	0.01	97.00	0.01	0.01
09DEC87	15:54	9.34	-8	9.34	274	7.41	52.50	49.88	2.59	0.01	97.25	0.01	0.01
09DEC87	15:58	8.28	-8	8.28	268	7.72	57.00	49.88	2.59	0.01	98.50	0.01	0.01
09DEC87	16:02	4.95	-8	4.95	267	6.75	60.25	49.88	2.98	0.01	98.50	0.01	0.01
09DEC87	16:06	8.06	-7	8.06	271	7.05	54.50	49.88	2.49	0.01	96.25	0.01	0.01
09DEC87	16:10	9.34	-8	9.34	268	7.14	55.38	49.88	2.49	0.01	97.50	0.01	0.01
09DEC87	16:14	5.41	-8	5.41	264	6.47	56.00	49.88	2.80	0.01	98.00	0.01	0.01
09DEC87	16:18	5.20	-8	5.20	268	7.38	49.13	49.88	2.69	0.01	97.00	0.01	0.01
09DEC87	16:22	9.47	-8	9.47	271	7.27	56.38	40.38	2.89	0.01	96.75	0.01	0.01
09DEC87	16:26	8.50	-8	8.50	266	6.19	56.38	-0.04	2.98	0.01	97.25	0.01	0.01
09DEC87	16:30	4.63		4.63	263	6.73	54.38	-0.04	2.68	0.01	94.50	0.01	0.01
09DEC87	16:34	5.52		5.52	268	7.34	46.50	-0.04	2.28	0.01	95.75	0.01	0.01
09DEC87	16:38	9.72		9.72	270	6.59	54.38	-0.04	2.88	0.01	98.25	0.01	0.01
09DEC87	16:42	8.22		8.22	265	7.27	56.50	-0.04	2.89	0.01	98.50	0.01	0.01
09DEC87	16:46	4.70		4.70	265	7.34	51.00	-0.04	2.38	0.01	97.25	0.01	0.01
09DEC87	16:50	7.67		7.67	270	6.92	55.63	-0.04	2.59	0.01	98.50	0.01	0.01
*09DEC87	16:54	10.13		10.13	269	8.00	56.25	-0.04	2.69	0.01	100.25	0.01	0.01
*09DEC87	16:58	7.20		7.20	265	8.09	56.38	-0.04	2.78	0.01	100.25	0.01	0.01
*09DEC87	17:02	5.81		5.81	267	6.78	56.25	-0.04	2.69	0.01	99.00	0.01	0.01
*09DEC87	17:06	8.94		8.94	270	7.56	58.25	-0.04	2.78	0.01	97.50	0.01	0.01
*09DEC87	17:10	8.28		8.28	267	7.84	63.38	-0.04	2.88	0.01	98.50	0.01	0.01
*09DEC87	17:14	5.61		5.61	265	6.42	56.38	-0.04	2.68	0.01	97.25	0.01	0.01
*09DEC87	17:18	7.03		7.03	267	7.27	57.38	-0.04	2.69	0.01	97.75	0.01	0.01
09DEC87	17:22	8.19		8.19	267	7.22	63.38	-0.04	3.09	0.01	97.50	0.01	0.01
09DEC87	17:26	5.69		5.69	265	6.45	57.38	-0.04	2.98	0.01	97.50	0.01	0.01
09DEC87	17:30	5.27		5.27	266	7.30	52.50	-0.04	2.48	0.01	96.75	0.01	0.01
09DEC87	17:34	7.98		7.98	268	7.41	60.38	-0.04	2.98	0.01	97.50	0.01	0.01
09DEC87	17:38	7.58		7.58	266	6.58	63.50	-0.04	3.28	0.01	98.50	0.01	0.01
09DEC87	17:42	5.33		5.33	265	6.97	50.50	-0.04	2.49	0.01	96.25	0.01	0.01
09DEC87	17:46	6.33		6.33	267	7.44	54.38	-0.04	2.48	0.01	97.00	0.01	0.01
09DEC87	17:50	7.52		7.52	267	6.78	60.25	-0.04	3.48	0.01	98.50	0.01	0.01
09DEC87	17:54	5.70		5.70	265	6.97	56.25	-0.04	3.48	0.01	98.25	0.01	0.01
09DEC87	17:58	6.52		6.52	267	6.55	58.25	-0.04	2.69	0.01	97.25	0.01	0.01

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H20	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
09DEC87	18:02	7.00		7.00	266	6.47	64.25	-0.04	2.88	0.01	97.50	0.01	0.01
09DEC87	18:06	5.14		5.14	265	7.19	63.38	-0.04	2.59	0.01	97.00	0.01	0.01
09DEC87	18:10	5.34		5.34	267	7.59	63.38	-0.04	2.48	0.01	98.75	0.01	0.01
09DEC87	18:14	7.80		7.80	268	6.95	65.25	-0.04	2.38	0.01	100.25	0.01	0.01
09DEC87	18:18	6.56		6.56	265	8.31	72.50	-0.04	2.68	0.01	102.75	0.01	0.01
09DEC87	18:22	5.81		5.81	267	8.53	74.25	-0.04	3.28	0.01	102.75	0.01	0.01
09DEC87	18:26	8.53		8.53	269	7.00	78.25	49.88	3.48	0.01	100.25	0.01	0.01
09DEC87	18:30	8.13		8.13	266	7.36	68.25	49.88	2.98	0.01	98.75	0.01	0.01
‡09DEC87	18:34	4.75		4.75	264	7.45	60.38	49.88	2.79	0.01	98.00	0.01	0.01
‡09DEC87	18:38	5.27		5.27	267	1.99	63.25	-0.04	2.68	21.69	0.09	21.69	21.69
‡09DEC87	18:42	0.41		0.41	264	1.54	58.25	1.40	1.98	20.56	0.08	20.56	20.56
‡09DEC87	18:46	0.30		0.30	260	1.35	50.50	48.13	1.59	20.56	0.08	20.56	20.56
	AVERAGE	6.95	-7	6.95	268	7.16	60.18	20.19	2.84	0.01	98.12	0.01	0.01

‡ NON-TEST PERIOD, VALUE NOT INCLUDED IN AVERAGE

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O.	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
		DPI371	PI371	PI372	DPI372	DPI373	PI373	TI3206	TI3228	AI3804	AI3804B	AI3804A	FI3202
#10DEC87	12:38	3.18	-1.76	-13.94	4.67	7.77	-20.75	358	278	0.41	0.05	-0.01	3.11
#10DEC87	12:42	3.07	-5.92	-12.78	4.97	7.39	-20.69	359	287	0.13	0.02	-0.01	3.08
10DEC87	12:46	3.23	-5.02	-13.00	4.66	8.34	-21.38	361	277	-0.90	-0.11	-0.01	3.09
10DEC87	12:50	3.09	-6.36	-13.56	4.53	7.84	-20.56	361	268	-0.59	-0.07	-0.01	3.02
10DEC87	12:54	3.15	-7.31	-12.19	4.72	7.08	-20.00	359	280	-0.51	-0.06	-0.01	2.99
10DEC87	12:58	3.24	-2.29	-12.97	4.52	7.98	-20.69	358	287	3.89	0.46	-0.01	2.99
10DEC87	13:02	3.12	-6.94	-13.88	4.75	8.00	-21.19	360	273	-0.90	-0.11	-0.01	2.98
10DEC87	13:06	3.05	-7.84	-12.84	5.13	7.41	-21.00	362	271	4.86	0.59	-0.01	2.95
10DEC87	13:10	3.21	-2.60	-12.88	4.48	8.06	-20.75	364	286	-0.38	-0.05	-0.01	2.98
10DEC87	13:14	3.09	-7.61	-12.91	4.30	7.61	-20.00	365	283	1.71	0.20	-0.01	3.02
10DEC87	13:18	3.08	-7.72	-11.88	4.31	6.67	-19.19	364	267	-0.90	-0.11	-0.01	3.06
10DEC87	13:22	3.06	-7.48	-11.97	4.25	7.86	-19.75	361	274	1.38	0.17	-0.01	3.06
10DEC87	13:26	3.22	-7.45	-13.41	4.48	8.25	-20.81	360	290	-0.50	-0.06	-0.01	3.07
10DEC87	13:30	2.97	-7.70	-13.50	5.27	7.19	-20.88	362	281	1.84	0.22	-0.01	3.09
10DEC87	13:34	3.23	-7.81	-12.72	4.53	7.92	-20.69	365	266	-0.87	-0.10	-0.01	5.53
10DEC87	13:38	3.11	-8.19	-12.56	4.33	8.03	-20.38	366	279	2.66	0.32	-0.01	6.52
10DEC87	13:42	3.15	-7.55	-12.34	4.45	7.08	-19.75	364	283	-0.77	-0.09	-0.01	6.31
10DEC87	13:46	3.22	-7.67	-12.91	4.45	8.00	-20.50	362	275	1.11	0.13	-0.01	7.31
10DEC87	13:50	3.30		-12.72	4.59	8.06	-21.00	362	272	1.56	0.19	-0.01	7.58
10DEC87	13:54	3.03		-13.06	5.34	7.38	-21.19	362	277	2.28	0.28	-0.01	7.55
10DEC87	13:58	3.27		-13.56	5.00	8.66	-22.06	363	282	-0.75	-0.09	-0.01	7.47
10DEC87	14:02	3.03		-13.38	5.00	8.53	-21.94	366	284	2.53	0.30	-0.01	7.44
10DEC87	14:06	2.88		-12.66	5.25	7.19	-20.88	367	275	-0.74	-0.09	-0.01	7.42
10DEC87	14:10	3.19	-8.03	-12.50	4.33	7.81	-20.31	366	272	2.72	0.33	-0.01	7.36
10DEC87	14:14	3.16	-8.13	-12.41	4.41	8.19	-20.44	365	278	-0.43	-0.05	-0.01	7.38
#10DEC87	14:18	3.16		-12.25	4.94	7.47	-20.75	361	280	1.81	0.21	-0.01	7.33
#10DEC87	14:22	3.24		-13.59	4.94	8.44	-21.81	359	280	0.48	0.06	-0.01	7.31
#10DEC87	14:26	2.86		-13.28	5.27	8.31	-21.94	364	280	0.00	0.00	-0.01	7.28
10DEC87	14:30	3.18		-12.66	4.41	6.95	-19.63	366	276	-0.74	-0.09	-0.01	7.23
10DEC87	14:34	3.15	-8.19	-12.56	4.39	8.09	-20.44	365	276	0.74	0.09	-0.01	7.23
10DEC87	14:38	3.23		-12.75	4.53	8.25	-21.00	364	280	0.28	0.03	-0.01	7.25
10DEC87	14:42	2.99		-14.03	5.30	7.50	-21.19	364	281	1.02	0.12	-0.01	7.25
10DEC87	14:46	2.94		-13.81	5.44	8.31	-22.13	367	278	2.91	0.35	-0.01	7.27
10DEC87	14:50	3.19		-12.88	4.45	8.19	-20.88	369	276	0.30	0.03	-0.01	7.25
10DEC87	14:54	3.27		-14.31	5.27	7.83	-21.50	367	277	2.68	0.32	-0.01	7.28
10DEC87	14:58	2.82		-14.59	6.23	8.84	-23.44	365	281	-0.82	-0.10	-0.01	7.25
10DEC87	15:02	2.66		-14.03	5.97	8.66	-23.00	367	280	4.67	0.57	-0.01	7.27
10DEC87	15:06	3.04		-13.56	4.88	7.39	-20.69	370	276	1.09	0.13	-0.01	7.27
10DEC87	15:10	3.10	-8.16	-12.38	4.33	7.73	-20.06	368	274	1.19	0.14	-0.01	7.30
10DEC87	15:14	3.09	-8.16	-12.50	4.31	7.97	-20.19	366	278	0.62	0.07	-0.01	7.36
10DEC87	15:18	3.16		-13.19	4.44	7.22	-19.81	364	281	-0.90	-0.11	-0.01	7.36

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
10DEC87	15:22	3.16		-12.66	4.44	7.59	-20.19	364	279	1.39	0.17	-0.01	7.41
10DEC87	15:26	3.19	-8.19	-12.69	4.48	8.19	-20.75	364	276	-0.90	-0.11	-0.01	7.48
10DEC87	15:30	3.03		-13.75	5.05	7.84	-21.31	364	278	1.98	0.24	-0.01	7.58
10DEC87	15:34	3.09		-12.81	4.59	7.67	-20.69	366	280	-0.90	-0.11	-0.01	7.66
10DEC87	15:38	3.05	-8.09	-12.44	4.23	7.69	-19.69	364	276	-0.52	-0.06	-0.01	7.69
10DEC87	15:42	3.13		-12.97	4.53	7.48	-20.13	362	275	-0.80	-0.10	-0.01	7.75
10DEC87	15:46	3.16		-12.81	4.81	7.83	-20.94	362	278	0.84	0.10	-0.01	7.78
10DEC87	15:50	3.21		-13.09	4.84	8.50	-21.75	364	281	-0.90	-0.11	-0.01	7.83
1 10DEC87	15:54	3.19		-14.09	4.84	7.97	-21.13	367	283	1.59	0.19	-0.01	7.84
1 10DEC87	15:58	3.05		-12.16	4.28	7.13	-19.63	367	277	0.00	-0.00	-0.01	7.92
1 10DEC87	16:02	3.07	-7.95	-12.25	4.23	7.89	-19.88	364	271	2.63	0.32	-0.01	7.94
1 10DEC87	16:06	3.08		-13.38	4.80	7.42	-20.63	362	276	-0.30	-0.04	-0.01	7.91
1 10DEC87	16:10	3.16		-12.56	4.45	7.83	-20.44	363	281	-0.63	-0.07	-0.01	7.98
1 10DEC87	16:14	3.10	-7.95	-12.25	4.27	7.77	-20.00	363	282	-0.01	-0.00	-0.01	8.00
1 10DEC87	16:18	3.13		-13.03	4.45	7.17	-19.81	361	279	2.22	0.27	-0.01	8.03
1 10DEC87	16:22	3.17		-12.47	4.53	7.86	-20.69	362	277	-0.34	-0.04	-0.01	8.00
1 10DEC87	16:26	3.08	-8.00	-12.28	4.23	7.91	-20.13	363	277	-0.65	-0.08	-0.01	8.06
10DEC87	16:30	3.26		-13.03	4.53	7.41	-20.19	361	276	1.57	0.19	-0.01	8.06
10DEC87	16:34	3.14		-12.72	4.75	7.75	-20.75	362	278	3.97	0.48	-0.01	8.09
10DEC87	16:38	3.37		-13.31	4.77	8.59	-21.75	362	279	-0.29	-0.03	-0.01	8.25
10DEC87	16:42	2.84		-14.69	5.55	8.13	-22.13	365	281	-0.90	-0.11	-0.01	8.25
10DEC87	16:46	2.82		-12.34	4.78	7.56	-20.75	367	281	0.65	0.08	-0.01	8.31
10DEC87	16:50	3.08	-7.94	-12.34	4.31	7.69	-19.88	364	274	3.52	0.43	-0.01	8.34
10DEC87	16:54	3.21		-13.50	4.72	7.64	-20.63	361	273	0.98	0.12	-0.01	8.38
10DEC87	16:58	2.96		-12.69	4.88	7.61	-20.75	362	277	-0.09	-0.01	-0.01	8.28
10DEC87	17:02	3.10	-7.84	-12.38	4.33	8.00	-20.25	362	281	5.55	0.66	-0.01	8.28
10DEC87	17:06	3.14		-13.06	4.53	7.44	-20.19	362	280	1.28	0.16	-0.01	8.19
10DEC87	17:10	3.12		-12.34	4.39	7.44	-19.88	361	278	-0.26	-0.03	-0.01	8.16
10DEC87	17:14	3.22	-8.31	-12.88	4.55	8.28	-21.00	360	277	1.81	0.22	-0.01	8.09
10DEC87	17:18	3.13		-14.56	5.33	8.19	-21.88	359	277	7.00	0.84	-0.01	8.06
10DEC87	17:22	2.77		-14.31	6.48	8.59	-23.50	358	279	1.34	0.17	-0.01	8.03
10DEC87	17:26	2.82		-14.78	6.36	9.06	-23.88	362	282	-0.51	-0.06	-0.01	8.09
10DEC87	17:30	2.30			6.77	8.63	-23.81	366	284	-0.18	-0.02	-0.01	0.00
10DEC87	17:34	2.78		-14.50	6.14	8.31	-22.88	369	281	7.97	0.96	-0.01	8.13
10DEC87	17:38	2.69		-14.47	5.94	8.69	-23.06	373	264	-0.32	-0.04	-0.01	8.16
10DEC87	17:42	2.94		-13.72	4.83	7.83	-21.00	372	274	0.21	0.03	-0.01	7.98
10DEC87	17:46	3.20		-12.31	4.55	7.30	-19.94	368	281	0.69	0.08	-0.01	7.98
10DEC87	17:50	3.28		-13.41	4.70	8.47	-21.50	365	283	7.03	0.85	-0.01	7.97
10DEC87	17:54	2.91		-13.66	4.94	8.22	-21.56	366	282	-0.82	-0.10	-0.01	7.92
10DEC87	17:58	3.04		-11.91	4.44	7.05	-19.50	366	274	-0.66	-0.08	-0.01	7.91
AVERAGE		3.07	-7.25	-13.11	4.84	7.89	-20.98	364	278	1.06	0.13	-0.01	6.70

1 NON-TEST PERIOD, NOT INCLUDED IN AVERAGE

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
		FI3200	PI200A	FI3200	TI3800	DPI3809	AI370A	AI370B	AI370C	IIL320	IIH320	IIL320	IIL320
*10DEC87	12:38	3.45	-2	3.45	267	7.75	40.50	14.31	2.89	0.01	101.25	0.01	0.01
*10DEC87	12:42	6.00	-6	6.00	271	7.42	42.50	14.91	3.08	0.01	101.50	0.01	0.01
10DEC87	12:46	8.56	-5	8.56	270	8.38	44.38	15.00	3.29	0.01	102.25	0.01	0.01
10DEC87	12:50	5.22	-6	5.22	264	7.83	54.38	14.81	2.38	0.01	100.75	0.01	0.01
10DEC87	12:54	2.81	-7	2.81	266	7.09	48.25	14.72	2.28	0.01	100.25	0.01	0.01
10DEC87	12:58	6.88	-2	6.88	271	8.00	65.50	15.00	2.48	0.01	101.00	0.01	0.01
10DEC87	13:02	8.25	-7	8.25	268	8.00	49.25	13.94	3.08	0.01	102.00	0.01	0.01
10DEC87	13:06	4.41	-8	4.41	264	7.42	42.50	12.91	3.09	0.01	102.00	0.01	0.01
10DEC87	13:10	4.72	-3	4.72	269	8.06	42.38	13.00	3.08	0.01	100.25	0.01	0.01
10DEC87	13:14	8.75	-8	8.75	271	7.61	43.38	17.31	3.08	0.01	99.25	0.01	0.01
10DEC87	13:18	7.22	-8	7.22	265	6.67	39.50	20.25	2.78	0.01	99.25	0.01	0.01
10DEC87	13:22	2.45	-8	2.45	264	7.89	35.50	30.56	2.49	0.01	98.75	0.01	0.01
10DEC87	13:26	4.94	-7	4.94	270	8.25	35.38	35.88	2.78	0.01	100.75	0.01	0.01
10DEC87	13:30	9.50	-8	9.50	271	7.19	47.25	20.19	3.29	0.01	102.75	0.01	0.01
10DEC87	13:34	3.68	-8	3.68	264	7.94	49.25	24.75	3.38	0.01	101.00	0.01	0.01
10DEC87	13:38	2.07	-8	2.07	266	8.06	44.38	21.25	2.89	0.01	99.25	0.01	0.01
10DEC87	13:42	4.67	-8	4.67	269	7.08	39.50	20.19	2.49	0.01	99.75	0.01	0.01
10DEC87	13:46	4.94	-8	4.94	268	8.03	42.50	22.19	2.59	0.01	100.50	0.01	0.01
10DEC87	13:50	2.13		2.13	265	8.09	43.38	32.38	2.69	0.01	101.75	0.01	0.01
10DEC87	13:54	1.68		1.68	266	7.36	46.50	30.19	2.68	0.01	103.00	0.01	0.01
10DEC87	13:58	1.90		1.90	269	8.72	46.38	16.00	3.08	0.01	103.50	0.01	0.01
10DEC87	14:02	4.55		4.55	271	8.59	42.50	17.88	2.88	0.01	103.25	0.01	0.01
10DEC87	14:06	5.09		5.09	269	7.16	46.38	24.81	3.08	0.01	102.50	0.01	0.01
10DEC87	14:10	2.53		2.53	266	7.83	46.50	20.44	3.08	0.01	100.00	0.01	0.01
10DEC87	14:14	1.87		1.87	267	8.22	39.50	26.81	2.59	0.01	100.25	0.01	0.01
*10DEC87	14:18	1.94		1.94	269	7.45	64.25	23.13	2.38	0.01	102.25	0.01	0.01
*10DEC87	14:22	2.48		2.48	269	8.47	56.25	27.00	3.09	0.01	103.50	0.01	0.01
*10DEC87	14:26	4.17		4.17	270	8.31	50.50	28.69	3.29	0.01	103.50	0.01	0.01
10DEC87	14:30	3.98		3.98	268	6.91	48.25	33.13	2.98	0.01	99.75	0.01	0.01
10DEC87	14:34	2.20		2.20	267	8.13	44.38	32.13	2.89	0.01	99.75	0.01	0.01
10DEC87	14:38	2.17		2.17	268	8.31	46.25	30.88	2.78	0.01	101.25	0.01	0.01
10DEC87	14:42	3.75		3.75	269	7.45	40.50	29.31	2.88	0.01	103.25	0.01	0.01
10DEC87	14:46	4.55		4.55	269	8.38	47.25	35.63	3.29	0.01	104.25	0.01	0.01
10DEC87	14:50	3.98		3.98	268	8.22	48.25	36.75	3.09	0.01	100.75	0.01	0.01
10DEC87	14:54	2.52		2.52	267	7.78	63.38	32.63	2.38	0.01	104.25	0.01	0.01
10DEC87	14:58	3.23		3.23	269	8.94	45.38	39.25	2.69	0.01	107.75	0.01	0.01
10DEC87	15:02	4.81		4.81	270	8.72	49.63	43.38	3.18	0.01	106.00	0.01	0.01
10DEC87	15:06	4.86		4.86	269	7.36	43.13	39.75	2.78	0.01	101.50	0.01	0.01
10DEC87	15:10	2.70		2.70	267	7.77	46.00	49.88	2.98	0.01	99.50	0.01	0.01
10DEC87	15:14	1.96		1.96	267	8.00	42.38	49.88	2.78	0.01	99.50	0.01	0.01
10DEC87	15:18	2.36		2.36	269	7.20	38.38	49.88	2.69	0.01	99.75	0.01	0.01

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
10DEC87	15:22	3.77		3.77	269	7.63	46.38	49.88	3.01	0.01	100.00	0.01	0.01
10DEC87	15:26	3.40		3.40	268	8.25	50.25	49.88	2.89	0.01	101.25	0.01	0.01
10DEC87	15:30	2.25		2.25	268	7.81	46.38	49.88	2.89	0.01	102.75	0.01	0.01
10DEC87	15:34	2.54		2.54	269	7.70	48.63	49.88	2.98	0.01	100.75	0.01	0.01
10DEC87	15:38	3.34		3.34	268	7.67	47.13	49.88	2.69	0.01	99.50	0.01	0.01
10DEC87	15:46	1.80		1.80	267	7.86	54.25	49.88	3.18	0.01	101.75	0.01	0.01
10DEC87	15:50	1.86		1.86	269	8.53	53.50	49.88	3.29	0.01	103.00	0.01	0.01
‡10DEC87	15:54	2.73		2.73	270	7.89	52.50	49.88	3.18	0.01	102.00	0.01	0.01
‡10DEC87	15:58	4.48		4.48	269	7.14	51.50	49.88	2.98	0.01	99.25	0.01	0.01
‡10DEC87	16:02	1.93		1.93	265	7.91	52.38	49.88	2.69	0.01	99.25	0.01	0.01
‡10DEC87	16:06	0.37		0.37	266	7.34	47.25	49.88	2.99	0.01	101.25	0.01	0.01
‡10DEC87	16:10	0.73		0.73	268	7.84	47.38	49.88	2.89	0.01	100.00	0.01	0.01
‡10DEC87	16:14	1.90		1.90	270	7.77	46.25	49.88	2.78	0.01	99.25	0.01	0.01
‡10DEC87	16:18	2.25		2.25	269	7.13	46.25	49.88	2.78	0.01	99.50	0.01	0.01
‡10DEC87	16:22	2.04		2.04	268	7.89	49.25	49.88	3.09	0.01	100.50	0.01	0.01
‡10DEC87	16:26	1.93		1.93	268	7.92	47.25	49.88	2.78	0.01	99.25	0.01	0.01
10DEC87	16:30	1.84		1.84	267	7.34	44.63	49.88	2.78	0.01	100.50	0.01	0.01
10DEC87	16:34	1.64		1.64	267	7.78	54.25	-0.02	2.59	0.01	101.25	0.01	0.01
10DEC87	16:38	1.73		1.73	268	8.63	47.38	-0.04	2.78	0.01	102.75	0.01	0.01
10DEC87	16:42	1.94		1.94	269	8.06	47.63	-0.04	3.08	0.01	103.75	0.01	0.01
10DEC87	16:46	2.71		2.71	270	7.58	46.25	45.50	2.59	0.01	100.00	0.01	0.01
10DEC87	16:50	2.54		2.54	268	7.69	53.63	2.88	2.28	0.01	99.00	0.01	0.01
10DEC87	16:54	1.70		1.70	266	7.58	62.50	-0.02	2.59	0.01	101.00	0.01	0.01
10DEC87	16:58	0.20		0.20	267	7.66	54.38	46.25	2.89	0.01	100.50	0.01	0.01
10DEC87	17:02	0.72		0.72	268	8.03	49.25	-0.04	2.78	0.01	99.25	0.01	0.01
10DEC87	17:06	1.72		1.72	269	7.39	44.63	-0.04	2.78	0.01	100.00	0.01	0.01
10DEC87	17:10	1.87		1.87	268	7.44	50.13	-0.04	2.98	0.01	99.25	0.01	0.01
10DEC87	17:14	1.77		1.77	268	8.28	54.13	-0.04	3.08	0.01	101.25	0.01	0.01
10DEC87	17:18	1.51		1.51	267	8.16	48.25	-0.04	2.38	0.01	104.25	0.01	0.01
10DEC87	17:22	1.48		1.48	268	8.66	47.88	-0.04	2.38	0.01	107.75	0.01	0.01
10DEC87	17:26	1.91		1.91	270	9.13	68.00	-0.04	3.08	0.01	107.75	0.01	0.01
10DEC87	17:30	4.16		4.16	272	8.56	95.00	10.97	3.18	0.01	106.75	0.01	0.01
10DEC87	17:34	8.03		8.03	272	8.38	66.25	49.88	3.29	0.01	106.25	0.01	0.01
10DEC87	17:38	4.05		4.05	264	8.72	51.88	37.38	3.38	0.01	105.75	0.01	0.01
10DEC87	17:42	0.77		0.77	264	7.77	47.63	49.88	2.89	0.01	100.75	0.01	0.01
10DEC87	17:46	0.53		0.53	268	7.31	43.88	-0.04	2.59	0.01	99.75	0.01	0.01
10DEC87	17:50	1.84		1.84	270	8.47	54.63	35.13	3.29	0.01	102.00	0.01	0.01
10DEC87	17:54	3.51		3.51	271	8.19	51.25	-0.04	3.18	0.01	102.25	0.01	0.01
10DEC87	17:58	3.77		3.77	268	7.06	53.38	-0.04	2.78	0.01	99.25	0.01	0.01
	AVERAGE	3.39	-7	3.39	268	7.92	48.92	25.14	2.88	0.01	101.71	0.01	0.01

‡ NON-TEST PERIOD, NOT INCLUDED IN AVERAGE

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H20	ABSR IN GAS P IN H20	ABSR OUT GAS P IN H20	ABSR GAS DIFF P IN H20	BGHSE DIFF P IN H20	ID FAN SUCT P IN H20	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
		DPI371	PI371	PI372	DPI372	DPI373	PI373	TI3206	TI3228	AI3804	AI3804B	AI3804A	FI3202
*12DEC87	11:12	3.46	-8.19	-12.91	4.75	8.47	-21.38	383	289	3.05	0.37	-0.01	7.39
*12DEC87	11:16	3.51	-5.92	-13.03	4.84	8.47	-21.50	383	289	8.81	1.05	-0.01	7.38
12DEC87	11:20	3.23	-5.02	-13.84	5.77	7.58	-21.81	382	268	10.53	1.27	-0.01	7.38
12DEC87	11:24	3.48	-6.36	-13.16	5.03	8.66	-22.00	383	273	8.94	1.07	-0.01	7.36
12DEC87	11:28	3.41	-8.06	-13.16	4.86	8.53	-21.38	383	288	10.81	1.30	-0.01	7.33
12DEC87	11:32	3.27	-2.29	-13.22	5.33	7.38	-21.06	382	284	11.78	1.42	-0.01	7.33
12DEC87	11:36	3.61	-6.94	-13.53	5.22	8.44	-22.13	382	269	9.59	1.11	-0.01	7.28
12DEC87	11:40	3.61	-7.84	-13.47	5.28	9.00	-22.75	383	279	4.09	0.47	-0.01	7.27
*12DEC87	11:44	2.96	-2.60	-14.78	6.73	8.31	-23.50	383	289	9.09	1.05	-0.01	7.25
*12DEC87	11:48	3.34	-7.61	-14.09	5.55	8.75	-22.75	383	278	7.78	0.90	-0.01	7.22
*12DEC87	11:52	3.57	-7.72	-14.31	5.59	8.78	-22.88	382	269	8.22	0.98	-0.01	7.22
*12DEC87	11:56	3.01	-7.67	-15.34	6.78	8.31	-23.63	380	283	9.06	1.08	-0.01	7.17
12DEC87	12:00	3.38	-7.45	-13.75	5.61	8.97	-23.06	383	289	12.72	1.50	-0.01	7.13
12DEC87	12:04	3.52	-7.70	-14.06	5.64	9.03	-23.13	385	273	6.61	0.79	-0.01	7.13
12DEC87	12:08	2.93	-7.81	-14.75	6.47	7.91	-22.81	387	272	7.06	0.84	-0.01	8.09
12DEC87	12:12	3.51	-7.61	-13.63	5.17	8.47	-22.06	388	284	4.20	0.50	-0.01	8.03
12DEC87	12:16	3.41	-7.55	-13.66	5.14	8.78	-22.38	387	283	5.42	0.66	-0.01	8.00
12DEC87	12:20	3.20	-7.67	-13.81	5.64	7.77	-21.75	385	272	3.58	0.42	-0.01	7.97
12DEC87	12:24	3.45		-13.16	4.84	8.16	-21.19	385	277	7.34	0.88	-0.01	7.92
12DEC87	12:28	3.45	-7.88	-12.69	4.84	8.31	-21.13	383	285	7.92	0.96	-0.01	7.91
12DEC87	12:32	3.24		-14.16	5.44	7.72	-21.56	383	281	7.59	0.91	-0.01	7.86
12DEC87	12:36	3.40		-12.81	4.88	8.16	-21.25	385	274	2.48	0.29	-0.01	7.84
12DEC87	12:40	3.34	-8.22	-12.84	4.67	8.34	-21.13	386	279	3.08	0.37	-0.01	7.84
12DEC87	12:44	3.39		-13.22	4.77	7.55	-20.44	382	281	7.61	0.91	-0.01	7.84
12DEC87	12:48	3.36		-13.03	4.86	7.83	-20.75	380	281	2.48	0.30	-0.01	7.81
12DEC87	12:52	3.33		-13.78	5.09	7.70	-21.19	381	279	2.13	0.25	-0.01	7.83
12DEC87	12:56	3.43		-12.66	4.88	8.06	-21.13	381	278	13.38	1.60	-0.01	7.78
12DEC87	13:00	3.36	-8.16	-12.81	4.67	8.53	-21.13	381	280	-0.82	-0.10	-0.01	7.81
*12DEC87	13:04	3.38		-13.88	5.06	7.88	-21.31	382	280	2.25	0.27	-0.01	7.73
*12DEC87	13:08	3.45		-13.06	4.89	7.81	-21.00	383	279	15.41	1.85	-0.01	7.75
*12DEC87	13:12	3.38	-8.22	-12.78	4.64	8.16	-20.81	384	278	4.75	0.57	-0.01	7.73
*12DEC87	13:16	3.32		-13.56	4.88	7.94	-20.63	383	279	7.83	0.94	-0.01	7.72
*12DEC87	13:20	3.39		-12.59	4.86	7.94	-20.94	381	278	0.76	0.10	-0.01	7.70
*12DEC87	13:24	3.42	-8.28	-13.09	4.77	8.41	-21.25	382	281	1.57	0.19	-0.01	7.86
12DEC87	13:28	3.33		-13.84	5.08	7.98	-21.44	385	281	10.56	1.27	-0.01	7.88
12DEC87	13:32	3.30		-12.78	5.08	7.80	-21.13	385	276	3.76	0.45	-0.01	7.84
12DEC87	13:36	3.34	-7.94	-12.69	4.72	8.50	-21.13	382	275	3.94	0.47	-0.01	7.84
12DEC87	13:40	3.39		-13.78	4.98	8.22	-21.44	381	281	12.91	1.55	-0.01	7.88
12DEC87	13:44	3.38		-13.41	5.41	7.86	-21.69	383	283	-0.08	-0.01	-0.01	7.91
12DEC87	13:48	3.45	-8.19	-13.06	4.84	8.38	-21.38	384	277	-0.44	-0.05	-0.01	7.91
12DEC87	13:52	3.38		-13.44	4.83	8.28	-21.25	382	274	8.03	0.96	-0.01	7.94

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H20	ABSR IN GAS P IN H20	ABSR OUT GAS P IN H20	ABSR GAS DIFF P IN H20	BGHSE DIFF P IN H20	ID FAN SUCT P IN H20	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
12DEC87	13:56	3.41		-13.00	5.05	7.80	-21.13	381	280	5.72	0.69	-0.01	7.92
12DEC87	14:00	3.37	-8.09	-12.78	4.77	8.44	-21.31	382	284	1.50	0.18	-0.01	7.91
12DEC87	14:04	3.36		-13.88	4.95	8.06	-21.25	382	277	10.72	1.29	-0.01	7.88
12DEC87	14:08	3.49		-12.59	4.92	7.61	-20.63	381	274	1.04	0.13	-0.01	7.88
12DEC87	14:12	3.42	-8.22	-13.06	4.77	8.69	-21.56	382	282	2.95	0.35	-0.01	7.84
12DEC87	14:16	3.41		-14.16	5.00	8.50	-21.81	383	284	8.75	1.05	-0.01	7.84
12DEC87	14:20	3.34		-12.75	5.00	7.42	-20.75	383	275	1.91	0.23	-0.01	7.81
12DEC87	14:24	3.47		-13.34	4.91	8.34	-21.31	383	276	13.44	1.61	-0.01	7.81
12DEC87	14:28	3.43		-14.44	5.03	8.69	-22.06	385	285	11.78	1.41	-0.01	7.78
12DEC87	14:32	3.30		-12.97	5.45	7.75	-21.56	387	282	3.01	0.36	-0.01	7.73
12DEC87	14:36	3.34		-13.66	5.36	8.63	-22.38	389	273	8.84	1.06	-0.01	7.72
12DEC87	14:40	3.54		-14.22	5.06	8.44	-21.88	389	278	0.22	0.03	-0.01	7.73
12DEC87	14:44	3.12		-12.81	5.63	7.52	-21.50	388	283	-0.88	-0.11	-0.01	7.70
*12DEC87	14:48	3.48		-13.06	4.80	8.59	-21.50	386	277	8.78	1.05	-0.01	7.73
*12DEC87	14:52	3.53		-13.50	4.98	8.72	-22.13	386	276	-0.82	-0.10	-0.01	7.75
*12DEC87	14:56	3.32		-13.38	5.41	7.48	-21.38	388	282	-0.81	-0.10	-0.01	7.70
*12DEC87	15:00	3.45		-13.16	4.75	8.28	-21.25	388	281	6.88	0.82	-0.01	7.66
*12DEC87	15:04	3.38	-7.84	-12.69	4.66	8.38	-21.06	385	274	3.01	0.36	-0.01	7.66
*12DEC87	15:08	3.30		-13.00	5.25	7.58	-21.19	383	277	1.00	0.12	-0.01	7.70
12DEC87	15:12	3.42	-8.22	-12.91	4.77	8.44	-21.38	383	285	5.83	0.70	-0.01	7.64
12DEC87	15:16	3.41	-8.03	-12.94	4.77	8.25	-21.06	382	280	3.01	0.36	-0.01	7.61
12DEC87	15:20	3.51		-13.00	5.22	7.44	-21.00	382	273	1.96	0.23	-0.01	7.59
12DEC87	15:24	3.60		-13.28	5.17	9.06	-22.63	384	281	0.05	0.01	-0.01	7.58
*12DEC87	15:28	3.36	-7.52	-11.97	4.64	8.47	-20.94	371	290	18.38	2.20	-0.01	0.00
*12DEC87	15:32	3.02	-6.73	-10.59	4.14	6.53	-18.06	346	276	17.50	2.10	-0.01	0.00
*12DEC87	15:36	2.30	-5.92	-9.16	3.23	5.97	-14.91	331	258	17.50	2.10	-0.01	0.00
*12DEC87	15:40	1.77	-4.84	-7.44	2.55	4.31	-11.38	324	275	9.72	1.17	-0.01	0.00
*12DEC87	15:44	2.09	-4.95	-7.88	2.94	4.83	-12.75	319	290	22.25	2.65	-0.01	0.00
*12DEC87	15:48	2.25	-5.05	-7.97	3.10	5.09	-13.78	311	289	7.83	0.94	-0.01	0.00
*12DEC87	15:52	2.05	-4.48	-7.08	2.82	4.72	-12.75	306	270	9.72	0.70	-0.01	0.00
*12DEC87	15:56	1.84	-4.98	-7.70	2.59	4.42	-11.69	305	267	18.38	0.97	-0.01	0.00
*12DEC87	16:00	1.98	-5.17	-8.09	2.75	4.66	-12.34	304	279	3.01	0.36	-0.01	0.00
*12DEC87	16:04	2.30	-5.69	-8.88	3.17	5.14	-13.97	305	287	17.44	2.09	-0.01	0.08
*12DEC87	16:08	2.19	-5.73	-8.81	2.99	4.98	-13.38	310	289	5.83	0.70	-0.01	0.07
*12DEC87	16:12	2.20	-5.70	-8.63	3.02	4.98	-13.56	317	281	8.78	1.05	-0.01	0.08
*12DEC87	16:16	2.58	-6.41	-9.88	3.52	5.47	-15.31	325	271	17.50	2.09	-0.01	0.09
*12DEC87	16:20	2.68	-7.42	-11.16	3.66	6.66	-16.88	334	283	13.59	1.63	-0.01	0.25
*12DEC87	16:24	2.77	-7.02	-10.56	3.77	6.31	-16.88	345	291	10.78	1.29	-0.01	0.21
*12DEC87	16:28	2.35	-6.16	-9.44	3.23	6.22	-15.56	355	274	19.44	1.80	-0.01	0.21
*12DEC87	16:32	2.11	-5.22	-8.22	2.93	5.61	-13.88	359	266	11.75	1.22	-0.01	0.21
*12DEC87	16:36	2.27	-6.03	-9.25	3.16	5.17	-14.06	360	289	24.25	2.75	-0.01	0.19
*12DEC87	16:40	2.01	-5.17	-8.00	2.77	4.95	-13.09	358	290	4.92	0.54	-0.01	0.19

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
#12DEC87	16:44	1.89	-5.11	-7.81	2.65	4.80	-12.31	345	256	9.72	1.09	-0.01	0.17
#12DEC87	16:48	2.22	-5.84	-9.03	3.05	5.31	-13.69	333	264	13.59	1.59	-0.01	0.18
#12DEC87	16:52	2.89	-6.13	-10.13	3.91	7.45	-18.06	330	275	5.88	0.69	-0.01	6.22
#12DEC87	16:56	2.59	-6.31	-9.97	3.55	7.28	-17.19	334	275	12.69	1.52	-0.01	6.05
#12DEC87	17:00	2.93	-7.23	-11.38	3.98	7.06	-18.00	344	279	14.66	1.76	-0.01	8.47
#12DEC87	17:04	3.05	-7.05	-11.13	4.16	7.30	-18.69	354	281	9.72	1.17	-0.01	8.59
#12DEC87	17:08	3.26	-7.84	-12.16	4.44	8.25	-20.19	362	283	7.83	0.94	-0.01	8.44
#12DEC87	17:12	3.45		-14.06	5.13	8.19	-21.50	369	287	10.78	1.29	-0.01	8.34
#12DEC87	17:16	3.25		-13.66	5.53	8.34	-22.31	379	291	4.92	0.59	-0.01	8.28
#12DEC87	17:20	3.42		-13.56	5.22	8.53	-22.19	385	276	6.88	0.82	-0.01	8.19
#12DEC87	17:24	3.26		-14.53	5.33	8.00	-21.81	386	268	16.56	1.99	-0.01	8.13
#12DEC87	17:28	3.46		-12.69	4.92	7.91	-21.06	383	280	5.88	0.70	-0.01	8.09
#12DEC87	17:32	3.50	-8.25	-13.06	4.81	8.66	-21.56	379	287	13.59	1.63	-0.01	8.06
#12DEC87	17:36	3.38		-14.16	5.27	8.31	-22.06	380	280	9.72	1.17	-0.01	8.00
#12DEC87	17:40	3.25		-13.69	5.86	8.00	-22.25	382	273	8.78	1.05	-0.01	7.97
#12DEC87	17:44	3.51		-13.31	5.08	8.84	-22.38	386	282	1.00	0.12	-0.01	7.94
#12DEC87	17:48	3.40		-14.44	5.14	8.56	-22.06	386	284	15.59	1.87	-0.01	7.91
#12DEC87	17:52	3.31		-13.19	5.56	7.91	-21.94	384	274	4.92	0.59	-0.01	7.91
#12DEC87	17:56	3.39		-13.88	5.25	8.50	-22.19	384	276	3.01	0.36	-0.01	7.91
#12DEC87	18:00	3.53		-13.59	4.88	8.13	-21.19	383	283	5.78	0.69	-0.01	7.86
#12DEC87	18:04	3.42		-13.38	5.28	8.03	-21.75	382	280	3.08	0.37	-0.01	7.95
#12DEC87	18:08	3.54		-13.72	5.02	8.69	-22.19	385	276	6.58	0.78	-0.01	7.92
#12DEC87	18:12	3.45		-13.91	5.00	8.25	-21.63	386	279	9.78	1.18	-0.01	7.91
12DEC87	18:16	3.32		-13.13	5.34	7.77	-21.44	386	281	2.70	0.33	-0.01	7.91
12DEC87	18:20	3.35		-13.09	4.94	8.50	-21.75	387	279	2.57	0.31	-0.01	8.47
12DEC87	18:24	3.48		-13.94	4.98	8.47	-21.56	385	274	6.52	0.79	-0.01	8.53
12DEC87	18:28	3.21		-14.81	6.53	8.38	-23.38	387	281	0.21	0.02	-0.01	8.56
12DEC87	18:32	2.91		-15.47	6.88	9.34	-24.69	390	286	0.36	0.03	-0.01	8.63
#12DEC87	18:36	2.18			7.38	9.66	-25.50	392	280	1.30	0.14	-0.01	0.10
#12DEC87	18:40	2.41			7.23	8.88	-24.56	386	288	8.88	0.86	-0.01	0.12
#12DEC87	18:44	2.56		-14.69	6.66	9.09	-24.25	377	277	-0.90	-0.06	-0.01	0.11
#12DEC87	18:48	2.91		-15.16	6.06	8.78	-23.31	366	264	0.26	0.02	-0.01	0.14
#12DEC87	18:52	3.01		-14.13	6.48	7.89	-22.88	360	279	12.09	0.91	-0.01	0.14
#12DEC87	18:56	3.09		-13.97	5.89	9.00	-23.38	355	293	5.48	0.00	-0.01	0.15
#12DEC87	19:00	3.39		-14.44	5.19	8.50	-22.19	352	273	2.58	0.00	-0.01	0.16
#12DEC87	19:04	3.38		-13.00	5.19	7.11	-20.69	351	264	13.03	0.00	-0.01	0.19
#12DEC87	19:08	3.29	-7.81	-12.41	4.56	7.61	-19.88	350	289	12.66	0.00	-0.01	0.17
#12DEC87	19:12	3.38	-8.09	-12.75	4.61	7.69	-20.25	351	292	11.22	0.00	-0.01	0.18
#12DEC87	19:16	3.38		-12.69	5.11	6.89	-20.38	356	267	16.25	0.00	-0.01	0.19
#12DEC87	19:20	3.35	-7.92	-12.53	4.63	7.69	-20.19	361	273	5.27	0.00	-0.01	0.19
#12DEC87	19:24	3.00	-7.20	-11.09	4.16	7.27	-19.00	364	296	6.69	0.38	-0.01	0.13
#12DEC87	19:28	2.50	-6.27	-9.69	3.43	5.36	-15.06	363	276	11.03	0.66	-0.01	0.15

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DST CLTR GAS DF P IN H2O	ABSR IN GAS P IN H2O	ABSR OUT GAS P IN H2O	ABSR GAS DIFF P IN H2O	BGHSE DIFF P IN H2O	ID FAN SUCT P IN H2O	ABSR IN GAS T DEG F	ABSR OUT GAS T DEG F	OUTLET GAS SO2 PPMV	CORRTD GAS SO2 %	OUTLET GAS NOX PPMV	LIME SLRY FEED GPM
‡12DEC87	19:32	2.50	-6.44	-10.03	3.52	5.08	-14.84	359	257	0.94	0.03	-0.01	0.20
‡12DEC87	19:36	2.44	-6.08	-9.59	3.45	5.14	-14.66	353	284	0.65	0.02	-0.01	0.21
	AVERAGE	3.37	-7.39	-13.42	5.17	8.22	-21.66	384	279	5.48	0.66	-0.01	7.80

‡ - NON-TEST PERIOD, VALUE NOT INCLUDED IN AVERAGE

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
		FI3200	PI200A	FI3200	TI3800	DPI3809	AI370A	AI370B	AI370C	IIL320	IIH320	IIL320	IIL320
*12DEC87	11:10	1.48	-2	1.48	266	8.41	91.25	44.25	3.69	0.01	100.25	0.01	0.01
*12DEC87	11:14	4.64	-6	4.64	272	7.52	74.00	44.88	2.99	0.01	102.50	0.01	0.01
*12DEC87	11:18	8.88	-5	8.88	271	8.50	81.75	44.00	2.98	0.01	103.00	0.01	0.01
12DEC87	11:22	4.33	-6	4.33	264	8.81	88.25	46.63	3.29	0.01	104.00	0.01	0.01
12DEC87	11:26	1.93	-7	1.93	266	7.66	81.25	43.38	3.09	0.01	102.75	0.01	0.01
12DEC87	11:30	5.55	-2	5.55	272	8.34	71.25	46.38	2.98	0.01	101.00	0.01	0.01
12DEC87	11:34	7.64	-7	7.64	269	8.31	70.50	44.00	2.98	0.01	103.75	0.01	0.01
12DEC87	11:38	3.66	-8	3.66	264	7.72	66.25	41.88	3.09	0.01	106.25	0.01	0.01
*12DEC87	11:42	2.80	-3	2.80	269	9.13	98.50	41.13	1.98	0.01	105.75	0.01	0.01
*12DEC87	11:46	7.67	-8	7.67	273	9.09	75.50	44.50	2.69	0.01	106.00	0.01	0.01
*12DEC87	11:50	6.86	-8	6.86	267	7.67	68.50	41.38	2.78	0.01	105.75	0.01	0.01
*12DEC87	11:54	2.67	-8	2.67	265	8.97	67.25	45.88	2.78	0.01	106.75	0.01	0.01
*12DEC87	11:58	4.52	-7	4.52	271	9.22	62.75	49.88	2.98	0.01	105.25	0.01	0.01
12DEC87	12:02	8.59	-8	8.59	272	8.06	66.75	44.75	3.39	0.01	106.00	0.01	0.01
12DEC87	12:06	5.88	-8	5.88	265	8.91	72.25	47.00	3.48	0.01	106.00	0.01	0.01
12DEC87	12:10	3.15	-8	3.15	266	8.75	67.75	40.13	3.09	0.01	105.25	0.01	0.01
12DEC87	12:14	5.31	-8	5.31	270	7.77	62.88	46.13	2.99	0.01	104.00	0.01	0.01
12DEC87	12:18	6.89	-8	6.89	269	8.47	66.25	46.38	3.18	0.01	102.50	0.01	0.01
12DEC87	12:22	3.98		3.98	265	8.53	59.00	41.13	3.18	0.01	102.75	0.01	0.01
12DEC87	12:26	2.57		2.57	267	7.48	53.38	45.63	2.78	0.01	101.25	0.01	0.01
12DEC87	12:30	5.55		5.55	270	8.16	65.00	40.50	3.48	0.01	102.00	0.01	0.01
12DEC87	12:34	6.19		6.19	268	8.53	61.25	49.88	3.48	0.01	102.75	0.01	0.01
12DEC87	12:38	4.08		4.08	266	7.75	65.25	47.25	3.29	0.01	103.00	0.01	0.01
12DEC87	12:42	4.13		4.13	268	7.91	57.88	47.75	2.59	0.01	100.00	0.01	0.01
12DEC87	12:46	4.97		4.97	268	8.25	56.63	41.00	2.89	0.01	102.00	0.01	0.01
12DEC87	12:50	4.86		4.86	268	7.77	57.25	43.13	2.87	0.01	100.75	0.01	0.01
12DEC87	12:54	4.78		4.78	268	8.25	56.75	42.50	2.89	0.01	101.75	0.01	0.01
12DEC87	12:58	4.06		4.06	268	7.81	57.50	43.50	3.09	0.01	102.25	0.01	0.01
*12DEC87	13:02	4.66		4.66	269	8.16	66.50	48.63	3.29	0.01	101.50	0.01	0.01
*12DEC87	13:06	5.17		5.17	269	8.44	64.25	49.25	3.29	0.01	102.00	0.01	0.01
*12DEC87	13:10	5.03		5.03	268	7.72	57.38	49.88	3.09	0.01	102.25	0.01	0.01
*12DEC87	13:14	4.72		4.72	268	7.83	52.50	49.75	2.98	0.01	101.00	0.01	0.01
*12DEC87	13:18	4.56		4.56	268	8.50	57.38	49.88	2.98	0.01	101.00	0.01	0.01
*12DEC87	13:22	4.19		4.19	268	7.94	59.25	49.88	3.18	0.01	101.75	0.01	0.01
12DEC87	13:26	5.08		5.08	269	7.88	61.13	49.88	3.58	0.01	102.75	0.01	0.01
12DEC87	13:30	5.72		5.72	269	8.31	61.50	49.88	3.39	0.01	101.50	0.01	0.01
12DEC87	13:34	4.83		4.83	267	8.00	62.50	49.88	2.99	0.01	101.00	0.01	0.01
12DEC87	13:38	3.09		3.09	266	7.86	59.00	48.75	2.98	0.01	101.00	0.01	0.01
12DEC87	13:42	4.39		4.39	269	8.50	57.25	49.88	3.18	0.01	101.75	0.01	0.01
12DEC87	13:46	6.08		6.08	270	8.19	54.38	49.88	3.18	0.01	103.50	0.01	0.01
12DEC87	13:50	5.25		5.25	267	7.67	57.25	49.88	2.89	0.01	102.25	0.01	0.01

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
12DEC87	13:54	2.92		2.92	266	8.56	55.38	49.88	2.78	0.01	101.00	0.01	0.01
12DEC87	13:58	3.59		3.59	269	8.31	56.38	49.88	3.39	0.01	102.00	0.01	0.01
12DEC87	14:02	5.97		5.97	270	7.61	51.50	49.88	2.89	0.01	102.25	0.01	0.01
12DEC87	14:06	5.05		5.05	267	8.22	59.38	49.88	2.98	0.01	101.50	0.01	0.01
12DEC87	14:10	2.91		2.91	267	8.44	64.25	49.88	3.18	0.01	102.25	0.01	0.01
12DEC87	14:14	4.66		4.66	270	7.83	64.25	49.88	3.29	0.01	101.75	0.01	0.01
12DEC87	14:18	6.44		6.44	270	8.47	57.75	49.88	3.09	0.01	102.00	0.01	0.01
12DEC87	14:22	4.80		4.80	266	8.09	59.25	49.88	2.78	0.01	101.50	0.01	0.01
12DEC87	14:26	3.24		3.24	268	7.64	76.25	49.88	3.88	0.01	102.75	0.01	0.01
12DEC87	14:30	5.94		5.94	271	8.75	69.25	49.88	3.79	0.01	102.75	0.01	0.01
12DEC87	14:34	7.14		7.14	269	8.63	78.25	49.88	4.08	0.01	103.50	0.01	0.01
12DEC87	14:38	4.89		4.89	266	7.53	77.25	49.88	3.98	0.01	104.25	0.01	0.01
12DEC87	14:42	4.80		4.80	269	8.41	72.50	49.88	3.69	0.01	102.50	0.01	0.01
*12DEC87	14:46	6.34		6.34	270	8.66	65.25	49.88	2.98	0.01	102.50	0.01	0.01
*12DEC87	14:50	5.41		5.41	268	7.61	69.25	49.88	3.48	0.01	103.25	0.01	0.01
*12DEC87	14:54	4.41		4.41	268	8.56	71.50	49.88	3.69	0.01	102.50	0.01	0.01
*12DEC87	14:58	5.58		5.58	270	8.47	64.25	49.88	3.48	0.01	103.00	0.01	0.01
*12DEC87	15:02	6.42		6.42	269	7.36	63.38	49.88	2.89	0.01	102.50	0.01	0.01
*12DEC87	15:06	4.22		4.22	266	8.50	60.50	49.88	2.89	0.01	102.00	0.01	0.01
12DEC87	15:10	3.01		3.01	268	8.56	54.38	49.88	3.18	0.01	101.75	0.01	0.01
12DEC87	15:14	5.77		5.77	270	7.39	57.25	49.88	2.89	0.01	102.50	0.01	0.01
12DEC87	15:18	5.83		5.83	268	8.22	62.50	49.88	3.09	0.01	101.50	0.01	0.01
12DEC87	15:22	3.66		3.66	267	8.88	63.38	49.88	3.29	0.01	103.75	0.01	0.01
*12DEC87	15:26	4.64		4.64	270	7.92	100.00	49.88	1.98	0.01	105.25	0.01	0.01
*12DEC87	15:30	8.66		8.66	272	8.00	42.50	49.88	0.20	0.01	101.25	0.01	0.01
*12DEC87	15:34	7.64		7.64	264	6.34	20.56	49.88	0.10	0.01	95.50	0.01	0.01
*12DEC87	15:38	-0.47		-0.47	259	4.61	11.59	49.88	0.10	0.01	90.25	0.01	0.01
*12DEC87	15:42	-1.03		-1.03	263	4.22	7.72	49.88	0.10	0.01	88.50	0.01	0.01
*12DEC87	15:46	1.97		1.97	269	4.95	1.62	49.88	0.10	0.01	92.25	0.01	0.01
*12DEC87	15:50	6.00		6.00	269	4.70	2.55	49.88	0.00	0.01	91.25	0.01	0.01
*12DEC87	15:54	2.11		2.11	262	4.30	0.69	49.88	0.10	0.01	89.50	0.01	0.01
*12DEC87	15:58	-1.02		-1.02	260	4.39	3.56	49.88	0.10	0.01	89.50	0.01	0.01
*12DEC87	16:02	-1.01		-1.01	264	4.72	8.56	49.88	0.20	0.01	90.75	0.01	0.01
*12DEC87	16:06	1.47		1.47	268	4.86	4.58	49.88	0.40	0.01	91.00	0.01	0.01
*12DEC87	16:10	5.02		5.02	270	4.92	6.53	49.88	0.59	0.01	91.25	0.01	0.01
*12DEC87	16:14	5.72		5.72	266	4.83	12.53	49.88	0.69	0.01	91.25	0.01	0.01
*12DEC87	16:18	2.19		2.19	263	6.03	27.44	49.88	0.69	0.01	94.75	0.01	0.01
*12DEC87	16:22	4.50		4.50	268	6.84	58.38	49.88	0.99	0.01	94.50	0.01	0.01
*12DEC87	16:26	9.38		9.38	270	6.59	59.25	-0.04	1.39	0.01	95.50	0.01	0.01
*12DEC87	16:30	7.06		7.06	264	5.03	192.00	-0.04	0.89	0.01	90.50	0.01	0.01
*12DEC87	16:34	1.97		1.97	262	5.91	159.00	-0.04	0.59	0.01	90.50	0.01	0.01
*12DEC87	16:38	6.42		6.42	269	5.09	147.00	-0.04	0.49	0.01	90.00	0.01	0.01

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
#12DEC87	16:42	10.53		10.53	268	4.80	222.00	-0.04	0.89	0.01	90.25	0.01	0.01
#12DEC87	16:46	1.53		1.53	256	4.92	136.50	-0.04	0.99	0.01	90.50	0.01	0.01
#12DEC87	16:50	-1.02		-1.02	258	7.44	189.00	-0.04	1.39	0.01	94.75	0.01	0.01
#12DEC87	16:54	-1.02		-1.02	262	6.97	224.00	-0.04	1.59	0.01	96.50	0.01	0.01
#12DEC87	16:58	-1.02		-1.02	263	6.95	129.00	-0.04	1.89	0.01	95.00	0.01	0.01
#12DEC87	17:02	-1.01		-1.01	265	7.56	68.25	-0.04	2.38	0.01	96.75	0.01	0.01
#12DEC87	17:06	-1.01		-1.01	267	7.30	58.38	-0.04	2.88	0.01	98.00	0.01	0.01
#12DEC87	17:10	-1.02		-1.02	269	8.06	57.38	-0.04	2.98	0.01	100.00	0.01	0.01
#12DEC87	17:14	2.27		2.27	272	8.88	79.25	-0.04	4.38	0.01	102.50	0.01	0.01
#12DEC87	17:18	7.70		7.70	273	8.22	76.25	-0.04	4.38	0.01	104.25	0.01	0.01
#12DEC87	17:22	6.52		6.52	266	8.00	71.50	-0.04	3.88	0.01	104.25	0.01	0.01
#12DEC87	17:26	1.98		1.98	264	8.50	62.38	-0.04	3.08	0.01	101.50	0.01	0.01
#12DEC87	17:30	2.07		2.07	268	8.22	54.50	-0.04	2.68	0.01	102.25	0.01	0.01
#12DEC87	17:34	5.75		5.75	271	8.03	61.38	-0.04	3.38	0.01	102.50	0.01	0.01
#12DEC87	17:38	6.06		6.06	267	8.56	61.38	-0.04	3.38	0.01	104.25	0.01	0.01
#12DEC87	17:42	3.63		3.63	266	8.28	60.38	-0.04	3.48	0.01	103.75	0.01	0.01
#12DEC87	17:46	4.86		4.86	270	8.16	58.25	-0.04	3.29	0.01	104.00	0.01	0.01
#12DEC87	17:50	6.77		6.77	270	8.69	59.38	-0.04	2.88	0.01	103.25	0.01	0.01
#12DEC87	17:54	4.72		4.72	266	8.44	61.38	-0.04	3.08	0.01	104.25	0.01	0.01
#12DEC87	17:58	3.24		3.24	268	7.73	57.25	-0.05	3.08	0.01	103.00	0.01	0.01
#12DEC87	18:02	5.30		5.30	270	8.69	81.25	-0.04	3.29	0.01	102.75	0.01	0.01
#12DEC87	18:06	5.84		5.84	269	8.50	60.88	-0.04	3.38	0.01	104.25	0.01	0.01
#12DEC87	18:10	4.84		4.84	268	7.89	59.00	-0.04	3.28	0.01	102.75	0.01	0.01
#12DEC87	18:14	4.78		4.78	269	8.31	60.38	-0.04	3.38	0.01	101.75	0.01	0.01
12DEC87	18:18	5.58		5.58	270	8.22	67.75	-0.04	3.78	0.01	102.75	0.01	0.01
12DEC87	18:22	5.34		5.34	268	7.73	75.50	-0.04	3.58	0.01	101.75	0.01	0.01
12DEC87	18:26	3.54		3.54	267	8.78	64.75	-0.04	3.58	0.01	103.75	0.01	0.01
12DEC87	18:30	4.58		4.58	270	9.19	72.00	-0.04	3.18	0.01	107.50	0.01	0.01
12DEC87	18:34	7.53		7.53	272	8.72	61.38	-0.04	3.58	0.01	110.25	0.01	0.01
#12DEC87	18:38	8.50		8.50	271	9.69	84.25	-0.04	1.79	0.01	108.75	0.01	0.01
#12DEC87	18:42	11.56		11.56	273	9.41	93.50	-0.04	1.69	0.01	108.75	0.01	0.01
#12DEC87	18:46	11.31		11.31	267	7.94	137.00	-0.04	1.09	0.01	108.50	0.01	0.01
#12DEC87	18:50	5.14		5.14	262	8.69	89.25	-0.04	0.68	0.01	107.25	0.01	0.01
#12DEC87	18:54	5.25		5.25	270	9.13	57.00	-0.04	0.59	0.01	108.25	0.01	0.01
#12DEC87	18:58	10.75		10.75	273	7.72	27.00	-0.04	0.59	0.01	107.25	0.01	0.01
#12DEC87	19:02	8.38		8.38	264	8.16	18.63	-0.04	0.59	0.01	105.00	0.01	0.01
#12DEC87	19:06	2.09		2.09	263	7.88	12.53	-0.04	0.49	0.01	101.50	0.01	0.01
#12DEC87	19:10	6.30		6.30	272	6.77	9.66	-0.04	0.59	0.01	100.50	0.01	0.01
#12DEC87	19:14	11.59		11.59	271	7.69	11.69	-0.04	0.69	0.01	101.50	0.01	0.01
#12DEC87	19:18	6.39		6.39	262	7.94	8.91	-0.04	0.59	0.01	102.75	0.01	0.01
#12DEC87	19:22	3.88		3.88	267	6.73	11.34	-0.04	0.59	0.01	100.50	0.01	0.01
#12DEC87	19:26	10.69		10.69	273	6.30	12.38	-0.04	0.59	0.01	94.75	0.01	0.01

PROCESS DATA SUMMARY
MAINE ENERGY RECOVERY COMPANY
YORK COUNTY WASTE-TO-ENERGY FACILITY
BIDDEFORD MAINE

UNIT A

DATE	TIME	DILUTION WATER GPM	ST IN STM PRESS PSIG	DILUTION WATER GPM	BHSE OUT GAS T DEG F	BGHSE DIFF P IN H2O	STACK CO PPMV	STACK OPACITY %	STACK CO2 %	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS	ID FAN CURRENT AMPS
*12DEC87	19:30	9.44		9.44	265	5.89	12.53	-0.04	0.60	0.01	94.00	0.01	0.01
*12DEC87	19:34	1.56		1.56	259	5.00	11.34	2.96	0.59	0.01	93.25	0.01	0.01
	AVERAGE	4.89	-7	4.89	268	8.20	64.02	42.54	3.23	0.01	102.84	0.01	0.01

* NON-TEST PERIOD,VALUE NOT INCLUDED IN AVERAGE