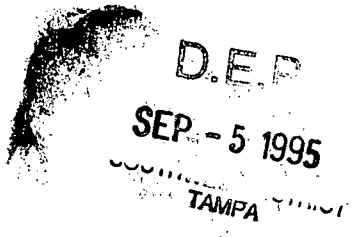


0830080-001-AO

Fero Funeral Home

FDEP Permit Renewal Application

August 1995

Department of Environmental Protection

DIVISION OF AIR RESOURCES MANAGEMENT

APPLICATION FOR AIR PERMIT - SHORT FORM

See Instructions for Form No. 62-210.900(2)

I. APPLICATION INFORMATION

This section of the Application for Air Permit form provides general information on the scope of this application and the purpose for which this application is being submitted. This section also includes information on the owner or authorized representative of the facility and the necessary statements for the applicant and professional engineer, where required, to sign and date for formal submittal of the Application for Air Permit to the Department. If the application form is submitted to the Department on diskette, this section of the Application for Air Permit must also be submitted in hard-copy.

Identification of Facility Addressed in This Application

Enter the name of the corporation, business, governmental entity, or individual that has ownership or control of the facility; the facility name, if any; and a brief reference to the facility's physical location. If known, also enter the ARMS or AIRS facility identification number. This information is intended to give a quick reference, on the first page of the application form, to the facility addressed in this application. Elsewhere in the form, numbered data fields are provided for entry of the facility data in computer-input format.

Fero Funeral Home	
Street Address	***Mailing Address***
7620 South U.S. Highway 41	**5955 North Lecanto Highway**
Dunnellon, Florida 34432	**Beverly Hills, Florida 34465**
AIRS ID: 0420024	

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Permit Number:	0830080001 AO

Owner/Authorized Representative

1. Name and Title of Owner/Authorized Representative:
   Mr. Lanse K. Fero, President

2. Owner/Authorized Representative Mailing Address:

   Organization/Firm: **Fero Funeral Home**
   Mailing Address: **5955 North Lecanto Highway**
   City: **Beverly Hills** State: **Florida** Zip Code: **34465**

3. Owner/Authorized Representative Telephone Numbers:
   Telephone: **(904)746-4551** Fax: **(904)746-4551**

4. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility (non-Title V source) addressed in this Application for Air Permit. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. Further, I agree to operate and maintain the air pollutant emissions units and air pollution control equipment described in this application so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. If the purpose of this application is to obtain an air operation permit or operation permit revision for one or more emissions units which have undergone construction or modification, I certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

   Lanse K. Fero — 08/31/95

   Signature — Date

* Attach letter of authorization if not currently on file.

Scope of Application

This Application for Air Permit addresses the following emissions unit(s) at the facility. An Emissions Unit Information Section (a Section III of the form) must be included for each emissions unit listed.

Emissions Unit ID	Description of Emissions Unit
001	**Industrial Equipment & Engineering Company IE43-M94 Cremation Incinerator**

Purpose of Application

This Application for Air Permit is submitted to obtain (check one):

[ ] Initial air operation permit for one or more existing, but previously unpermitted, emissions units.

[ ] Initial air operation permit for one or more newly constructed or modified emissions units.

Current construction permit number: _____

[ ] Air operation permit revision to address one or more newly constructed or modified emissions units.

Current construction permit number: _____

Operation permit to be revised: _____

[X] Air operation permit renewal.

Operation permit to be renewed: AO42-184997

Application Processing Fee

Check one:

[X] Attached - Amount: $1,500.00 [ ] Not Applicable.

Construction/Modification Information

1. Description of Alterations:

2. Date of Commencement of Construction (DD-MON-YYYY):
NA - Renewal Application

Professional Engineer Certification

1. Professional Engineer Name: **George C. Sinn, Jr., P.E.**

   Registration Number: **16911**

2. Professional Engineer Mailing Address:

   Organization/Firm: **Central Florida Testing Laboratories, Inc.**
   Street Address: **1400 Starkey Road**
   City: **Largo** State: **Florida** Zip Code: **34641**

3. Professional Engineer Telephone Numbers:
   Telephone: **(813)581-7019** Fax: **(813)585-2222**

4. Professional Engineer Statement:

   I, the undersigned, hereby certify, except as particularly noted herein, that:*

   (1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

   (2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

GEORGE C. SINN, JR. * CERTIFIED NO. 16911 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signature 8-24-05

Date

(seal)

* Attach any exception to certification statement.

Application Contact

1. Name and Title of Application Contact: **Mr. Russell B. Keith, Environmental Engineer**
2. Application Contact Mailing Address: Organization/Firm: **Central Florida Testing Laboratories, Inc.** Street Address: **1400 Starkey Road** City: **Largo** State: **Florida** Zip Code: **34641**
3. Application Contact Telephone Numbers: Telephone: **(813)581-7019** Fax: **(813)585-2222**

Application Comment

This project consists of an Industrial Equipment & Engineering Company, Model IE43-M94 cremation incinerator at Fero Funeral Home, in Dunnellon, Florida. This incinerator is currently permitted under FDEP Permit Number AO42-184997. This incinerator was tested for visible emissions on 7/24/95. The enclosed stack test report for particulate matter and carbon monoxide emissions is from an identical unit permitted under FDEP permit number AO48-245307 (APIS 30ORG480126-01) in Orlando, Florida. This facility will comply with all applicable FDEP air pollution rules and regulations.

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Name, Location, and Type

1. Facility Owner or Operator: **Fero Funeral Home**			
2. Facility Name: **Fero Funeral Home**			
3. Facility Identification Number: [X] Unknown			
4. Facility Location Information: Facility Street Address: **7620 South U.S. Highway 41** City: **Dunnellon** County: **Florida** Zip Code: **34432**			
5. Facility UTM Coordinates: Zone: **17** East (km): **359.0** North (km): **3221.1**			
6. Facility Latitude/Longitude: Latitude (DD/MM/SS): **29/06/41** Longitude (DD/MM/SS): **82/26/57**			
7. Governmental Facility Code: **0**	8. Facility Status Code: **A**	9. Relocatable Facility? [ ] Yes [X] No	10. Facility Major Group SIC Code: **7261**
11. Facility Comment:			

Facility Contact

1. Name and Title of Facility Contact: **Mr. William C. Ward, III, Licensed Funeral Director**
2. Facility Contact Mailing Address: Organization/Firm: **Fero Funeral Home** Street Address: **7620 South U.S. Highway 41** City: **Dunnellon** State: **Florida** Zip Code: **34432**
3. Facility Contact Telephone Numbers: Telephone: **(904)489-5363** Fax: **(904)465-0072**

Facility Regulatory Classifications

1. Small Business Stationary Source? [ ] Yes [ ] No [X] Unknown
2. Title V Source? [X] No
3. Synthetic Non-Title V Source by Virtue of Previous Air Construction Permit? [ ] Yes [X] No Construction Permit Number/Issue Date: _____
4. Facility Regulatory Classifications Comment: **This facility is a minor source.**

B. FACILITY SUPPLEMENTAL INFORMATION

This subsection of the Application for Air Permit form provides supplemental information related to the facility as a whole. (Supplemental information related to individual emissions units within the facility is provided in Subsection III-B of the form.) Supplemental information must be submitted as an attachment to each copy of the form, in hard-copy or computer-readable form.

Supplemental Requirements for All Applications

1. Area Map Showing Facility Location: [ ] Attached, Document ID: _____ [X*] Not Applicable [ ] Waiver Requested * *In Department's file with construction permit application.*
2. Facility Plot Plan: [ ] Attached, Document ID: _____ [X*] Not Applicable [ ] Waiver Requested
3. Process Flow Diagram(s): [ ] Attached, Document ID: _____ [X*] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A and B) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION

This subsection of the Application for Air Permit form provides general information on the emissions unit addressed in this Emissions Unit Information Section, including information on the type, control equipment, operating capacity, and operating schedule of the emissions unit.

Type of Emissions Unit Addressed in This Section

Check one:

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, an individually-regulated emission point (stack or vent) serving a single process or production unit, or activity, which also has other individually-regulated emission points.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a collectively-regulated group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

Emissions Unit Information Section 1 of 1

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section:

The emissions unit addressed in this section consists of a single Industrial Equipment & Engineering Company, Model IE43-M94 cremation incinerator. This incinerator will be used solely for the incineration of human remains and appropriate containers and clothing as allowed by 62-296.401(5), F.A.C.

2. ARMS Identification Number: [ ] No Corresponding ID [X] Unknown

3. Emissions Unit Status Code: **A**	4. Emissions Unit Major Group SIC Code: **7261**

5. Initial Startup Date (DD-MON-YYYY):

6. Long-term Reserve Shutdown Date (DD-MON-YYYY): **Not Applicable**

7. Package Unit: **Human Crematory**
Manufacturer: **Industrial Equipment & Engineering Company** Model Number: **IE43-M94**

8. Generator Nameplate Rating: **NA** MW

9. Incinerator Information:
Dwell Temperature: **1400°F**
Dwell Time: **1 second (minimum)**
Incinerator Afterburner Temperature : **1400°F**

10. Emissions Unit Comment:

The new permit issued for this incinerator should require a minimum secondary chamber temperature of 1400° Fahrenheit.

Emissions Unit Information Section 1 of 1

Emissions Unit Control Equipment

1. Description:
The emissions are controlled by an afterburner which maintains a minimum secondary chamber temperature of 1400°F throughout the combustion process in the primary chamber.

2. Control Device or Method Code(s):
021

Emissions Unit Operating Capacity

1. Maximum Heat Input Rate: **1,550,000** Btu/hr

2. Maximum Incineration Rate: **~100** lb/hr **1.2** tons/day

3. Maximum Process or Throughput Rate: **~100** lb/hr

4. Maximum Production Rate: **~100** lb/hr

5. Operating Capacity Comment:
The average cremation cycle is approximately two hours, and the average weight of human remains to cremate is usually greater than one hundred pounds; but the average process usually equates to approximately one hundred pounds per hour.

Emissions Unit Operating Schedule

Requested Maximum Operating Schedule:

10 hours/day	6 days/week
52 weeks/year	**3120** hours/year

B. EMISSIONS UNIT SUPPLEMENTAL INFORMATION

This subsection of the Application for Air Permit form provides supplemental information related to the emissions unit addressed in this Emissions Unit Information Section. Supplemental information must be submitted as an attachment to each copy of the form, in hard-copy or computer-readable form.

Supplemental Requirements for All Applications

1. Process Flow Diagram [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [X] Attached, Document ID: See attached visible emissions, particulate and carbon monoxide test reports. [ ] Previously submitted, Date:_____ [ ] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID: _____ [X] Not Applicable
7. Operation and Maintenance Plan [ ] Attached, Document ID: _____ [X] Not Applicable
8. Other Information Required by Rule or Statute [ ] Attached, Document ID:_____ [X] Not Applicable

EMISSIONS TESTING
of the
INDUSTRIAL EQUIPMENT & ENGINEERING CO.
Crematory Incinerator

Model IE43-M-94

Project Participants

Byron E. Nelson
Kenneth M. Roberts
Mark S. Gierke
John R. Wallace
David W. Owen

EMISSIONS TESTING
of the
INDUSTRIAL EQUIPMENT & ENGINEERING CO.
Crematory Incinerator

IE43-M-94
November 10, 1993

TABLE OF CONTENTS

1.0 INTRODUCTION

Southern Environmental Sciences, Inc. conducted emissions testing of the Industrial Equipment & Engineering Company's Model IE43-M-94 crematory incinerator on November 10, 1993. The unit was located at Baldwin Fairchild Funeral Home (a permitted facility), 301 Ivanhoe Blvd., Orlando, Florida. Testing was conducted for particulates, carbon monoxide and visible emissions. Oxygen (O_2) concentrations were measured in order to correct results to 7% O_2.

2.0 SUMMARY OF RESULTS

The equipment was found to be in compliance with all applicable emission limiting standards. Results of the particulate and carbon monoxide testing are summarized in Table 1.

The average measured particulate emission rate was 0.023 grains per dry standard cubic foot (corrected to 7% O_2).

The average measured carbon monoxide emission concentration was 94 parts per million (corrected to 7% O_2).

A visible emissions evaluation was conducted over a 60 minute period. The maximum three minute average opacity was zero percent.

TABLE 1. EMISSIONS TEST SUMMARY

Company: INDUSTRIAL EQUIPMENT & ENGINEERING CO., INC.
Source: Crematory Model IE43-M-94

	Run 1	Run 2	Run 3
Date of Run	11/10/93	11/10/93	11/10/93
Process Rate (lb./hr.)	**96**	**101**	**93**
Start Time (24-hr. clock)	0948	1225	1501
End Time (24-hr. clock)	1050	1327	1603
Vol. Dry Gas Sampled Meter Cond. (DCF)	36.890	33.723	31.804
Gas Meter Calibration Factor	1.010	1.010	1.010
Barometric Pressure at Barom. (in. Hg.)	30.21	30.17	30.15
Elev. Diff. Manom. to Barom. (ft.)	0	0	0
Vol. Gas Sampled Std. Cond. (DSCF)	37.062	33.942	32.082
Vol. Liquid Collected Std. Cond. (SCF)	5.139	4.489	4.423
Moisture in Stack Gas (% Vol.)	12.2	11.7	12.1
Molecular Weight Dry Stack Gas	29.52	29.37	29.31
Molecular Weight Wet Stack Gas	28.12	28.04	27.94
Stack Gas Static Press. (in. H_2O gauge)	-0.05	-0.04	-0.04
Stack Gas Static Press. (in. Hg. abs.)	30.21	30.17	30.15
Average Square Root Velocity Head	0.153	0.147	0.137
Average Orifice Differential (in. H_2O)	1.281	1.110	0.984
Average Gas Meter Temperature (° F.)	77.6	75.7	74.0
Average Stack Gas Temperature (° F.)	909.4	976.4	944.4
Pitot Tube Coefficient	0.84	0.84	0.84
Stack Gas Vel. Stack Cond. (ft./sec.)	13.98	13.74	12.68
Effective Stack Area (sq. ft.)	2.18	2.18	2.18
Stack Gas Flow Rate Std. Cond. (DSCFM)	626	589	553
Stack Gas Flow Rate Stack Cond. (ACFM)	1,830	1,799	1,660
Net Time of Run (min.)	60	60	60
Nozzle Diameter (in.)	0.620	0.620	0.620
Percent Isokinetic	102.8	100.0	100.7
Oxygen (%)	12.47	13.93	14.4
Particulate Collected (mg.)	13.7	14.9	45.2
Particulate Emissions (gr./DSCF)	**0.006**	**0.007**	**0.022**
Particulate Emissions (gr./DSCF @ 7% O_2)	**0.009**	**0.013**	**0.046**
Avg. Particulate Emissions (gr./DSCF @ 7% O_2)		**0.023**	
Allowable Part. Emissions (gr./DSCF @ 7% O_2)		**0.08**	
CO Emissions (ppm)	**160.8**	**2.9**	**5.7**
CO Emissions (ppm @ 7% O_2)	**263.9**	**5.71**	**12.1**
Avg. CO Emissions (ppm @ 7% O_2)		**94**	
Allowable CO Emissions (ppm @ 7% O_2)		**100**	
CO Emissions (lb./hr.)	**0.44**	**0.01**	**0.01**
Avg. CO Emissions (lb./hr.)		**0.15**	

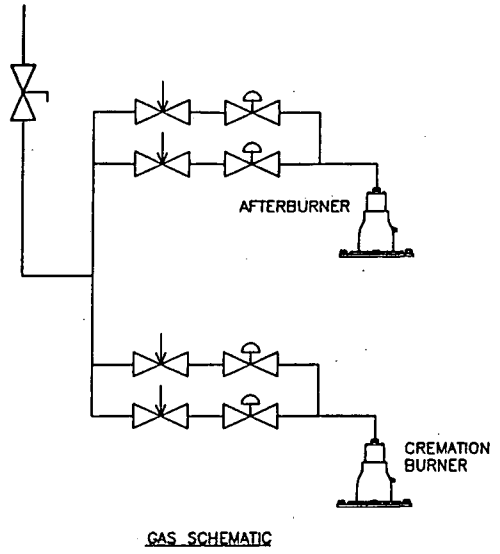
Note: Standard conditions 68° F., 29.92 in. Hg.

3.0 PROCESS DESCRIPTION

The Model IE43-M-94 crematory is a multiple chamber incinerator with a **100 pound per hour capacity**. The afterburner ignites and preheats the secondary chamber to an **operating temperature of 1,400° Fahrenheit**. A human body enclosed within a container is loaded into the primary chamber onto the hearth. The control timers are set and the opacity monitor and power switch are activated.

After loading the remains into the chamber, the low fire ignition burner in the primary chamber starts. Within 30 minutes the high fire cremation burner in the primary chamber begins a controlled cycling range of 1,750 to 1,800° Fahrenheit. This cycling continues until the cremation process is complete.

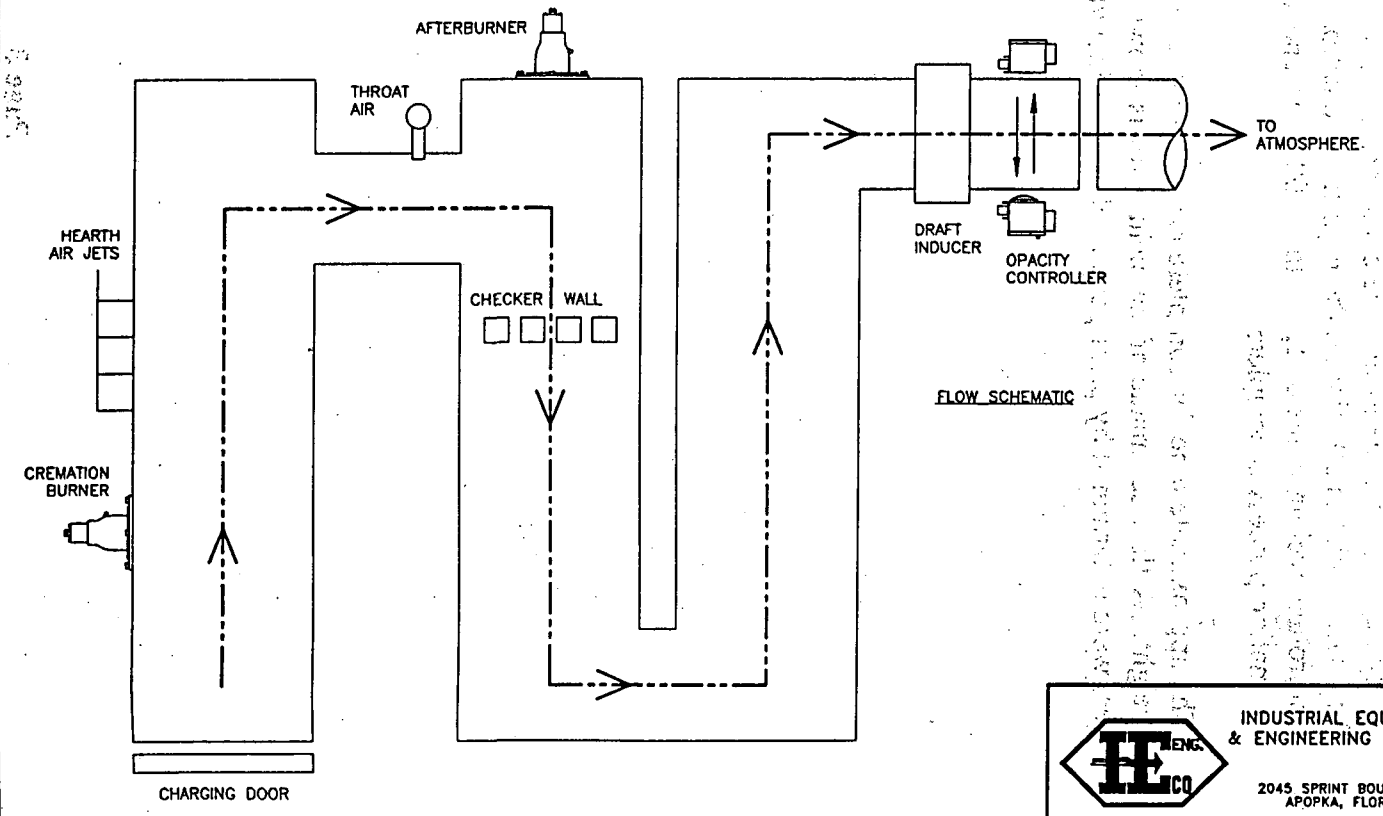
The approximate time for **complete cremation is 2 hours**, but may vary depending on body weight. A flow schematic of the incinerator is shown in Figure 1. Process rates during the test were determined by plant personnel and are included in the appendix.



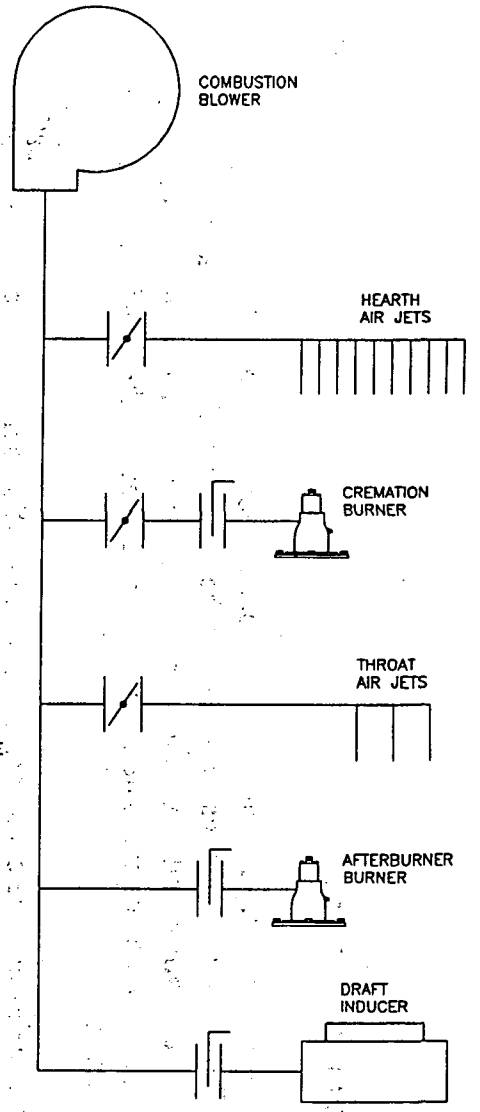
GAS SCHEMATIC

LEGEND OF SYMBOLS

- MANUAL VALVE
- MANUAL ORIFICE VALVE
- ELECTRIC SAFETY SHUTOFF VALVE
- BUTTERFLY DAMPER
- FIXED BLADE DAMPER



FLOW SCHEMATIC



AIR SCHEMATIC

IE ENG. CO

INDUSTRIAL EQUIPMENT & ENGINEERING COMPANY

2045 SPRINT BOULEVARD
APOPKA, FLORIDA

IE43-M94

SCHEMATICS & FLOWS

DRAWN	G. BRAGUE	FILE	MPP-EM14
CHECKED	R. THOMAS	DATE	12-20-93
APPROVED	P. RAHILL	DRAWING NO.	MPP-EM14
SCALE	N.T.S.	SHEET NO.	5 of 5 SHEETS

4.0 SAMPLING PROCEDURES

4.1 Methods

Particulate sampling and analyses were conducted in accordance with EPA Method 5 - Determination of Particulate Emissions from Stationary Sources, 40 CFR 60, Appendix A. Carbon monoxide emissions were conducted in accordance with EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources, 40 CFR 60, Appendix A. The visible emissions evaluation was performed in accordance with EPA Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources, 40 CFR 60, Appendix A. The oxygen content of the stack was determined in accordance with EPA Method 3 - Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight, 40 CFR 60, Appendix A.

4.2 Sampling Locations

Locations of the sample ports and stack dimensions are shown in Figure 2. Particulate sampling was accomplished by conducting horizontal traverses through each of two ports located on the stack at a 90° angle from one another. Twenty-four sample points were chosen in accordance with EPA Method 1 - Sample and Velocity Traverses for Stationary Sources, 40 CFR 60, Appendix A. Carbon monoxide and oxygen sampling were performed from the same sampling ports as the particulate sampling.

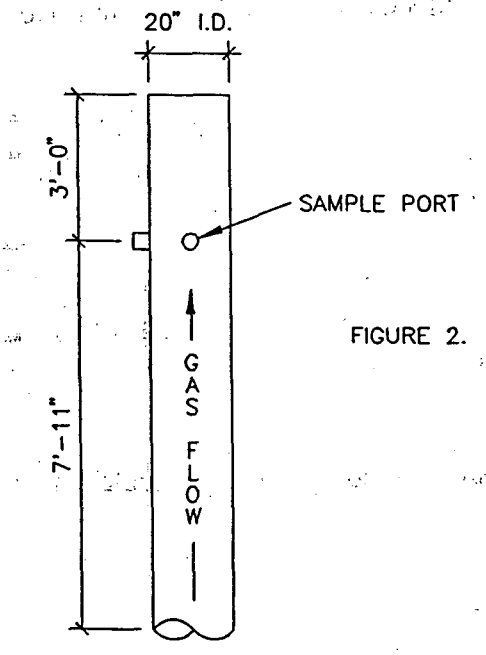


FIGURE 2. STACK DIMENSIONS AND SAMPLE PORT LOCATIONS
INDUSTRIAL EQUIPMENT & ENGINEERING CO.
CREMATORY INCINERATOR

4.3 Sampling Trains

The particulate sampling train consisted of a Nutech Corporation 3 foot water-cooled probe utilizing a heated stainless steel liner, heated glass fiber filter, and four impingers arranged as shown in Figure 3. Flexible tubing was used between the heated filter and the impingers. The first two impingers were each charged with 100 milliliters of water, the third served as a dry trap, and the fourth impinger was charged with indicating silica gel desiccant. The impingers were cooled in an ice and water bath during sampling. A Nutech Corporation control console was used to monitor the gas flow rates and stack conditions during sampling.

The carbon monoxide sampling train consisted of a stainless steel probe, teflon sample line, condenser, silica gel and ascarite tubes, and a Thermo Environmental Instruments, Inc. Model 48 Gas Filter Correlation Carbon Monoxide Analyzer.

The oxygen sampling train consisted of a probe, sample line, tedlar bag in a rigid container, valve, vacuum pump and flow meter.

4.4 Sample Collection

Prior to particulate sampling, the pitot tubes were checked for leaks and the manometers were zeroed. A pretest leak check of the particulate sampling train was conducted by sealing the nozzle and applying a 15" Hg. vacuum. A leak rate of less than 0.02 cubic feet per minute was considered acceptable. Particulate sample was collected isokinetically for two and one half minutes at each of the points sampled.

The carbon monoxide analyzer was calibrated immediately before the beginning and after the end of the test by introducing known gases into the instrument through the sampling train. Zero and a calibration gas were also introduced after each run.

The tedlar bag used for obtaining an integrated oxygen sample was leak checked prior to the test by pressurizing it to 2 to 4 in. H_2O and allowing it to stand overnight. A deflated bag indicated a leak. A one hour integrated sample was obtained at a rate of 0.5 liters per minute for each run.

Carbon monoxide and oxygen sampling were conducted simultaneously with particulate sampling.

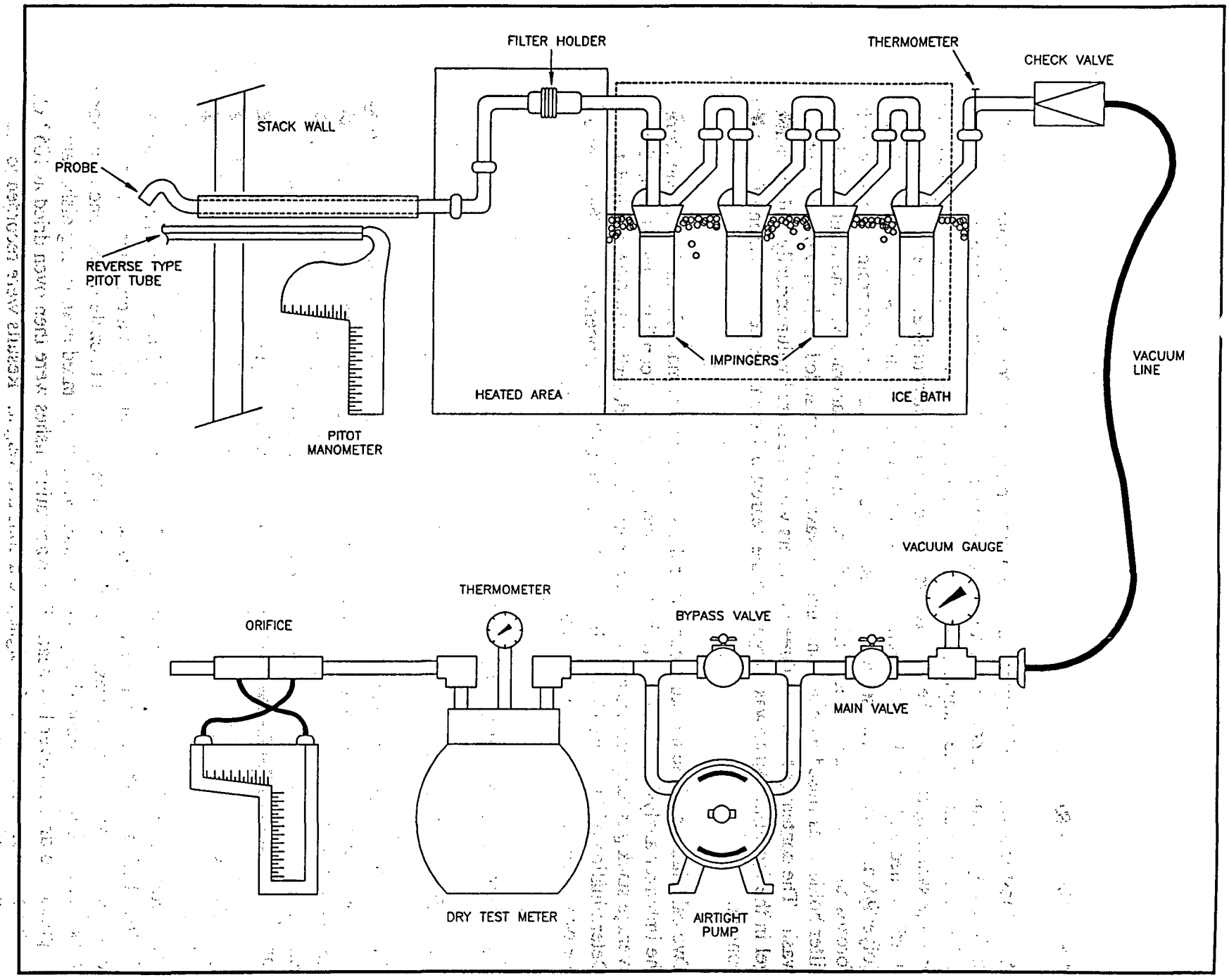


FIGURE 3. METHOD 5 SAMPLING TRAIN

4.5 Sample Recovery

A post test leak check of the particulate sampling train was performed at the completion of each run by sealing the nozzle and applying a vacuum equal to or greater than the maximum value reached during the sample period. A leak rate of less than 0.02 CFM or 4 percent of the average sampling rate (whichever was less) was considered acceptable. The nozzle and probe were brushed and rinsed with reagent grade acetone and the washings were placed in clean polyethylene containers and sealed. The glass fiber filter was removed from the holder with forceps and placed in a covered petri dish for return to the laboratory. The front half of the filter holder was rinsed with acetone and the washings were added to the nozzle and probe wash. The contents of the first three impingers were measured volumetrically and the silica gel in the fourth impinger was weighed to the nearest 0.1 gram for determination of moisture content.

Two calculations of the moisture content of the stack gas were made for each run, one from the impinger analysis and one from the assumption of saturated conditions based upon the average stack gas temperature and a psychrometric chart as described in EPA Method 4 - Determination of Moisture Content in Stack Gases, 40 CFR 60, Appendix A. The lower of the two values of moisture content was considered to be correct.

5.0 ANALYTICAL PROCEDURE

5.1 Pretest Preparation

The glass fiber filters for the particulate train were numbered, oven dried at 105° C. for three hours, desiccated and weighed to a constant weight in preparation for the test. Results were recorded to the nearest 0.1 milligram. Filters were loaded into holders and a filter was set aside as a control blank. The impingers were charged as described in section 4.3 and the contents of the fourth impinger were weighed to the nearest 0.1 gram.

5.2 Analysis

Upon return to the laboratory, the particulate filters were removed from the containers with forceps, dried at 105° C. for three hours, desiccated and weighed to a constant weight. Results were recorded to the nearest 0.1 milligram. The probe and nozzle washes and an acetone blank were measured volumetrically and transferred to clean, tared evaporating dishes and evaporated to dryness over low heat. The evaporating dishes were then oven dried at 105° C. for three hours, desiccated and weighed to a constant weight. Results were recorded to the nearest 0.1 milligram. The total particulate reported is the sum of the filter weight gain and the weight gain of the evaporating dishes, corrected for the acetone blank.

APPENDIX

Project Participants

Certification

Visible Emissions Evaluation

Process Weight Statement

Laboratory Data

Particulate Data Sheets

Gas Analysis Sheets

CO Strip Charts

Calibration Data

Calculations and Symbols

PROJECT PARTICIPANTS AND CERTIFICATION

BALDWIN - FAIRCHILD FUNERAL HOME
Crematory Incinerator
Orlando, Florida

November 10, 1993

Project Participants:

Byron E. Nelson Mark S. Gierke John R. Wallace David W. Owen	Conducted the field testing.
Ted Ryder (Baldwin-Fairchild)	Provided process rates.
Mark S. Gierke	Performed laboratory analyses.
Kenneth M. Roberts	Prepared the final test report.

Certification:

I certify that to my knowledge all data submitted in this report is true and correct.

Kenneth Roberts for
Byron E. Nelson

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

1204 North Wheeler Street, Plant City, Florida 33566 (813)752-5014

VISIBLE EMISSIONS EVALUATION

COMPANY: Baldwin Fairchild

UNIT: Crematory Incinerator

ADDRESS: Ivanhoe Blvd.

Orlando, Florida

PERMIT NO.	COMPLIANCE? YES ☒ NO ☐
PROCESS RATE: 1751b/hr	PERMITTED RATE: 150

PROCESS EQUIPMENT: IEE Power Pak Model IE 43-M94

CONTROL EQUIPMENT: Afterburner

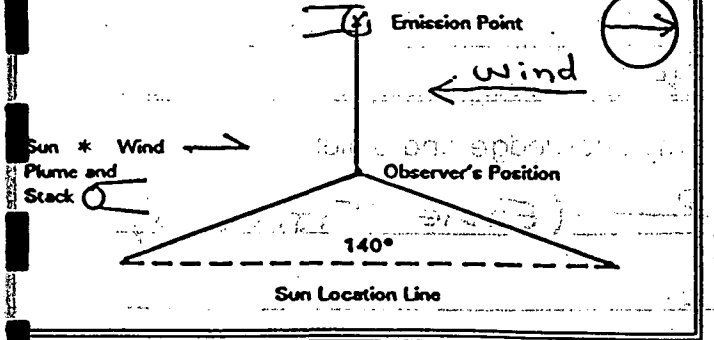
OPERATING MODE: Natural gas Fired	AMBIENT TEMP. (°F) START 60 STOP 60
HEIGHT ABOVE GROUND LEVEL START ~17' STOP ~17'	HEIGHT REL. TO OBSERVER START 7' STOP 7'
DISTANCE FROM OBSERVER START 40' STOP 40'	DIRECTION FROM OBSERVER START W STOP W
EMISSION COLOR: None	PLUME TYPE: NA CONTIN. ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT NO ☒ YES ☐	IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐ NA

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START stack exit STOP stack exit

DESCRIBE BACKGROUND: START Trees STOP Trees

BACKGROUND COLOR START Green STOP	SKY CONDITIONS START Over-cast STOP Over-cast
WIND SPEED (MPH) START 3-5 STOP 3-5	WIND DIRECTION START N STOP N
AVERAGE OPACITY FOR HIGHEST PERIOD 0%	RANGE OF OPAC. READINGS MIN. 0% MAX. 0%

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS: No sun line due to overcast conditions.

SN: 254368

OBSERVATION DATE: 11/10/93 START TIME: 9:50am STOP TIME: 10:50am

SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

Observer: Byron Nelson

Certified by: ETA

Certified at: Tampa, Florida

Date Certified: 9/2/93

Expiration Date: 3/4/94

PROCESS WEIGHT STATEMENT

DATE 11/10/93 SAMPLING TIME : FROM 9:48 A.M. TO 4:05 P.M.

STATEMENT OF PROCESS WEIGHT

COMPANY:	BALDWIN FAIRCHILD
MAILING ADDRESS	
SOURCE IDENTIFICATION	HUMAN CREMATORY
SOURCE LOCATION	ORLANDO FLORIDA

DATA ON OPERATING CYCLE TIME

START OF OPERATION, TIME	N/A	
END OF OPERATION, TIME		
ELAPSED TIME		
IDLE TIME DURING CYCLE		
DESIGN PROCESS RATING	PROCESS WEIGHT RATE (INPUT)	100 lb/hr
	PRODUCT (OUTPUT)	

DATA ON ACTUAL PROCESS RATE DURING OPERATION CYCLE

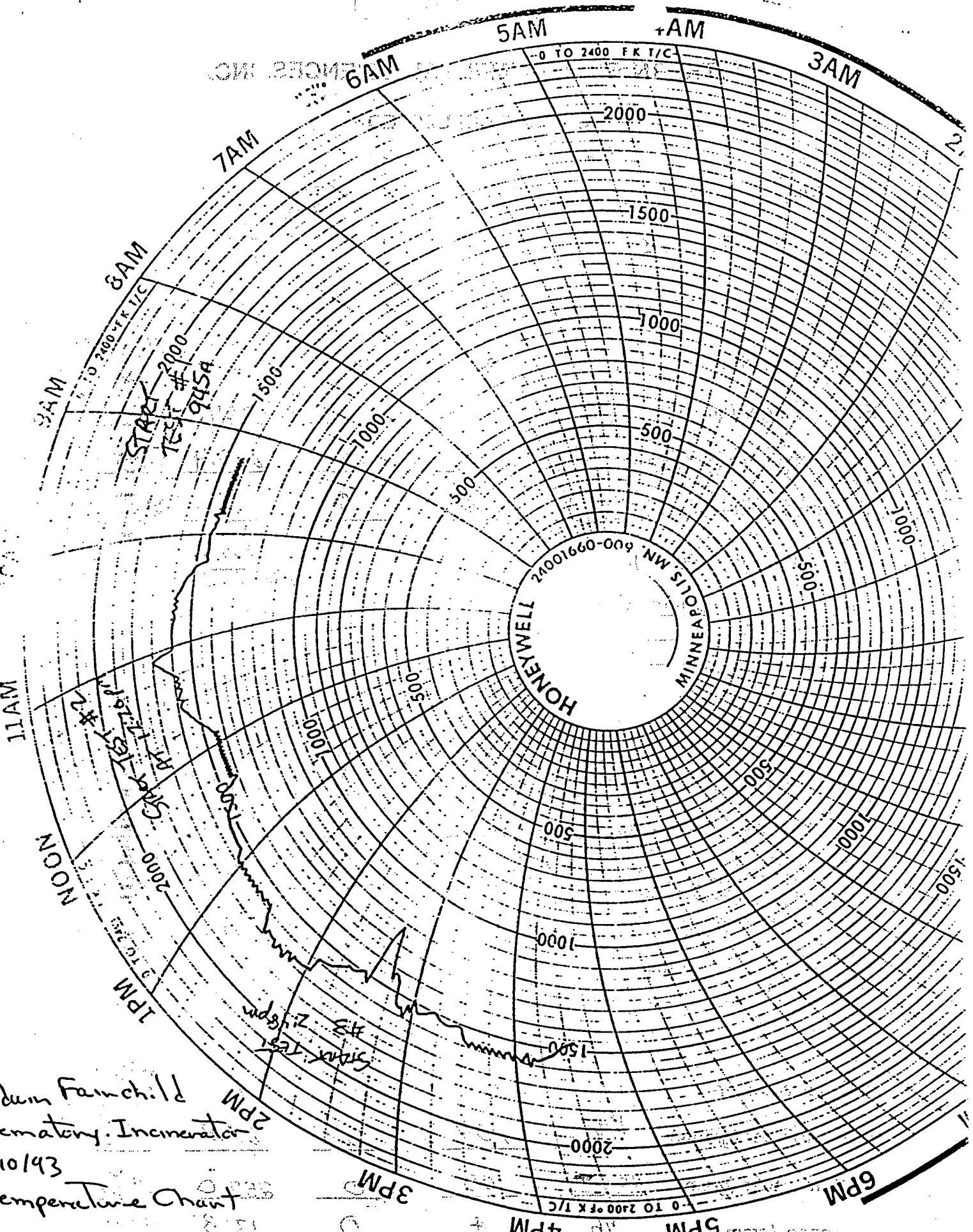
MATERIAL	HUMAN REMAINS	RATE	96 lb/hr (110 minutes)
MATERIAL	HUMAN REMAINS	RATE	101 lb/hr (95 minutes)
MATERIAL	HUMAN REMAINS	RATE	93 lb/hr (90 minutes)
	AVERAGE PROCESS WEIGHT	RATE	
PRODUCT		RATE	
PRODUCT		RATE	
PRODUCT		RATE	

I certify that the above statement is true to the best of my knowledge and belief.

Signature: (EDDIE TAJUDEEN)

Title: ENGINEER.

Best Available Copy



Caldwell Fairchild
Crematory Incinerator
1/10/93
Temperature Chart

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

MOISTURE COLLECTED

Plant: IEE - Baldwin Fairchild

Unit: Crematory Incinerator
Date: 11/10/93
Run No.: 1

Impinger Number	1	2	3	4	Weighed by:
Final Impinger (grams):	190	102	0	267.4	MG
Initial Impinger (grams):	100	100	0	250.4	MG
Difference (grams):	90	2	0	17.0	MG
Total Condensate (grams):				109.0	

Unit: Crematory Incinerator
Date: 11/10/93
Run No.: 2

Impinger Number	1	2	3	4	Weighed by:
Final Impinger (grams):	174	106	0	268.8	MG
Initial Impinger (grams):	100	100	0	253.6	MG
Difference (grams):	74	6	0	15.2	MG
Total Condensate (grams):				95.2	

Unit: Crematory Incinerator
Date: 11/10/93
Run No.: 3

Impinger Number	1	2	3	4	Weighed by:
Final Impinger (grams):	176	104	0	270.8	MG
Initial Impinger (grams):	100	100	0	257.0	MG
Difference (grams):	76	4	0	13.8	MG
Total Condensate (grams):				93.8	

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

PARTICULATE MATTER COLLECTED

Plant: IEE BALDWIN-FAIRCHILD
Unit No. CREMATORY INCINERATOR
Test Date: 11/10/93 Analyzed by: M. Cuenke

Acetone blank container no.	28	Filter blank no.	2662
Acetone blank volume, ml.,(Va)	150	Filter blank tare weight, g.	0.3373
Acetone blank final weight, g.	106.7435	Filter blank final weight, g.	0.3373
Acetone blank tare weight, g.	106.7435	Filter weight diff., g.	0
Acetone blank weight diff.,g.,(ma)	0		

Run No.	1
Filter No.	2660
Liquid lost during transport, ml.	0
Acetone wash container no.	25
Acetone wash volume, ml. (Vaw)	100
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3478	0.3384	0.0094
2 (Wash)	105.6312	105.6269	0.0043
		TOTAL	0.0137
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0137

Run No.	2
Filter No.	2658
Liquid lost during transport, ml.	0
Acetone wash container no.	26
Acetone wash volume, ml. (Vaw)	146
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3501	0.3397	0.0104
2 (Wash)	104.4547	104.4502	0.0045
		TOTAL	0.0149
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0149

Run No.	3
Filter No.	2661
Liquid lost during transport, ml.	0
Acetone wash container no.	27
Acetone wash volume, ml. (Vaw)	105
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3735	0.3383	0.0352
2 (Wash)	108.8511	108.8411	0.01
		TOTAL	0.0452
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0452

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

GAS ANALYSIS DATA FORM

Plant Baldwin Fairchild	
Unit Crematory Incinerator	Test No. Run #1
Date 11/10/93	Sampling Location stack
Sampling Time (24-hr Clock) 0950 - 1050	
Sample Type: Continuous ☒ Integrated Bag ☒	Grab ☐
Analytical Method ORSAT	Ambient Temperature ~68°F
Operator J. Wallace	

RUN →	1		2		3		Average Net Volume	Multiplier	Molecular Weight of Stack Gas (Dry Basis) (Md)
GAS ↓	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	6.4	6.4	6.4	6.4	6.4	6.4	6.40	.44	2.82
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.0	12.6	18.8	12.4	18.8	12.4	12.47	.32	3.99
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							81.13 ~~18.87~~	.28	22.72 ~~5.28~~
N_2 (NET IS 100 MINUS ACTUAL CO READING)								.28	
								TOTAL	29.53

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

GAS ANALYSIS DATA FORM

Plant Baldwin Fairchild	
Unit Crematory Incinerator	Test No. 2
Date 11/10/93	Sampling Location Stack
Sampling Time (24-hr Clock) 1225-1325	
Sample Type: Continuous ☐ Integrated Bag ☒ Grab ☐	
Analytical Method Orsat	Ambient Temperature 65°F
Operator J. Wallace	

RUN →	1		2		3		Average Net Volume	Multiplier	Molecular Weight of Stack Gas (Dry Basis) (Md)
GAS ↓	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	5.2	5.2	5.0	5.0	5.0	5.0	5.07	.44	2.23
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.0	13.8	19.0	14.0	19.0	14.0	13.93	.32	4.46
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	19.0	0	19.0	0	19.0	0	~~81.00~~	.28	22.68 ~~24.08~~
N_2 (NET IS 100 MINUS ACTUAL CO READING)							81.00	.28	~~22.68~~
								TOTAL	29.37 ~~30.77~~

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

GAS ANALYSIS DATA FORM

Plant Baldwin / Fairchild	
Unit Human Crematory	Test No. 3
Date 11/10/93	Sampling Location Stack
Sampling Time (24-hr Clock) 1501 – 1603	
Sample Type: Continuous ☐ Integrated Bag ☒	Grab ☐
Analytical Method Orsat	Ambient Temperature 65°F
Operator B. Nelson	

RUN →	1		2		3		Average Net Volume	Multiplier	Molecular Weight of Stack Gas (Dry Basis) (Md)
GAS ↓	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net			
CO_2	4.4	4.4	4.6	4.6	4.6	4.6	4.53	.44	1.99
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.0	14.6	19.0	14.4	19.0	14.4	14.47	.32	4.63
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							81.50	.28	22.68
N_2 (NET IS 100 MINUS ACTUAL CO READING)								.28	
								TOTAL	29.30

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: IEE - Baldwin Fairchild
Source: Crematory Incinerator
Operator(s): M Shanks / D Owen

Run Number: 1
Date: 11/10/93
24 hr Time at Start: 0948
24 hr Time at End: 1050
Filter No(s): 2658
Impinger Set No.: —
Barometric Press. ("Hg): 30.21
Ambient Temperature (°F): 60°

Dimensions Dia. or L x W: 20"
Stack Static Press. ("H_2O): -.05
Meter Box No.: 004
Meter ΔH@: 1.875
Meter Correction Factor: 1.010
Pitot Cp: .84
Nozzle ID: —
Nozzle Dia. (inches): .620
Probe Length/Liner: 3'WC/6'SS

Assumptions:
% Moisture: 12
Stack Temp.: 1200/800
Meter Temp.: 85
Md/Ms: 1.05
K Factor: 43.48/59.25

K = 51.18 @ 950°

Sample Train Leak Check:
Initial 0.000 CFM@ 15 "Hg
Final 0.000 CFM@ 8.0 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	952.90	.030	1.30	800	70	242	62	3.0	
2	2.5	954.44	.03	1.30	810	70	245	60	4.0	
3	5	956.00	.03	1.30	820	70	244	60	4.0	
4	7.5	957.60	.03	2.26	804	72	250	60	4.0	
5	10	959.75	.02	1.50	825	75	255	60	4.0	
6	12.5	961.40	.03	2.26	879	74	261	61	6.0	
7	15	963.50	.03	1.54	866	75	263	61	6.0	
8	17.5	964.75	.02	1.02	900	77	260	60	6.0	
9	20	966.70	.02	1.15	891	79	261	60	4.0	
10	22.5	968.42	.02	1.15	910	80	261	60	4.0	
11	25	969.68	.02	1.15	907	80	262	60	4.0	
12	27.5	971.10	.02	1.02	893	80	263	60	4.0	
13	30	972.41	.02	1.02	895	81	260	58	4.0	
14	32.5	973.82	.03	1.54	938	79	261	59	4.0	
15	35	975.70	.03	1.54	950	80	260	59	4.0	
16	37.5	977.19	.03	1.54	958	80	262	59	5.0	
17	40	978.91	.02	1.02	962	81	262	59	5.0	
18	42.5	980.22	.02	1.02	967	81	263	59	5.0	
19	45	981.60	.02	1.02	966	80	260	59	5.0	
20	47.5	982.93	.02	1.02	984	80	261	59	5.0	
21	50	984.30	.02	1.02	971	80	260	60	5.0	
22	52.5	985.71	.02	1.02	974	79	258	60	5.0	
23	55	987.05	.02	1.02	976	80	259	60	5.0	
24	57.5	988.43	.02	1.02	980	80	260	61	5.0	
	60	989.79								

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: IEE - BalDWin Fairchild
Source: CremaTory Incinerator
Operator(s): MStuck / D.Owen

Run Number: 2
Date: 11/10/93
24 hr Time at Start: 1225
24 hr Time at End: 1327
Filter No(s).: 2660
Impinger Set No.: —
Barometric Press. ("Hg): 30.17
Ambient Temperature (°F): 62°

Dimensions Dia.○ / L x W□: 20"
Stack Static Press. ("H_2O): -.04
Meter Box No.: 004
Meter ΔH@: 1.875
Meter Correction Factor: 1.010
Pitot Cp: .84
Nozzle ID: —
Nozzle Dia. (inches): .630
Probe Length/Liner: 3' wc/6'455

Assumptions:
% Moisture: 12
Stack Temp.: 950/800
Meter Temp.: 80
Md/Ms: 1.05
K Factor: 50.71/56.75

K=48.98 @ 1000

Sample Train Leak Check:
Initial 0.000 CFM@ 15 "Hg
Final 0.000 CFM@ 10 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) 1 (+) 2

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	990.50	.03	1.52	854	70	260	60	4.0	
2	2.5	992.10	.03	1.52	870	70	259	60	4.0	
3	5	994.30	.03	1.70	953	71	260	59	4.0	
4	7.5	996.21	.03	1.52	974	70	260	59	4.0	
5	10	997.50	.03	1.52	982	70	263	58	4.0	
6	12.5	999.01	.03	1.52	982	72	265	58	4.0	
7	15	1000.95	.02	1.01	985	72	262	58	4.0	
8	17.5	1001.92	.02	1.01	988	74	261	58	4.0	
9	20	1003.21	.02	1.01	988	73	260	59	4.0	
10	22.5	1004.74	.02	1.01	987	75	261	59	4.0	
11	25	1006.00	.02	1.01	992	75	262	59	4.0	
12	27.5	1007.40	.02	.98	990	77	260	59	4.0	
13	30	1008.70	.02	.98	980	75	263	58	4.0	
14	32.5	1010.53	.02	.98	997	76	265	58	4.0	
15	35	1011.50	.02	.98	996	78	262	58	4.0	
16	37.5	1012.82	.02	.98	995	79	260	58	4.0	
17	40	1014.24	.03	1.47	992	79	261	59	4.0	
18	42.5	1015.63	.03	1.47	993	80	259	59	5.0	
19	45	1017.25	.02	.98	989	80	262	59	5.0	
20	47.5	1018.58	.02	.98	995	79	261	59	5.0	
21	50	1019.92	.02	.98	990	80	260	60	5.0	
22	52.5	1021.32	.01	.50	987	80	260	60	5.0	
23	55	1022.26	.01	.50	990	81	262	60	5.0	
24	57.5	1023.31	.01	.50	985	81	260	60	5.0	
	60	1024.223								

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: IEE-Baldwin Fairchild
Source: Crematory Incinerator
Operator(s): M. Burke / D. Dwen

Run Number: 3
Date: 11/10/93
24 hr Time at Start: 1501
24 hr Time at End: 1603
Filter No(s).: 2661
Impinger Set No.: —
Barometric Press. ("Hg): 30.15
Ambient Temperature (°F): 65°

Dimensions Dia.: ◻
L x W ◻: 20"
Stack Static Press. ("H_2O): -.04
Meter Box No.: 004
Meter ΔH@: 1.675
Meter Correction Factor: 1.010
Pitot Cp: 1.84
Nozzle ID: —
Nozzle Dia. (inches): .620
Probe Length/Liner: 3' WC/Glass
K=53.52 @ 900°

Assumptions:
% Moisture: 11
Stack Temp.: 950/1000
Meter Temp.: 80
Md/Ms: 1.045
K Factor: 51.63/49.86

Sample Train Leak Check:
Initial 0.000 CFM@ 15 "Hg
Final 0.000 CFM@ 10 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	25.35	.02	1.03	880	70	254	56	4.0	
2	2.5	26.74	.02	1.03	872	71	256	56	4.0	
3	5	28.15	.02	1.03	881	71	260	57	4.0	
4	7.5	29.50	.03	1.55	878	71	261	57	4.0	
5	10	31.60	.03	1.61	876	73	262	58	4.0	
6	12.5	32.95	.02	1.07	878	73	264	58	4.0	
7	15	34.33	.03	1.61	884	73	261	58	4.0	
8	17.5	36.14	.02	1.03	957	76	260	58	4.0	
9	20	37.50	.02	1.03	974	74	258	58	4.0	
10	22.5	38.80	.02	1.03	970	75	259	59	4.0	
11	25	40.18	.01	.52	967	75	261	59	3.0	
12	27.5	41.96	.01	.52	965	76	260	59	3.0	
13	30	42.17	.02	1.03	925	74	262	59	3.0	
14	32.5	43.64	.02	1.03	939	75	260	58	3.0	
15	35	44.90	.02	0.99	993	74	261	58	4.0	
16	37.5	46.18	.02	1.00	992	75	259	58	4.0	
17	40	47.81	.02	1.00	991	75	260	57	4.0	
18	42.5	49.00	.02	1.00	988	76	259	57	4.0	
19	45	50.30	.02	1.00	993	76	258	57	4.0	
20	47.5	51.80	.01	.50	986	75	259	57	4.0	
21	50	52.60	.01	.50	987	74	260	58	4.0	
22	52.5	53.60	.02	1.00	966	74	259	58	4.0	
23	55	54.93	.02	1.00	962	75	258	58	4.0	
24	57.5	56.20	.01	.50	962	75	260	58	4.0	
	60	57.154								

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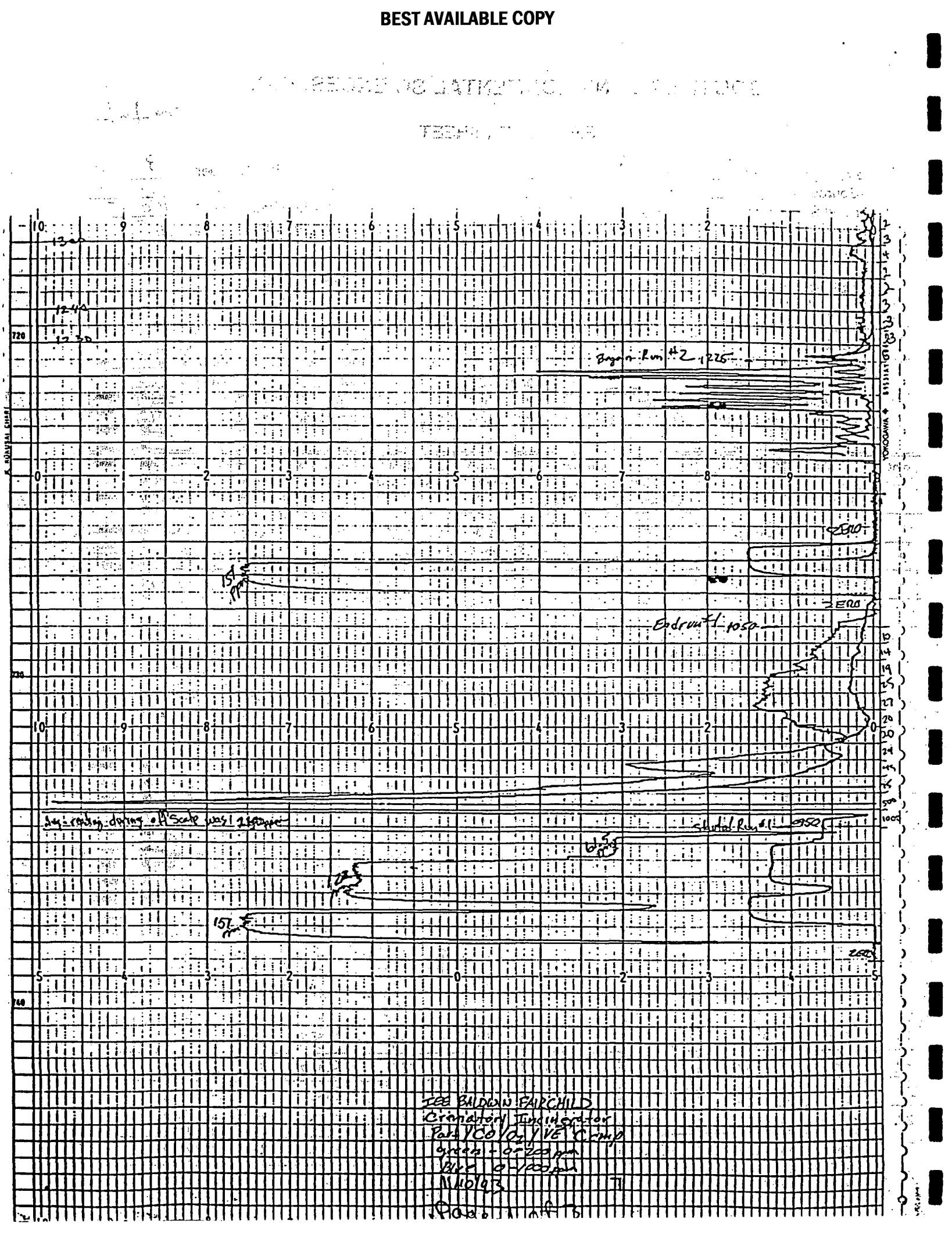
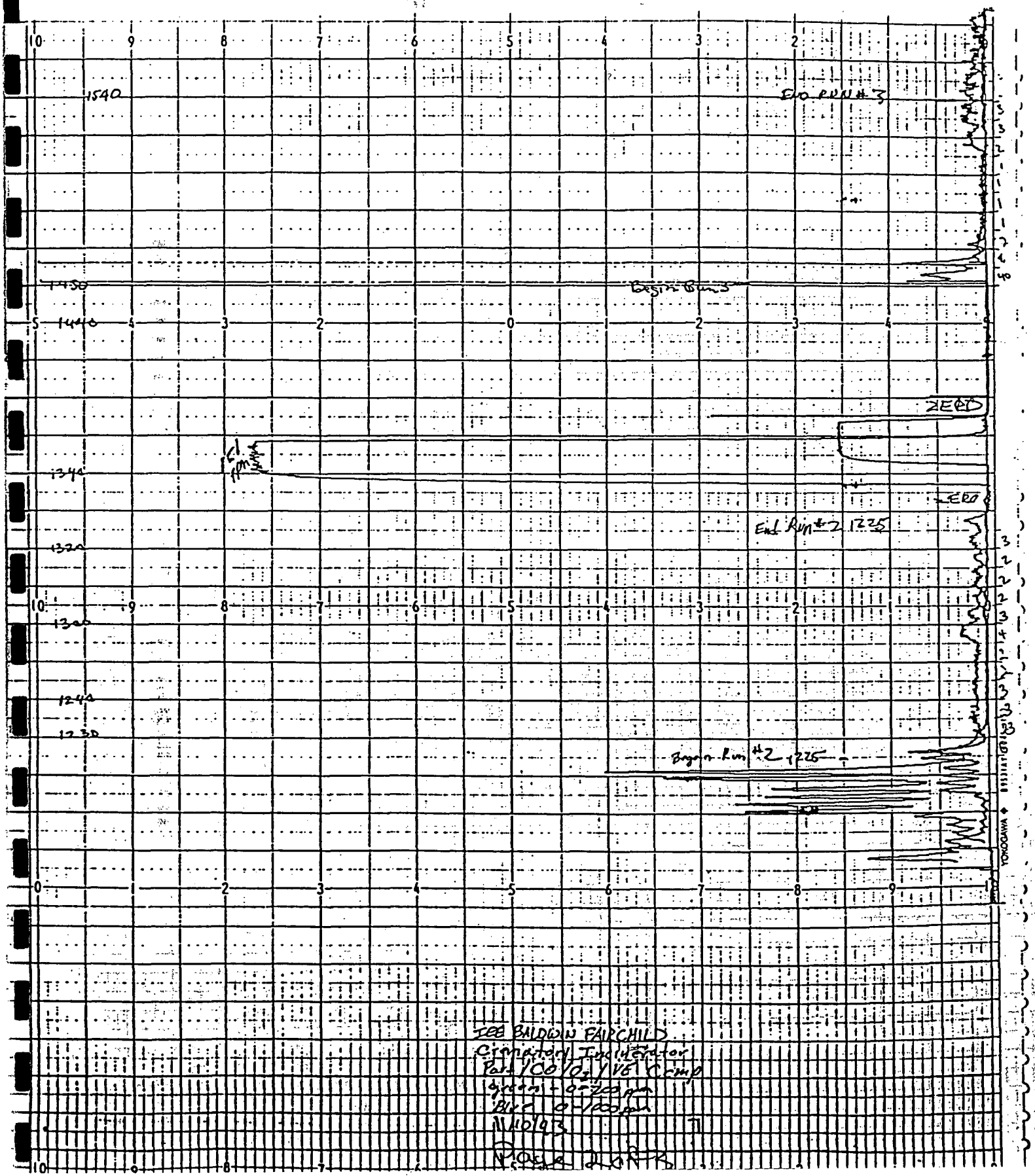
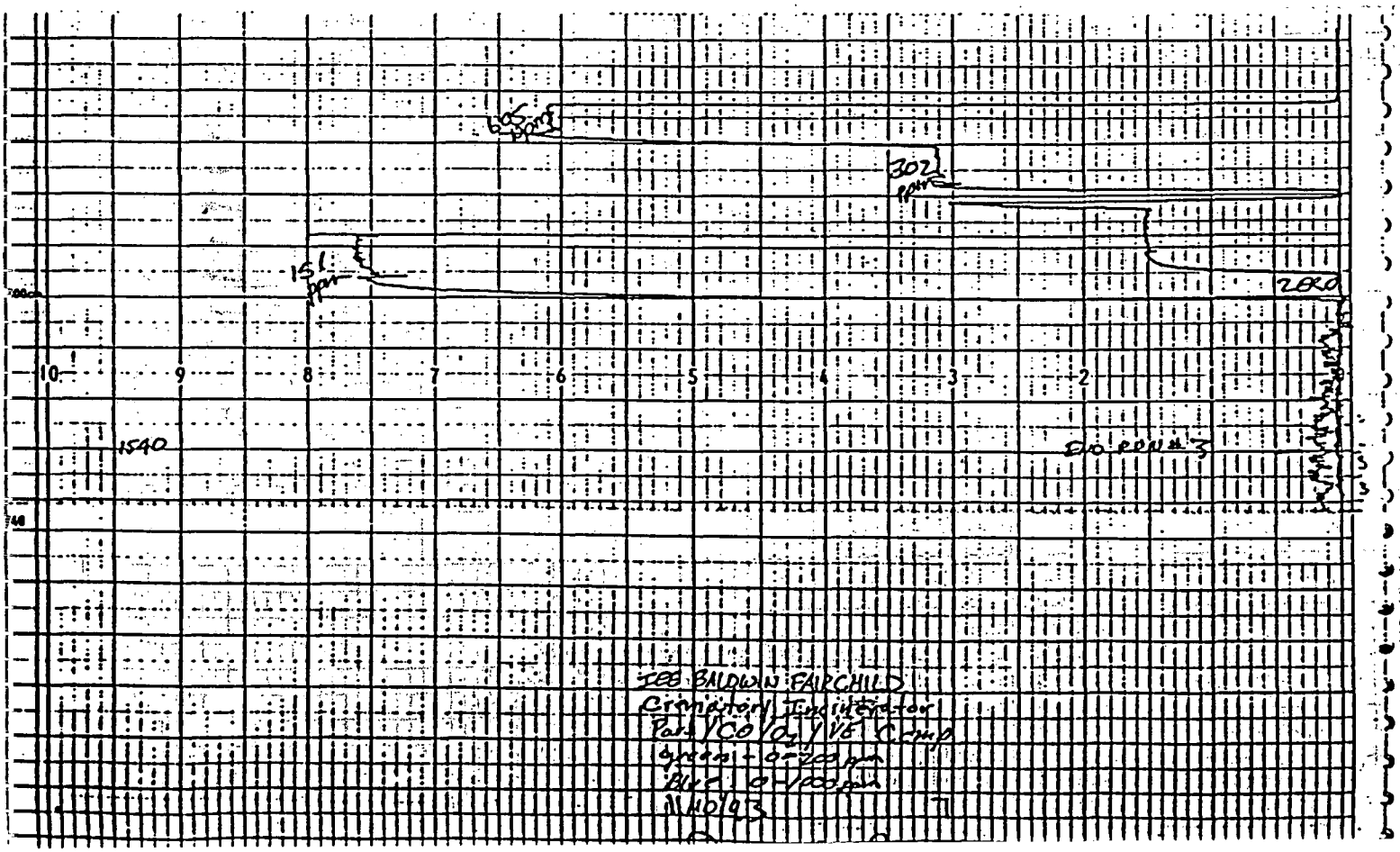


Best Available Copy




605 ppm
302 ppm
151 ppm
200
10
9
8
7
6
5
4
3
2
1540
210 ppm
IBB BALDWIN FAIRCHILD

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

NOZZLE CALIBRATION

Date: 11/10/93 by: MG

Nozzle ID	Run No.	D_1 (INCHES)	D_2 (INCHES)	D_3 (INCHES)	ΔD (INCHES)	D_{AVG} (INCHES)
	1-3	.620	.621	.620	.001	.620

where: D_1, D_2, D_3 = Nozzle diameter measured on a different diameter (inches).
Tolerance = 0.001 inches

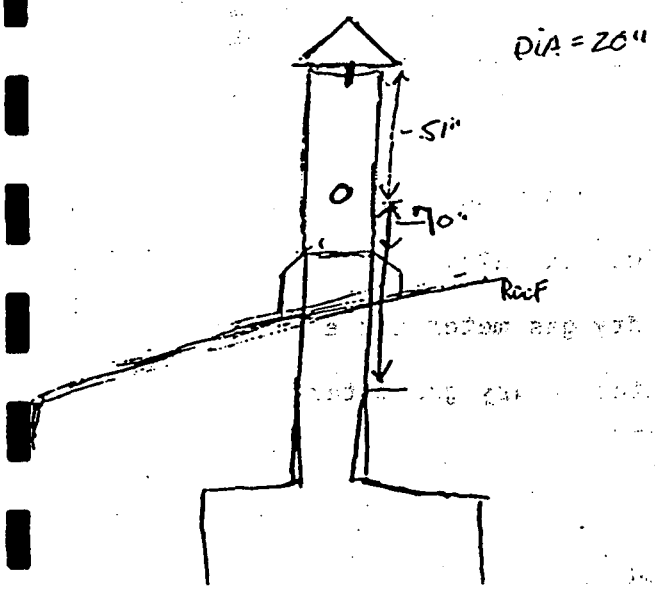
ΔD = Maximum difference in any two measurements (inches).
Tolerance = 0.004 inches

D_{avg} = Average of D_1, D_2, D_3

****

SAMPLE POINT LOCATIONS

Company: IEE/Baldwin Fairchild
Source: Crematory Incinerator
Date: 11/10/93
Duct Dimensions: 20" dia
Port Length: 0"
Points corrected for port length? Yes ☐ No ☑



Point No.	Distance from Duct Wall (inches)
1	0.42 * 0.50
2	1.34
3	2.36
4	3.54
5	5.00
6	7.12
7	12.88
8	15.00
9	16.46
10	17.64
11	18.66
12	19.58 * 19.50

SOUTHERN ENVIRONMENTAL SCIENCES, INC.
DRY GAS METER CALIBRATION FORM

Meter Box Number: 004 STD TEST METER #:656687
Date:7/7/93
Barometric Pressure, Pb: 30.13

Orifice Manometer setting (Delta H) in. H20	Gas volume: Std Test Meter (Vw) ft.^3	Gas volume: Dry Gas Meter (Vd) ft.^3	Temperature: Std Test Meter (Tw) Deg F	Temperature: Dry Gas Meter (Td) Deg F	Time (Theta) min	Yi	Delta H@i in. H20
0.50	5.002	4.972	85.5	80.5	12.75	0.996	1.882
1.00	5.000	4.968	86.5	83.8	9.10	0.999	1.914
1.50	10.690	10.767	88.0	99.0	16.00	1.009	1.899
2.00	10.000	10.063	87.0	96.5	13.00	1.006	1.912
3.00	10.200	10.252	85.5	96.0	10.70	1.007	1.859
4.00	14.000	13.547	84.0	96.0	12.50	1.046	1.786
					AVG	1.010	1.875
					MAX DIFF		0.128

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)\ (Tw + 460)}$$

$$Delta\ H@ = \frac{.0317\ (Delta\ H)}{Pb\ (td+460)} [(tw+460)\ (theta) / Vw]^2$$

where: Vw= Gas Volume passing through the std test meter, ft.^3.

Vd = Gas Volume passing through the dry gas meter, ft^3

Tw = Temperature of the gas in the std test meter, deg. F.

Td = Average temperature of the gas in the dry gas meter, Deg F.

Delta H = Pressure differential across orifice, in. H20.

Yi = Ratio of accuracy of std test meter to dry gas meter for each run.

Y = Average ratio of accuracy of std test meter to dry gas meter.

Pb = Barometric pressure, in. Hg.

Theta = Time of calibration run, min.

SOUTHERN ENVIRONMENTAL SCIENCES, INC.
NOZZLE CALIBRATION

Date: 11/10/93 by: MG

Nozzle ID	Run No.	D_1 (INCHES)	D_2 (INCHES)	D_3 (INCHES)	ΔD (INCHES)	D_{AVG} (INCHES)
	1-3	.620	.621	.620	.001	.620

where: D_1, D_2, D_3 = Nozzle diameter measured on a different diameter (inches). Tolerance = 0.001 inches

ΔD = Maximum difference in any two measurements (inches). Tolerance = 0.004 inches

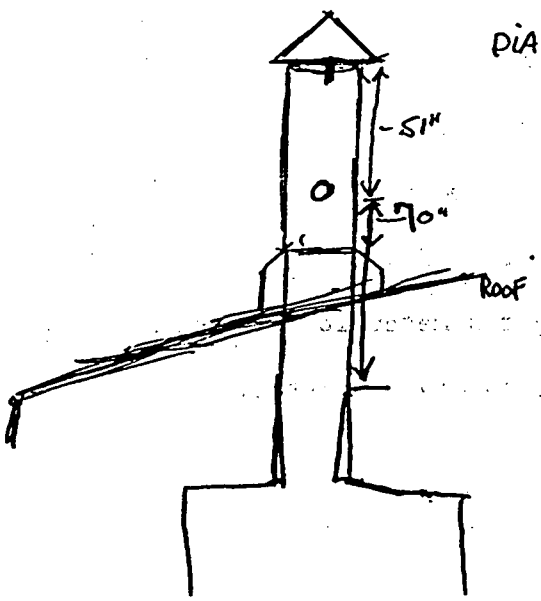
D_{avg} = Average of D_1, D_2, D_3

****

SAMPLE POINT LOCATIONS

Company: IEE/Baldwin Fairchild
Source: Crematory Incinerator
Date: 11/10/93
Duct Dimensions: 20" dia
Port Length: 0"
Points corrected for port length? Yes ☐ No ☒

Point No.	Distance from Duct Wall (inches)
1	0.42 * 0.50
2	1.34
3	2.36
4	3.54
5	5.00
6	7.12
7	12.88
8	15.00
9	16.46
11	17.64
11	18.66
12	19.38 * 19.50



SOUTHERN ENVIRONMENTAL SCIENCES, INC.
DRY GAS METER CALIBRATION FORM

Meter Box Number: 004 STD TEST METER #:656687
Date:7/7/93
Barometric Pressure, Pb: 30.13

Orifice Manometer setting (Delta H) in. H20	Gas volume: Std Test Meter (Vw) ft.^3	Gas volume: Dry Gas Meter (Vd) ft.^3	Temperature: Std Test Meter (Tw) Deg F	Temperature: Dry Gas Meter (Td) Deg F	Time (Theta) min	Yi	Delta H@i in. H20
0.50	5.002	4.972	85.5	80.5	12.75	0.996	1.882
1.00	5.000	4.968	86.5	83.8	9.10	0.999	1.914
1.50	10.690	10.767	88.0	99.0	16.00	1.009	1.899
2.00	10.000	10.063	87.0	96.5	13.00	1.006	1.912
3.00	10.200	10.252	85.5	96.0	10.70	1.007	1.859
4.00	14.000	13.547	84.0	96.0	12.50	1.046	1.786
					AVG	1.010	1.875
					MAX DIFF		0.128

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)\ (Tw + 460)}$$

$$Delta\ H@ = \frac{.0317\ (Delta\ H)}{Pb\ (td+460)} [(tw+460)\ (theta) / Vw]^2$$

where: Vw= Gas Volume passing through the std test meter, ft.^3.

Vd = Gas Volume passing through the dry gas meter, ft^3

Tw = Temperature of the gas in the std test meter, deg. F.

Td = Average temperature of the gas in the dry gas meter, Deg F.

Delta H = Pressure differential across orifice, in. H20.

Yi = Ratio of accuracy of std test meter to dry gas meter for each run.

Y = Average ratio of accuracy of std test meter to dry gas meter.

Pb = Barometric pressure, in. Hg.

Theta = Time of calibration run, min.

POSTTEST DRY GAS METER CALIBRATION FOR..

Meter Box Number: 004 Dry Gas Meter #:656687
Date:11/12/93 Pretest Y: 1.010
Barometric Pressure, Pb: 30.12

Orifice Manometer setting (Delta H) in. H2O	Gas volume: Wet Test Meter (Vw) ft.^3 10.xxxx	Gas volume: Dry Gas Meter (Vd) ft.^3	Temperature: Wet Test Meter (Tw) Deg F	Temperature: Dry Gas Meter: Inlet (Tdi) Deg F	Temperature: Dry Gas Meter: Outlet (Tdo) Deg F	Temperature: Dry Gas Meter: Average (Td) Deg F	Time (Theta) min	Vacuum Setting in. Hg	Yi
1.50	10.000	10.326	75.25			79.00	15.37	10.00	0.972
1.50	10.000	10.075	62.50			62.50	15.25	10.00	0.989
1.50	11.850	11.940	65.25			69.50	17.95	10.00	0.997

Y = 0.986
Diff = 0.024

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)\ (Tw + 460)}$$

Where:

Vw = Gas Volume passing through the wet test meter, ft.^3.
Vd = Gas volume passing through the dry gas meter, ft^3.
Tw = Temperature of the gas in the wet test meter, deg F.
Tdi = Temperature of the inlet gas of the dry gas meter, Deg F.
Tdo = Temperature of the outlet gas of the dry gas meter, Deg F.
Td = Average temperature of the gas in the dry gas meter, Deg F.
Delta H = Pressure differential across orifice, in. H2O.
Yi = Ratio of accuracy of wet test meter to dry gas meter for each run.
Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y +/- 0.05Y.
Pb = Barometric pressure, in. Hg.
Theta = Time of calibration run, min.

POSTTEST DRY GAS METER
THERMOMETER CALIBRATIONS

Ref. Deg F	Wet Test Meter: Inlet Deg F	Wet Test Meter: Outlet Deg F	Dry Gas Meter: Inlet Deg F	Dry Gas Meter: Outlet Deg F
66.0	67.0	67.0	67.0	67.0
diff.	1.0	1.0	1.0	1.0

Quality Control Limits: +/- 5 deg F

Southern Environmental Sciences, Inc.

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube ID number OWC
Inspection Date 7/27/93
Inspected by B. Nelson / M. Gibbs

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

$\alpha 1$ = 1 ° (<10°), $\alpha 2$ = 1 ° (<10°), $\beta 1$ = 1 ° (<5°),

$\beta 2$ = 1 ° (<5°)

γ = 1 °, θ = 0 °, A = 0.602 cm (in.)

z = A sinγ = .016 cm (in.); ~~0.32 cm~~ (<1/8 in.),

w = A sin θ = 0 cm (in.); ~~<.08 cm~~ (<1/32 in.)

P_A ~~.301~~ .301 cm (in.) P_b ~~.301~~ .301 cm (in.)

D_t = 0.253 cm (in.)

Comments: New pitot tube

Calibration required? _____ yes ✓ no

Southern Environmental Sciences, Inc.

THERMOMETER CALIBRATIONS

Calibrated By Mark S. Gierke

DATE	ID No.	Type	Range	ICE BATH			TEPID WATER			BOILING WATER			HOT OIL		
				STD Therm	Temp.	% or° Diff.	STD Therm	Temp.	% or° Diff.	STD Therm	Temp.	% or° Diff.	STD Therm	Temp.	% or° Diff.
4/7/93	I2	BM	0-220°F	36	35	1	72	72	0	211	212	1	---	---	-
4/7/93	I3	BM	0-220°F	36	35	1	72	72	0	212	212	0	---	---	-
4/7/93	Lab I4	BM	0-100°C	4°C	35	1	24°C	72	2	212	212	0	---	---	-
4/7/93	003	BM	0-220°F	36	35	1	73	72	1	212	212	0	---	---	-
4/7/93	SS110	BM	0-220°F	36	35	1	72	72	0	211	212	1	---	---	-
4/7/93	007	BM	0-220°F	37	35	2	72	72	0	210	212	2	---	---	-
4/7/93	T2	PT	DIG	37	35	2	74	72	2	210	212	2	382	380	2
4/7/93	T3	PT	DIG	36	35	1	74	72	2	211	212	1	382	380	2
4/7/93	T9	PT	DIG	37	35	2	74	72	2	212	212	0	381	380	1
4/7/93	T10	PT	DIG	37	35	2	74	72	2	211	212	1	382	380	2
4/7/93	T101	PT	DIG	37	35	2	74	72	2	211	212	1	381	380	1
4/7/93	SS301	PT	DIG	37	35	2	74	72	2	212	212	0	381	380	1
4/7/93	SS300	PT	DIG	37	35	2	74	72	2	213	212	1	381	380	1
4/7/93	3'P	PT	DIG	42	44	2	85	84	1	222	220	2	391	390	1
4/7/93	2.5'P	PT	DIG	42	43	1	86	84	2	221	220	1	391	390	1
4/7/93	5'a P	PT	DIG	51	50	1	86	84	2	221	220	1	390	390	0
4/7/93	5'b P	PT	DIG	40	40	0	84	84	0	220	220	0	397	395	2
4/7/93	8'P	PT	DIG	41	42	1	85	84	1	220	220	0	394	395	1
4/7/93	10'P	PT	DIG	43	44	1	85	84	1	222	220	2	396	395	1
4/7/93	I99	BM	0-220°F	36	35	1	73	72	1	212	212	0	---	---	-
4/7/93	001	BM	0-140°F	--	--	--	69	68	1	---	---	-	---	---	-
4/7/93	002	BM	0-140°F	--	--	--	66	68	2	---	---	-	---	---	-
4/7/93	003	BH	0-140°F	--	--	--	70	72	2	---	---	-	---	---	-
4/7/93	004	PT	DIG	--	--	--	69	70	1	---	---	-	---	---	-
4/7/93	VOST 280/01B	PT	DIG	--	--	--	64	66	2	---	---	-	---	---	-

Quality Control Limits:
Liquid in Glass Thermometers (L/G)±2%
Bimetalic Thermometers (BM)±5 F
Pyrometers/Thermocouples (PT)±5 F

SOUTHERN ENVIRONMENTAL SCIENCES, INC.
INSTRUMENT CALIBRATION

Test Information

Date: 11/10/93
Company: BALDWIN FAIRCHILD
Source: CREMATORY INCINERATOR
Parameter: CARBON MONOXIDE

Instrument

Manufacture: Thermoenvironmental
Model No: 48
Serial No:
Range: 0 - 200 ppm

Recorder

Manufacture: Yokogawa
Model No: 302121
Serial No: 43PA0014
Chart Speed: 20 CM/HR

Calibration Gases

Supplier: Liquid Carbonic
Cylinder #: SGAL1739
Concentration: 61.5
Analysis Date: 5/4/93

Supplier: Liquid Carbonic
Cylinder #: SA347
Concentration: 122 PPM
Analysis Date: 5/25/93

Supplier: Liquid Carbonic
Cylinder #: SA3114
Concentration: 151
Analysis Date: 5/25/93

Point	Observed Conc.	Actual Conc.	Percent Diff.
1	0	0	0.0
2	151	151	0.0
3	124	122	1.6
4	62	61.5	0.8

Regression Output:

Constant	0.2179
Std Err of Y Est	1.0881
R Squared	0.9998
No. of Observations	4
Degrees of Freedom	2
X Coefficient(s)	1.0049
Std Err of Coef.	0.0094

J. Wallace

Technician

407-851-4711
FAX (407) 851-2157

LIQUID CARBONIC
CYLINDER GAS PRODUCTS
403 ZELL DRIVE
ORLANDO, FLORIDA 32824

CERTIFICATE OF ANALYSIS

FOR: Southern Env. Sciences DATE: May 4, 1993

PURCHASE ORDER NUMBER: 0345

DELIVERY RECEIPT NUMBER: SJ25756

PRODUCT: 60 ppm Carbon Monoxide/Nitrogen

CYLINDER SERIAL NUMBER: SGAL1739

****

Components:	Requested	Actual
Carbon Monoxide	60 ppm	61.5 ppm
Nitrogen	Balance	Balance

CGA VALVE NUMBER: 350
TOTAL CYLINDER PRESSURE: 1650 PSIG

METHODS OF ANALYSIS: Gas Chromatograph

CERTIFIED BY: Dave Kagrise

Dave Kagrise / Laboratory Manager

407-851-4711
FAX (407) 851-2157

LIQUID CARBONIC
CYLINDER GAS PRODUCTS
403 ZELL DRIVE
ORLANDO, FLORIDA 32824

CERTIFICATE OF ANALYSIS

FOR: Southern Enviromental Date: May 25, 1993

PURCHASE ORDER NUMBER: N/A

DELIVERY RECEIPT #: SJ25689

PRODUCT: 120 ppm Carbon Monoxide/Nitrogen

FILL DATE: 05/24/93

****

Cylinder Number	Carbon Monoxide	Nitrogen
SA 347	122 ppm	Balance

CYLINDER VOLUME: 103 CFT

CGA VALVE NUMBER: 350

TOTAL CYLINDER PRESSURE: 1650 PSIG

METHODS OF ANALYSIS: Gas Chromatograph

CERTIFIED BY: Dave Kagrise

Dave Kagrise/Laboratory Manager

407-651-4711
FAX (407) 651-2157

LIQUID CARBONIC

CYLINDER GAS PRODUCTS

403 ZELL DRIVE
ORLANDO, FLORIDA 32824

CERTIFICATE OF ANALYSIS

FOR: Southern Enviromental Date: May 25, 1993

PURCHASE ORDER NUMBER: N/A

DELIVERY RECEIPT #: SJ25689

PRODUCT: 150 ppm Carbon Monoxide/Nitrogen

FILL DATE: 05/24/93

****

Cylinder Number	Carbon Monoxide	Nitrogen
SA 3114	151 ppm	Balance

CYLINDER VOLUME: 103 CFT

CGA VALVE NUMBER: 350

TOTAL CYLINDER PRESSURE: 1650 PSIG

METHODS OF ANALYSIS: Gas Chromatograph

CERTIFIED BY: Dave Kagrise

Dave Kagrise/Laboratory Manager

COMPANY: BALDWIN-FAIRCHILD
SOURCE: CREMATORY
CO EMISSION TEST CALCULATIONS
TEST DATE:11/10/93
Data analyzed by: K. Rabat

RUN NO.	AVG. CO PPM	AVG. O2 PERCENT	AVG. CO2 PERCENT	AVG. CO @ 7% O2	STACK GAS MOL. WT.
1	160.8	12.5	6.4	263.8	29.52
2	2.9	13.9	5.1	5.8	29.37
3	5.7	14.5	4.5	12.1	29.31
AVERAGES	56.4	13.6	5.3	93.9	29.40

FORMULAS: CO @ 7% O2 = ACTUAL CO * (14/(21-%02)

MOLECULAR WT. = (%O2 * .44) + (%CO2 * .32) + (%N2 * .28)

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TEST CALCULATIONS

Plant: IEE BALDWIN-FAIRCHILD Test Date: 11/10/93
Unit: CREMATORY INCINERATOR Data Input By: M. Cienka
Run No: 2

==========

Pbar = (Pbar at barom.) - (Elev. diff. barom. to manom., ft.)*(.1/100)
= 30.17 - 0 * (0.1/100)
= 30.17

Pm = Pbar + Delta H / 13.6 = 30.17 + 1.110 / 13.6

= 30.25

Vm(std) = (Vm)*(Y)*(Tstd,°R)*(Pm) / ((Tm,°R)*(Pstd))
= 33.723 * 1.01 * 528 * 30.25 / (535.7 * 29.92)
= 33.942

Vw(std) = Vlc*(.04715) = 95.2 * 0.04715 = 4.489

Bws = Vw(std) / (Vw(std) + Vm(std)) = 4.489 / (4.489 + 33.942) = 0.117

Bws @ saturation = 0.99
1 - Bws = 0.883 USE LOWER BWS

Md = 0.44(%CO2) + .32(%O2) + .28(%N2+%CO)
= .44 * 5.07 + .32 * 13.93 + 0.28 * 78
= assume 29.3684

Ms = Md(1-Bws) + 18(Bws) = 29.3684 * 0.883 + 18 * 0.117
= 28.04

Ps = Pbar + (Pg, in. H20) / 13.6 = 30.17 + -0.05 / 13.6 = 30.17

Vs = 85.49*(Cp)*(avg sqrt delta P)*sqrt((Ts,°R)/(Ps)(Ms))
= 85.49 * 0.84 * 0.147 *sqrt 1436.4 / 30.17 * 28.04
= 13.74

An =(Nozzle diam, in./12)^2 * 3.14159 / 4 = (0.62 /12)^2 * 3.14159 / 4

= 0.002096

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TEST CALCULATIONS

Plant: IEE BALDWIN-FAIRCHILD
Unit: CREMATORY INCINERATOR
Run No: 2

Test Date: 11/10/93
Data Input By: M. Grieve

$$\%I = \frac{(.09450)(Ts,{}^{\circ}R)(Vm(std)}{(Ps)(Vs)(An)(Sample\ Time)(1-Bws)}$$

$$= \frac{0.0945 * 1436.4 * 33.942}{30.17 * 13.74 * 0.002096 * 60 * 0.883}$$

$$= 100.0$$

$$As = \frac{(Stack\ Diam.,\ ft.)^2 * 3.14159}{4} = \frac{(1.6666)^2 * 3.14159}{4}$$

$$= 2.18$$

$$As.eff = \frac{As(total\ No.\ pts. - No.\ neg.\ pts.)}{(Total\ No.\ pts.)} = \frac{2.1816 * (24) - (0)}{(24)}$$

$$= 2.18$$

$$Q = 60(As,eff)(Vs) \quad 60 * 2.18 * 13.74$$

$$= 1798.7$$

$$Qstd = \frac{(Q)(Tstd)(Ps)(1-Bws)}{(Ts,{}^{\circ}R)(Pstd)} = \frac{1798.67 * 528 * 30.167 * 0.8832}{1436.416 * 29.92}$$

$$= 588.8$$

$$Cs = \frac{(.01543)(mn,\ mg)}{Vm(std)} = \frac{0.01543 * 0.0149}{33.9421} = 0.007$$

$$PMR = \frac{(Cs)(Qstd)(60}{7000} = \frac{0.007 * 588.7584 * 60}{7000} = 0$$

Emissions calculations in emissions test summary may differ slightly from example calculations due to rounding of some numbers in example

Southern Environmental Sciences, Inc.
1204 North Wheeler Street ☐ Plant City, Florida 33566-2354 ☐ (813) 752-5014

NOMENCLATURE USED IN STACK SAMPLING CALCULATIONS

A_n = Cross-sectional area of nozzle, ft^2

A_s = Cross-sectional area of stack, ft^2

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot coefficient

C_s = Pollutant concentration, gr/DSCF

F_d = Ratio of gas generated to heat value of fuel, DSCF/mm BTU

ΔH = Average pressure differential across orifice, in. H_2O

%I = Isokinetic variation, %

M_d = Molecular weight of dry gas

M_n = Total amount of pollutant collected, mg

M_s = Molecular weight of stack gas

N = Normality of barium perchlorate titrant

$\sqrt{\Delta P_{avg}}$ = Average of the square roots of the velocity heads

P_{bar} = Barometric pressure at the sampling site, in. Hg

P_g = Stack gas static pressure, in. H_2O

P_m = Absolute pressure at the dry gas meter, in. Hg

P_s = Absolute stack pressure, in. Hg

PMR = Pollutant mass rate, lb/hr

P_{std} = Standard absolute pressure, 29.92 in. Hg

θ = Total sampling time, minutes

Southern Environmental Sciences, Inc.
1204 North Wheeler Street ☐ Plant City, Florida 33566-2354 ☐ (813) 752-5014

NOMENCLATURE USED IN STACK SAMPLING CALCULATIONS (Continued)

Q = Stack gas flowrate, ACFM

Q_{std} = Stack gas flowrate, DSCFM

T_m = Absolute average meter temperature, °R

T_s = Absolute average stack gas temperature, °R

T_{std} = Standard absolute temperature, 528 °R

V_a = Volume of sample aliquot titrated, ml

V_{lc} = Liquid collected in impingers and silica gel, grams

V_m = Sample volume at meter conditions, DCF

$V_{m(std)}$ = Sample volume at standard conditions, DSCF

V_s = Stack gas velocity, ft/sec

V_{soln} = Total volume of solution, ml

V_t = Volume of barium perchlorate titrant used for the sample, ml

V_{tb} = Volume of barium perchlorate titrant used for the blank, ml

$V_{w(std)}$ = Volume of water vapor in sample corrected to standard conditions, SCF

Y = Dry gas meter calibration factor

13.6 = Specific gravity of mercury

MODEL NAME - CREMATORY
MODEL NUMBER - IE43-M94

THESE CALCULATIONS HAVE BEEN PREPARED TO PROPERLY EVALUATE THE COMBUSTION PROCESS IN THE INCINERATOR EQUIPMENT SELECTED ABOVE.

THE INCINERATOR INSTITUTE OF AMERICA HAS PUBLISHED THE FOLLOWING SPECIFICATIONS COVERING AVERAGE WASTES.

WASTE TYPE	TYPE 0	TYPE4
B.T.U. PER POUND	8500	1000
POUNDS OF ASH PER POUND	.05	.05
POUNDS OF MOISTURE PER POUND	.1	.85
POUNDS OF NET COMBUSTIBLE PER POUND	.85	.1

1. PRODUCTS OF COMBUSTION TYPE 0 WASTE

A. COMBUSTION AIR

$$\frac{8500 \text{ BTU PER LB.}}{100 \text{ BTU PER CUBIC FOOT OF AIR}} \times 200\% \times .075 = 12.75 \text{ LBS PER LB}$$

B. COMBUSTIBLES FROM CHART ABOVE = 0.85 LBS PER LB

C. WATER VAPOR (VOLUME CONVERSION ONLY)

$$.1 \text{ LBS} \times \frac{28.9 \text{ MOL. WT. AIR}}{18.0 \text{ MOL. WT. WATER}} = 0.16 \text{ LBS PER LB}$$

D. TOTAL POUND PER POUND FLUE PRODUCTS FROM TYPE 0 WASTE = 13.76 LBS PER LB

2. PRODUCTS OF COMBUSTION TYPE 4 WASTE

A. COMBUSTION AIR

$$\frac{1000.00}{100 \text{ BTU PER CUBIC FOOT OF AIR}} \times 200\% \times .075 = 1.50 \text{ LBS PER LB}$$

B. COMBUSTIBLES FROM CHART ABOVE = 0.10 LBS PER LB

C. WATER VAPOR (VOLUME CONVERSION ONLY)

$$.85 \text{ LBS} \times \frac{28.9 \text{ MOL. WT. AIR}}{18.0 \text{ MOL. WT. WATER}} = 1.36 \text{ LBS PER LB}$$

D. AUXILIARY FUEL

3000 BTU PER LB OF WASTE X $\frac{\text{0.045 LBS. PER CU.FT NATURAL GAS}}{\text{1000 B.T.U. PER CU.FT. NATURAL GAS}}$

= 0.135 LBS PER LB

E. COMBUSTION AIR FOR AUXILIARY FUEL

3 CU.FT. GAS X 10 CU.FT. AIR X 0.075 LB. PER CU.FT. AIR

= 2.25 LBS PER LB

F. TOTAL POUND PER POUND FLUE PRODUCTS FROM TYPE 4 WASTE = 5.345 LBS PER LB

3. FLUE PRODUCTS AFTERBURNER

A. NATURAL GAS FUEL@ 300000 AVERAGE BTU PER HOUR

300.00 CU.FT. PER HOUR X 0.045 LB. PER CU.FT. NAT. GAS

= 13.50 LBS PER HOUR

B. COMBUSTION AIR

$\frac{\text{300000 BTU PER HOUR}}{\text{100 BTU PER CU.FT.AIR}}$ x 200% x .075 = 450.00 LBS PER HOUR

C. SECONDARY AIR SUPPLY

3 1.5 INCH I.D. NOZZLES X 5000 CFH =10000.00 C.F.H.

4. RETENTION TIME

A. TYPE 0 WASTE@ 25.00 POUNDS PER HOUR

13.76 LB. PER LB. WASTE X 25.00 = 344.00 LBS PER HOUR

B. TYPE 4 WASTE@ 125.00 POUNDS PER HOUR

5.34 LB. PER LB. WASTE X 125.00 = 667.50 LBS PER HOUR

C. AFTERBURNER @ 300000 BTU PER HOUR = 463.50 LBS PER HOUR

D. SECONDARY AIR

10000.00 CU.FT. HOUR X .075 LB. PER CF = 750.00 LBS PER HOUR

E. TOTAL POUNDS PER HOUR = 2225.00 LBS PER HOUR

F. AFTERCHAMBER GAS TEMP. = 1600.00 DEG. F

G. CFS CALCULATION

$$2225.00 \times \frac{13.35 \text{ STD. CU.FT. PER POUND}}{3600 \text{ SECONDS PER HOUR}} = 8.25 \text{ CFS}$$

H. ACFS CALCULATION

$$\frac{1600.00 + 460}{70 + 460} = 3.89$$

I. TOTAL PRODUCTS ACFS

8.25 CFS X 3.89 = 32.07 ACFS

J. RETENTION TIME

$$\frac{64.00 \text{ CU.FT. IN AFTERCHAMBER}}{32.07 \text{ PRODUCTS OF COMBUSTION ACFS}} = 2.00 \text{ SEC.}$$

5. CHAMBER CONDITIONS

A. VELOCITY IN FLAME PORT

$$\frac{32.07 \text{ PRODUCTS OF COMBUSTION ACFS}}{1.34 \text{ SQ.FT. AREA OF FLAME PORT}} = 23.93 \text{ F.P.S.}$$

B. VELOCITY AT MIXING BAFFLES

$$\frac{32.07 \text{ PRODUCTS OF COMBUSTION ACFS}}{1.61 \text{ SQ.FT. AREA OF MIXING BAFFLES}} = 19.92 \text{ F.P.S.}$$

C. VELOCITY IN SECONDARY CHAMBER

$$\frac{32.07 \text{ PRODUCTS OF COMBUSTION ACFS}}{3.65 \text{ SQ.FT. AREA OF SECONDARY CHAMBER}} = 8.79 \text{ F.P.S.}$$

6. STACK CONDITIONS

A. STACK EXIT DIAMETER 20.00 INCHES

B. STACK EXIT AREA 2.18 SQ.FT.

C. FLUE GAS TEMP. 1600.00 DEG. F

D. INDUCING AIR TEMP. 70.00 DEG. F

E. INDUCING AIR QUAN. 2500.00 LB. PER HOUR

(555 X 60 X .075)

7. STACK GAS VOLUME

$$\frac{2225.00 + 2500}{3600} \times 13.35 \times \frac{1250.48}{530} = 41.34 \text{ ACFS AT STACK CONDITIONS}$$

8. STACK GAS TEMPERATURE

$$2225.00 \times (2060.00 - T) = 2500 \times (T - 530)$$

$$2060.00 - T = 2500 / 2225.00 \ (T - 530)$$

$$2060.00 - T = 1.12 \ (T - 530)$$

$$2060.00 - T = 1.12\,T - 595.51$$

$$2.12\,T = 2655.51$$

$$T = 2655.51 / 2.12$$

$$T = 1250.48 - 460 \text{ ABSOLUTE}$$

STACK GAS TEMPERATURE = 790.48

9. STACK EXIT VELOCITY

$$\frac{41.34 \text{ ACFS}}{2.18 \text{ SQ.FT OF STACK}} = 18.96 \text{ FEET PER SECOND}$$

CENTRAL FLORIDA TESTING LABORATORIES, INC.

VISIBLE EMISSIONS OBSERVATION FORM

METHOD USED (CIRCLE ONE): METHOD 9 | 203A | 203B | OTHER:

FORM NUMBER | PAGE 1 OF 1

CONTINUED ON VEO NUMBER

COMPANY NAME: Fero Funeral Home

STREET ADDRESS: 7620 U.S. Highway 41 | CITY: Dunnellon

MAILING ADDRESS: 5955 North Lecanto Highway

CITY: Beverly Hills | STATE: FL | ZIP: 32665

PHONE/KEY CONTACT: Bill Ward | SOURCE PERMIT NUMBER: A042-184997

PROCESS EQUIPMENT: IE43-M94 Cremation Incinerator | OPERATING MODE: ≤ 100 lb/hr

CONTROL EQUIPMENT: Afterburner | OPERATING MODE: > 1400 °F

DESCRIBE EMISSION PT.: 20" Diameter Stack through the roof of the rear of the funeral home

DISTANCE TO EMISS. PT. START ~90' END ~90' | DIRECTION TO EMISS. PT. (DEGREES) START 60° END 60°

HEIGHT OF EMISS PT. START ~20' END ~20' | HEIGHT TO EMISS. PT. REL. TO OBSERVER START ~14' END ~14'

VERTICAL ANGLE TO OBS. PT. START ~10° END ~10° | DIRECTION TO OBS. PT. (DEGREES) START 60° END 60°

APPROX. DISTANCE AND DIRECTION FROM EMISS. PT. TO OBSERV. PT START Observed at Emission Point END same

DESCRIBE EMISSIONS START Occassional Puff light smoke END None

EMISSION COLOR START Brown END None | WATER DROPLET PLUME: ☐ ATTACHED ☐ DETACHED ☒ NONE

DESCRIBE PLUME BACKGROUND START Sky END Sky

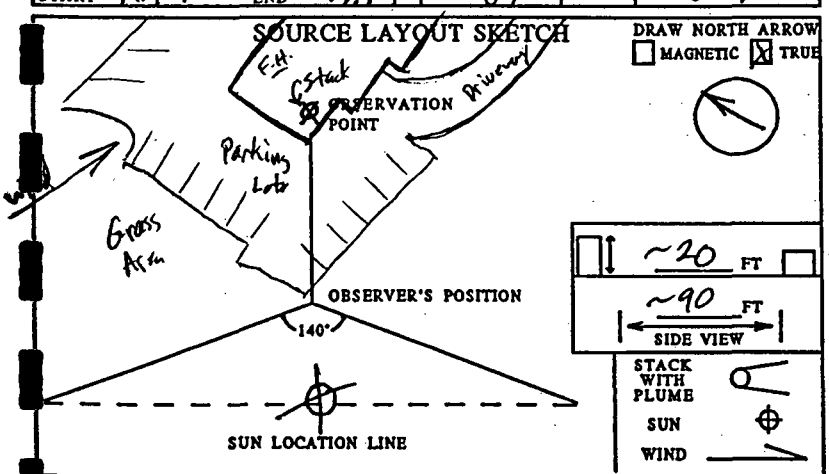
BACKGROUND COLOR START Blue & White END Blue & White | SKY CONDITIONS START Scattered END Scattered

WIND SPEED START ~1-3mph END ~2-4mph | WIND DIRECTION START West END

AMBIENT TEMPERATURE START ~91.9°F END ~97.7°F | WET BULB TEMP. ~87° F | PERCENT RH ~85%

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW: ☐ MAGNETIC ☒ TRUE



OBSERVATION DATE	START TIME	END TIME
July 24, 1995	2:03 pm	3:03 pm

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	5	5	0	31	0	0	0	0
2	0	0	0	5	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	5	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY <0.1% | HIGHEST SIX MINUTE INTERVAL <1%

LAT: | LONG: | DECLINATION

ADDITIONAL INFORMATION: Preheated to 1455°F prior to loading at 201pm.
Bill Ward - Operator.
~150 lb. body in cardboard box.
LP Gas Fired; No objectionable odors detected

OBSERVER'S NAME (PRINT): Russell B. Keith

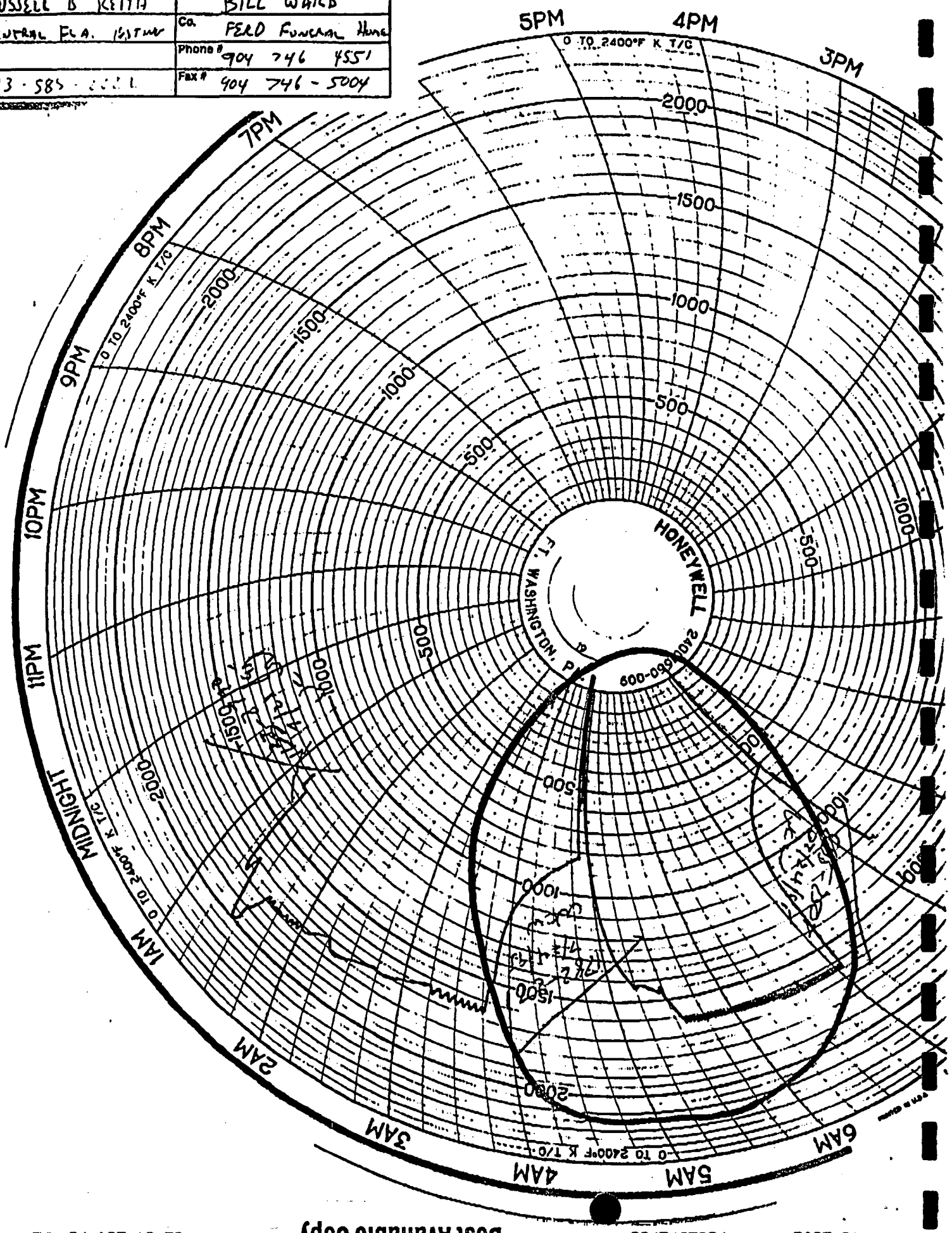
OBSERVER'S SIGNATURE: Russell B. Keith | DATE: 7/24/95

ORGANIZATION: CFTL

CERTIFIED BY: FTA - Jax. | DATE: 6/7/95

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To RUSSELL B KEITH	From BILL WARD
Co. CENTRAL FLA. INSTR	Co. FERD Funeral Home
Dept.	Phone # 904 746 4551
Fax # 813-585-[illegible]	Fax # 904 746-5004



Best Available Copy

Certificate of Completion

William C. Ward III

has successfully completed the State of Florida

Crematory Operator Training

This required program consisted of eight hours of classroom instruction and hands-on training. Industrial Equipment & Engineering Company, a State-approved training organization for crematory operators, administered the course from February 22 to February 23, 1994. Prepared this 1st day of March, 1994, by Industrial Equipment & Engineering Company.

MODEL TYPE: POWER-PAK II
CERTIFICATION #0203-IE-0PPII-02-94