Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER

JUL 21 1993

Southwest District Tampa

AC 42-234786

DER Form #	
Form Title	
Effective Date	
DER Application No.	

RECEIVED JUN 1993 D.P. Central District

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Human Crematory [x] New[1] [ ] Existing[1]

APPLICATION TYPE: [x] Construction [ ] Operation [ ] Modification

COMPANY NAME: Roberts Funeral Home of Dunnellon, Inc. COUNTY: Marion

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Incinerator

SOURCE LOCATION: Street 19939 E. Pennsylvania Ave. City Dunnellon

UTM: East 17-357.5 North 3214.0

Latitude 29° 02' 50"N Longitude 82° 27' 55"W

APPLICANT NAME AND TITLE: Kenneth E. Roberts, President

APPLICANT ADDRESS: 19939 E. Pennsylvania Ave., Dunnellon, Florida 34432

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Roberts Funeral Home Of Dunnellon, Inc.

I certify that the statements made in this application for a Construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: K E Roberts

Kenneth E. Roberts, President
Name and Title (Please Type)

Date: 6-28-93 Telephone No. (904) 489-2429

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed Kim G Thompson

Kim G. Thompson
Name (Please Type)

Southern Environmental Sciences, Inc.
Company Name (Please Type)

1204 N. Wheeler Street, Plant City, Florida 33566
Mailing Address (Please Type)

Florida Registration No. 45334 Date: 6/24/93 Telephone No. (813) 752-5014

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

This project consists of the construction of a B & L Systems 150 lb/hr crematory unit with afterburner. The project is expected to result in full compliance.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction Approximately 6/93 Completion of Construction Approximately 8/93

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Crematory unit package $40,000.00

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

N/A

E. Requested permitted equipment operating time: hrs/day 10 ; days/wk 5 ; wks/yr 52 ;
if power plant, hrs/yr _____; if seasonal, describe: ____________________

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ______
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ______
   c. If yes, list non-attainment pollutants. ______
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No
3. Does the State "Prevention of Significant Deteriorlation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No
   a. If yes, for what pollutants? ______
   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants Type	Contaminants % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
Container with	Ash	5%	150 lb/hr	1
human body				

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): 150 lb/hr container with human body

2. Product Weight (lbs/hr): 7.5 lb/hr inert ash

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2*	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/yr	Potential[4] Emission T/yr	Relate to Flow Diagram
Particulate	0.049	0.076	0.08 gr/dscf	0.226 @ 14% O_2	153	0.076	2
			@ 7% O_2				
Carbon Monoxide	0.057	0.089	100 ppm by	0.144 @14% O_2	178	0.089	2
			vol @ 7% O_2				

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

*Chapter 17-296.401(5),F.A.C.

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Propane	0.00034 MMCF/hr	0.00054 MMCF/hr	1.30 MMBTU/hr

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: Negligible   Percent Ash: Negligible

Density: NA lbs/gal   Typical Percent Nitrogen: Negligible

Heat Capacity: 2500 BTU/FT^3 BTU/lb   90,500 BTU/gal BTU/gal

Other Fuel Contaminants (which may cause air pollution): None

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average ______   Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Ash is disposed of per applicable regulation or returned to the family for interment or disposal.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 10.3 ft. Stack Diameter: 1.5 ft.

Gas Flow Rate: 1400 ACFM 700 DSCFM Gas Exit Temperature: 500 - 600 °F.

Water Vapor Content: by volume % Velocity: 13 FPS
approx. 10% (by volume)

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated					150 lb/hr		
Uncontrolled (lbs/hr)							

Description of Waste Pathological Ash

Total Weight Incinerated (lbs/hr) 150 Design Capacity (lbs/hr) 150

Approximate Number of Hours of Operation per day 10 day/wk 6 wks/yr. 52

Manufacturer B & L Systems, Inc.

Date Constructed 6/93 Model No. N-20AA

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	60	450,000 max*	propane	300,000 max	1,000 - 1,400
Secondary Chamber	65	1,000,000 max	propane		1,600 - 1,800

Stack Height: 10.3 ft. Stack Diamter: 1.5 ft Stack Temp. 500 - 600°F

Gas Flow Rate: 1400 ACFM 700 DSCFM* Velocity: 13 FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify)

$$*1,000 \text{ BTU/hr (from attachment 2)} \times 150 \frac{lb}{hr} + 300,000 \frac{BTU}{hr} \text{ (burner)} = 450,000 \frac{BTU}{hr}$$

Brief description of operating characteristics of control devices: Uncontrolled source, although afterburner is integral with unit. Remains loaded into primary chamber. Afterburner is preheated for initial cremation. After preheating cycle, the primary burner is activated and the cremation cycle begins. Afterburner maintains a consistent minimum temperature of 1600°F in the secondary chamber.

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

Pathological ash is disposed of per applicable regulations or returned to the family for interment disposal.

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
   Attachment 1
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
   Attachment 2
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
   Attachment 3
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
   Attachment 4
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
   Attachment 5
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
   Attachment 6
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
   Attachment 7
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.
   Attachment 8

9. List of Similar Units operating in Florida, Attachment 9.
10. A copy of an FDER approved operator training program, Attachment 10.
11. Emissions test report of B & L Systems, Inc. N-20 Series crematory incinerator, Attachment 1

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ____________ no. sites ____________ TSP ____________ ( ) SO^2* ____________ Wind spd/dir

Period of Monitoring ______/______/______ to ______/______/______
month day year month day year

Other data recorded ____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)______________________________

3. Upper air (mixing height) data obtained from (location)______________________

4. Stability wind rose (STAR) data obtained from (location)______________________

C. Computer Models Used

1. ______________________________ Modified? If yes, attach description.

2. ______________________________ Modified? If yes, attach description.

3. ______________________________ Modified? If yes, attach description.

4. ______________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	______________________________	grams/sec
SO^2	______________________________	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

ATTACHMENT 1

Roberts Funeral Home
Dunnellon, Florida

SECTION V.I. SUPPLEMENTAL REQUIREMENTS

PROCESS INPUT RATE AND PRODUCT RATE DERIVATION

Process Input Rate = **150 lb/hr human body & container** [1]
Approx 5% Ash

Product Weight = 150 lb Input/hr x 0.05 lb ash/lb Input

7.5 lb/hr Ash

[1] The only materials to be cremated in this incinerator will be dead human bodies with appropriate containers. The appropriate containers will typically be cardboard boxes, cloth coverings or caskets. Mr. Mike Huett of FDER Tallahassee has advised the incinerator manufacturer that commercially available caskets would be acceptable to be burned.

Roberts Funeral Home
Dunnellon, Florida

SECTION V.2 SUPPLEMENTAL REQUIREMENTS

BASIS OF EMISSION ESTIMATES

1. Maximum Emissions

A. Particulate Maximum Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/hr = 0.009 gr/cu ft @ 14% O2 x 660 cu.ft./min x 1/7000 lb/gr x 60 min/hr

= **0.049 lb/hr PM @ 14 % O2**

T/yr = 0.049 lb/hr x 10 hr/day x 6 day/wk x 52 wk/yr x 1/2000 lb/ton

= **0.076 Ton/yr PM @ 14% O2**

B. Carbon Monoxide Maximum Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/hr = 20.1 ppm CO @14% O2 x 0.041573 gmole-mg/m3/g x 28 g CO/gmole x 0.028 m3/ft3 x 0.001 g/mg x 1/453.6 lb/gr

= 1.44 E -6 lb/ft3 x 660 cu ft/min x 60 min/hr

= **0.057 lb/hr CO @ 14 %O2**

T/yr = 0.057 lb/hr CO x 3120 hr/yr x 1/2000 lb/ton

= **0.089 Ton/yr Co @ 14 %O2**

Roberts Funeral Home
Dunnellon, Florida

SECTION V.2 SUPPLEMENTAL REQUIREMENTS

BASIS OF EMISSION ESTIMATES cont.

2. Allowable Emissions

A. Particulate Allowable Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/hr = **0.080 grains/cu.ft. @ 7% O2** [1]
x (21-14 %O2)/(21-7 %O2)
= 0.040 grains/cu.ft @ 14% O2
x 660 cu.ft./min. x 60 min/hr x 1 lb/7000 gr

= **0.226 lb/hr PM @ 14 %O2**

B. Carbon Monoxide Allowable Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/hr = **100 ppm CO @7% O2** [1] x 0.041573 gmole-mg/m3/g
x 28 g CO/gmole x 0.028 m3/ft3 x 0.001 g/mg
x 1/453.6 lb/gr

= 3.63 E -6 lb/ft3 x 660 cu ft/min x 60 min/hr

= **0.144 lb/hr CO @ 14 %O2**

(1) Chapter 17-296.401(5), F.A.C.

Roberts Funeral Home
Dunnellon, Florida

SECTION V.3 SUPPLEMENTAL REQUIREMENTS

BASIS OF POTENTIAL DISCHARGE

1. Potential Emissions

A. Particulate Potential Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/yr = 0.009 gr/cu ft @ 14% O2 x 660 cu.ft./min x 1/7000 lb/gr x 60 min/hr x 3120 hr/yr

= **153 lb/yr PM @ 14 % O2**

T/yr = 153 lb/yr x 1/2000 ton/lb.

= 0.076 Ton/yr PM @ 14% O2

B. Carbon Monoxide Potential Emissions

BASIS: May 1993 Compliance Test on B&L Systems, Inc. N-20 series crematory incinerator at Inverness, Florida

lb/yr = 20.1 ppm CO @14% O2 x 0.041573 gmole-mg/m3/g x 28 g CO/gmole x 0.028 m3/ft3 x 0.001 g/mg x 1/453.6 lb/gr

= 1.44 E -6 lb/ft3 x 660 cu ft/min x 60 min/hr x 3120 hr/yr

= **178 lb/yr CO @ 14 %O2**

T/yr = 178 lb/yr CO x 1/2000 lb/ton

= **0.089 Ton/yr Co @ 14 %O2**

TABLE 1.5-1. EMISSION FACTORS FOR LPG COMBUSTION[a]
EMISSION FACTOR RATING: C

Furnace Type and Fuel	Particulates		Sulfur Oxides[b]		Nitrogen Oxides[c]		Carbon Monoxide		Volatile Organics			
									Nonmethane		Methane	
	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$	$kg/10^3 l$	$lb/10^3 gal$
Industrial												
Butane	0.01-0.06	0.10-0.47	0.01S	0.09S	1.58	13.2	0.6	3.3	0.03	0.26	0.03	0.28
Propane	0.01-0.05	0.09-0.44	0.01S	0.09S	1.49	12.4	0.37	3.1	0.03	0.25	0.03	0.27
Domestic/commercial												
Butane	0.01-0.06	0.10-0.47	0.01S	0.09S	1.13	9.4	0.23	1.9	0.06	0.5	0.03	0.25
⇨ Propane	0.01-0.05	0.09-0.44	0.01S	0.09S	1.05	8.8	0.22	1.8	0.06	0.47	0.03	0.24

[a] Assumes emissions (except sulfur oxides) are the same, on a heat input basis, as for natural gas combustion.
[b] Expressed as SO_2. S equals the sulfur content expressed in $g/100\ m^3$ gas vapor. For example, if sulfur content is $0.366\ g/100 m^3$ ($0.16\ gr/100 ft^3$) vapor, the SO_2 emission factor would be 0.01×0.366 or $0.0037\ kg\ SO_2/10^3$ liters (0.09×0.16 or 0.014 lb of $SO_2/1000$ gal) butane burned.
[c] Expressed as NO_2.

TABLE 2.1-1. EMISSION FACTORS FOR REFUSE INCINERATORS WITHOUT CONTROLS[a]

EMISSION FACTOR RATING: A

Incinerator type	Particulates[b] kg/Mg	Particulates[b] lb/ton	Sulfur Oxides[c] kg/Mg	Sulfur Oxides[c] lb/ton	Carbon monoxide kg/Mg	Carbon monoxide lb/ton	Organics[d] kg/Mg	Organics[d] lb/ton	Nitrogen oxides[e] kg/Mg	Nitrogen oxides[e] lb/ton	Lead[f] kg/Mg	Lead[f] lb/ton
Municipal[g]												
Multiple chamber, uncontrolled	15	30	1.25	2.5	17.5	35	0.75	1.5	1.5	3	0.2	0.4
With settling chamber and water spray system[h]	7	14	1.25	2.5	17.5	35	0.75	1.5	1.5	3	-	-
Industrial/commercial												
Multiple chamber[i]	3.5	7	1.25[j]	2.5[j]	5	10	1.5	3	1.5	3	-	-
Single chamber[k]	7.5	15	1.25[j]	2.5[j]	10	20	7.5	15	1	2	-	-
Trench[l]												
Wood	6.5	13	0.05	0.1[m]	-	-	-	-	2	4	-	-
Rubber tires	69	138	-	-	-	-	-	-	-	-	-	-
Municipal refuse	18.5	37	1.25[j]	2.5[j]	-	-	-	-	-	-	-	-
Controlled air[n]	0.7	1.4	0.75	1.5	Neg	Neg	Neg	Neg	5	10	-	-
Flue-fed single chamber[o]	15	30	0.25	0.5	10	20	7.5	15	1.5	3	-	-
Flue-fed (modified)[p,q]	3	6	0.25	0.5	5	10	1.5	3	5	10	-	-
Domestic single chamber												
Without primary burner[r]	17.5	35	0.25	0.5	150	300	50	100	0.5	1	-	-
With primary burner[s]	3.5	7	0.25	0.5	Neg	Neg	1	2	1	2	-	-
Pathological[t]	4	8	Neg	Neg	Neg	Neg	Neg	Neg	1.5	3	-	-

[a]Emission factors are based on weight per unit weight of refuse charged. Dash indicates no available data.
[b]Average factors given based on EPA procedures for incinerator stack testing.
[c]Expressed as sulfur dioxide.
[d]Expressed as methane.
[e]Expressed as nitrogen dioxide.
[f]References 5, 8-14, 24-28.
[g]References 5, 8-14.
[h]Most municipal incinerators are equipped with at least this much control; see Table 2.1-2 for appropriate efficiencies for other controls.
[i]References 3, 5, 10, 13, 15.
[j]Based on municipal incinerator data.
[k]References 3, 5, 10, 15.
[l]Reference 7.
[m]Based on data for wood combustion in conical burners.
[n]Reference 9.
[o]References 3, 10, 11, 13, 15, 16.
[p]With afterburners and draft controls.
[q]References 3, 11, 15.
[r]References 5, 10.
[s]Reference 5.
[t]Reference 3, 9.

SECTION V. 4 SUPPLEMENTAL REQUIREMENTS
DESIGN DETAILS FOR AIR POLLUTION CONTROL SYSTEMS

Secondary Chamber Volume
Calculations for 1 sec residence time @ 1800° F

A B C 1 x 15 x 1000 10,000 = D	1.5 lbs. of air
A E 1 x 0.10	0.1 lbs. of combustables
A F G 1 x .85 x 1.6 =	1.36 lbs. of vapor
H I 5,000 x 23.8 119,000 2330 x 13.35 34,043 = J K	3.49 lbs. of air for auxilary fuel
H L 5,000 x 1.52 2550 = J	2.98 lbs. of auxillary fuel
TOTAL P.O.C. =	9.43 lbs./ hr / lbs. of waste
M 9.43 x 51.9 3600 = N	0.13 cubic feet / seconds @ 1600° F
0.13 x 150 lb = hr	20 cubic feet for 1600° F @ 1 second
9.43 x 56.95 3600 =	0.15 cubic feet / seconds @ 1800° F
0.15 x 150 lbs hr =	22.37 ^{3} Ft. @ 1800° F

SECTION V.4 SUPPLEMENTAL REQUIREMENTS
ROBERTS FUNERAL HOME
PAGE 2

Volume of secondary chamber is 79.16^3 Ft.

See following page for index of values.

Make, model, and manufacturers specifications for the continuous temperature monitor (Thermocouple) is listed below.

Make: Pyromation
Model: Type K, #K11 C - 12 - 0
continuous temperature recorder: Honeywell DR4200

NOTE: The value of 5,000 BTU for auxillary fuel input is based on the fact that the primary burner is temperature interlocked to fire when the unit reaches 1630^{0}F. The afterburner will be at 500,000 BTU/HR at this point the primary burner will fire @ 100,000 for 30 minutes then raise 300,000 maximum firing.

B&L INCINERATION SYSTEMS
4505 - 131st Avenue North • Unit #27 • Clearwater, Florida 34622
1-800-622-5411 • 813-573-6001 • FAX 813-572-1373

INDEX OF VALUES

A. = One pound of waste.

B. = Weight of air per 10,000 BTU.

C. = BTU content per pound of waste.

D. = 10 cubic feet of air per 1000 BTU.

E. = Amount of non-combustibles per pound of waste.

F. = Amount of moisture per pound of waste.

G. = Correction for difference of dry air and water vapor.

H. = BTU of Auxiliary fuel per pound of waste.

I. = Air in cubic feet per 100 cubic feet of fuel.

J. = BTU per cubic foot of propane.

K. = Specific volume of air in cubic feet per pound at 70 F.

L. = Weight of gas.

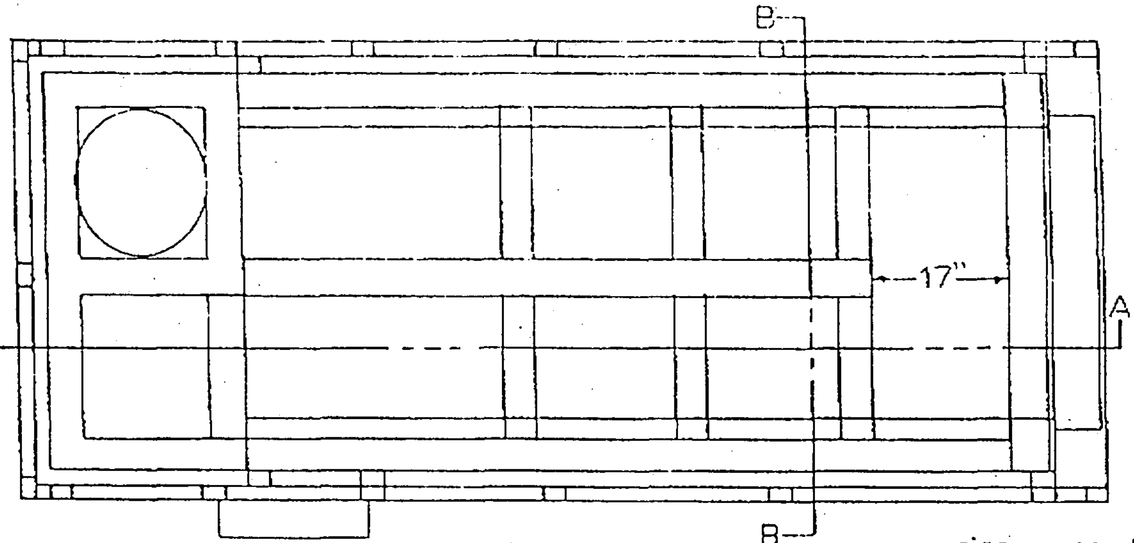
M. = Specific Volume of air in cubic feet per pound at 1800 F.

N. = Multiplier for hours to seconds.

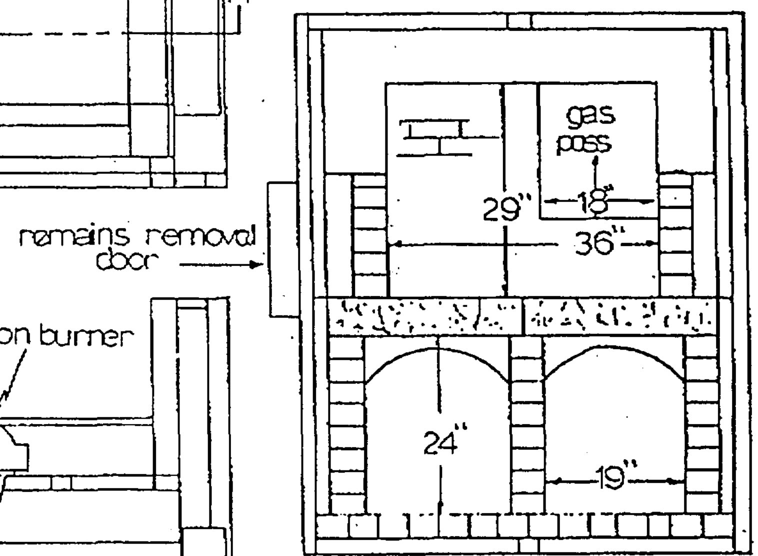
References; Incinerator Institute of America and North American Combustion Handbook.

BEST AVAILABLE COPY

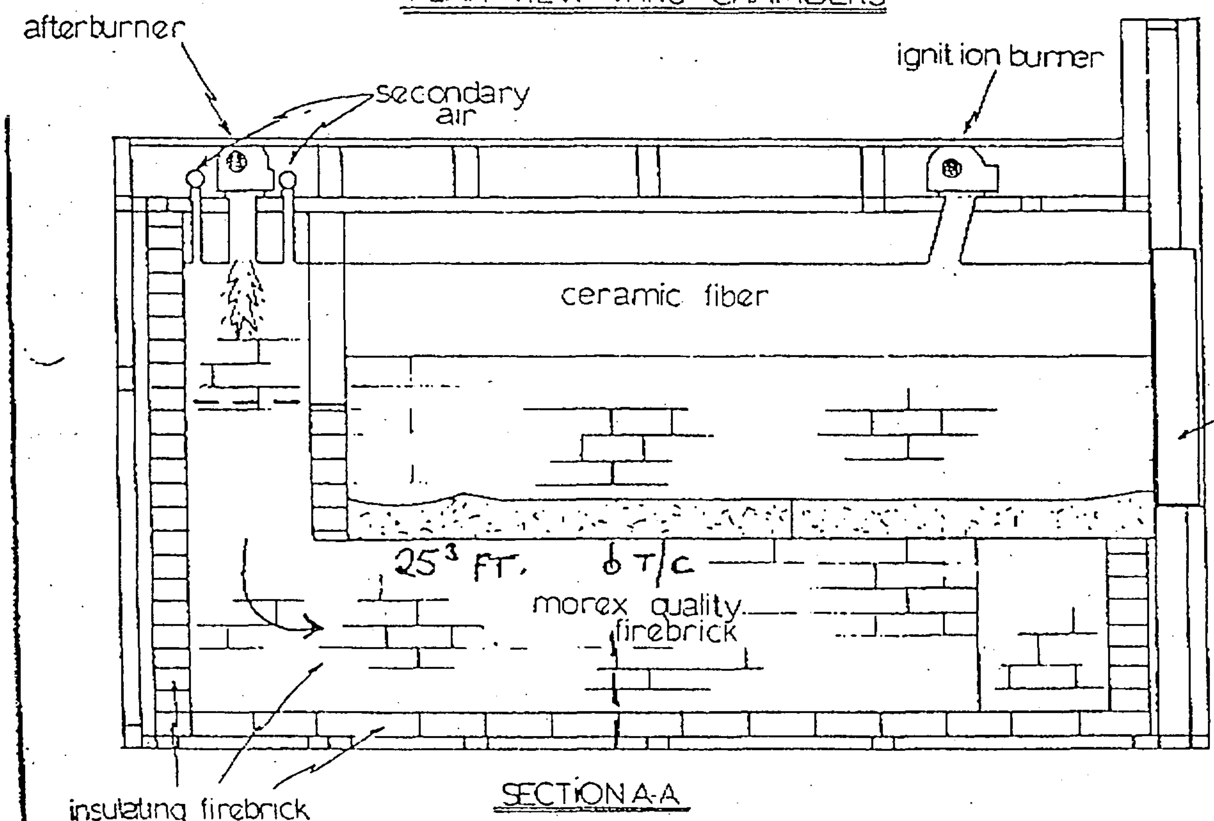
Note: Thermocouple is connected to a circular chart recorder, Eclipse Dungs Control, Inc., type DR4200, Model GP. Recorder continuously records temperature with an accuracy of 5% for the thermocouple/recorder.



PLAN VIEW THRU CHAMBERS



SECTION B-B



SECTION A-A

N-20AA
CREMATOR

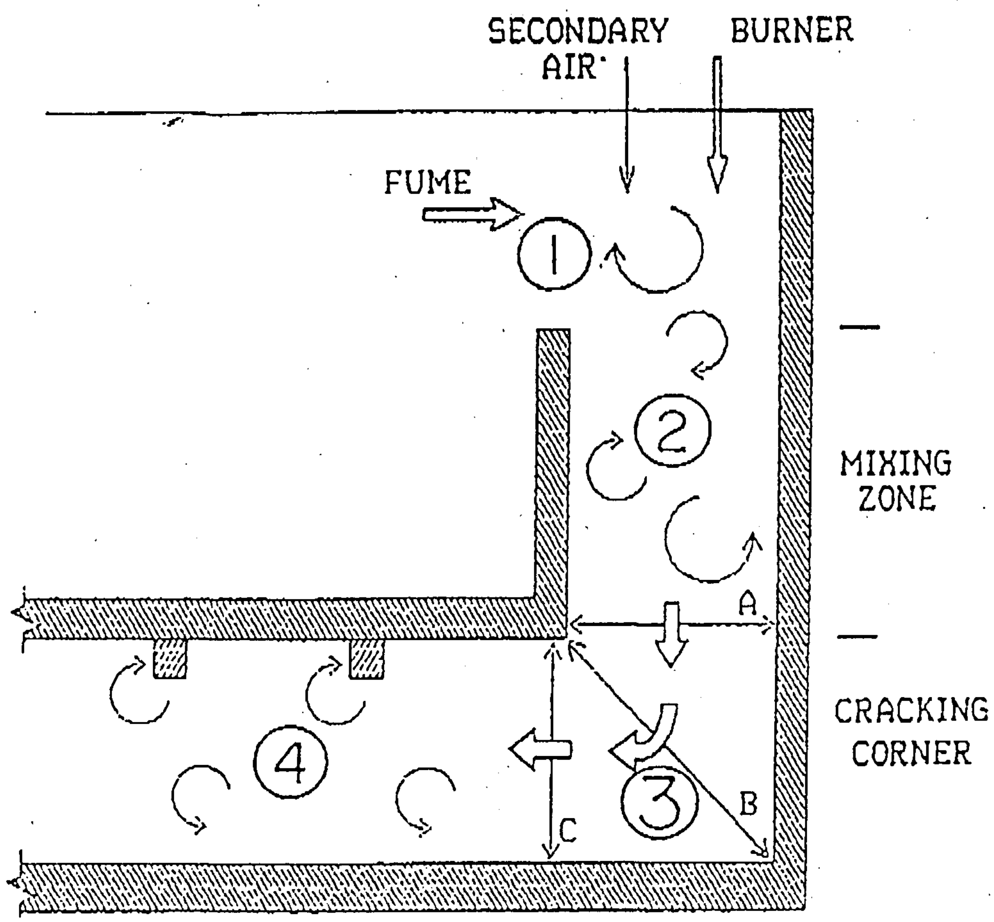
B&L SYSTEMS

REVISIONS	BY

DRAWN S. Locker
CHECKED
DATE
SCALE 1"=1'
JOB NO. N-20AA
SHEET
OF SHEETS

B & L Systems, Inc.
Serving The Cremation & Incineration Industries
4505 131st Avenue North, #27 • Clearwater, Florida 34622
(813) 545-3707 • 573-6001 • FAX 572-1373 • 1-800-622-5411

TURBULENCE ANALYSIS



1. At the back of primary chamber, waste fume, air and burner flame all meet with different viscosities, volumes, velocities and flow directions which causes turbulence in the mixing zone of the secondary chamber.

2. Turbulence continues in the mixing zone as flows are traversing the flame tip.

3. Changing velocity at flame front zone and cornering cause additional turbulence at the base the unit. $V_A > V_B < V_C$.

4. Uneven cross sectional area due to arches in the ceiling to support the primary chamber floor and additional chances in directional flow causes further turbulence downstream in secondary chamber.

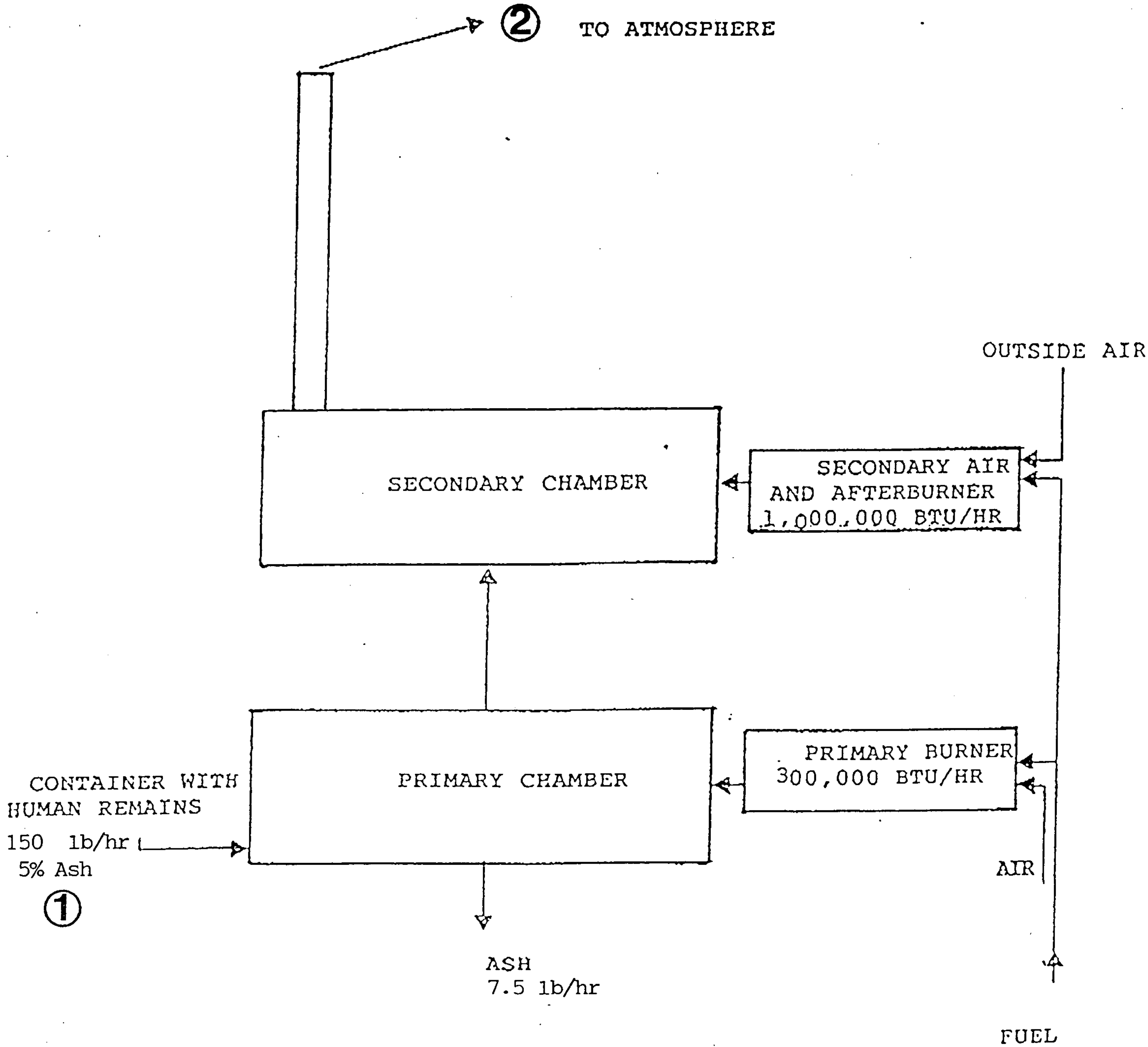
SECTION V.5 SUPPLEMENTAL REQUIREMENTS
CONTROL DEVICE DERIVATION

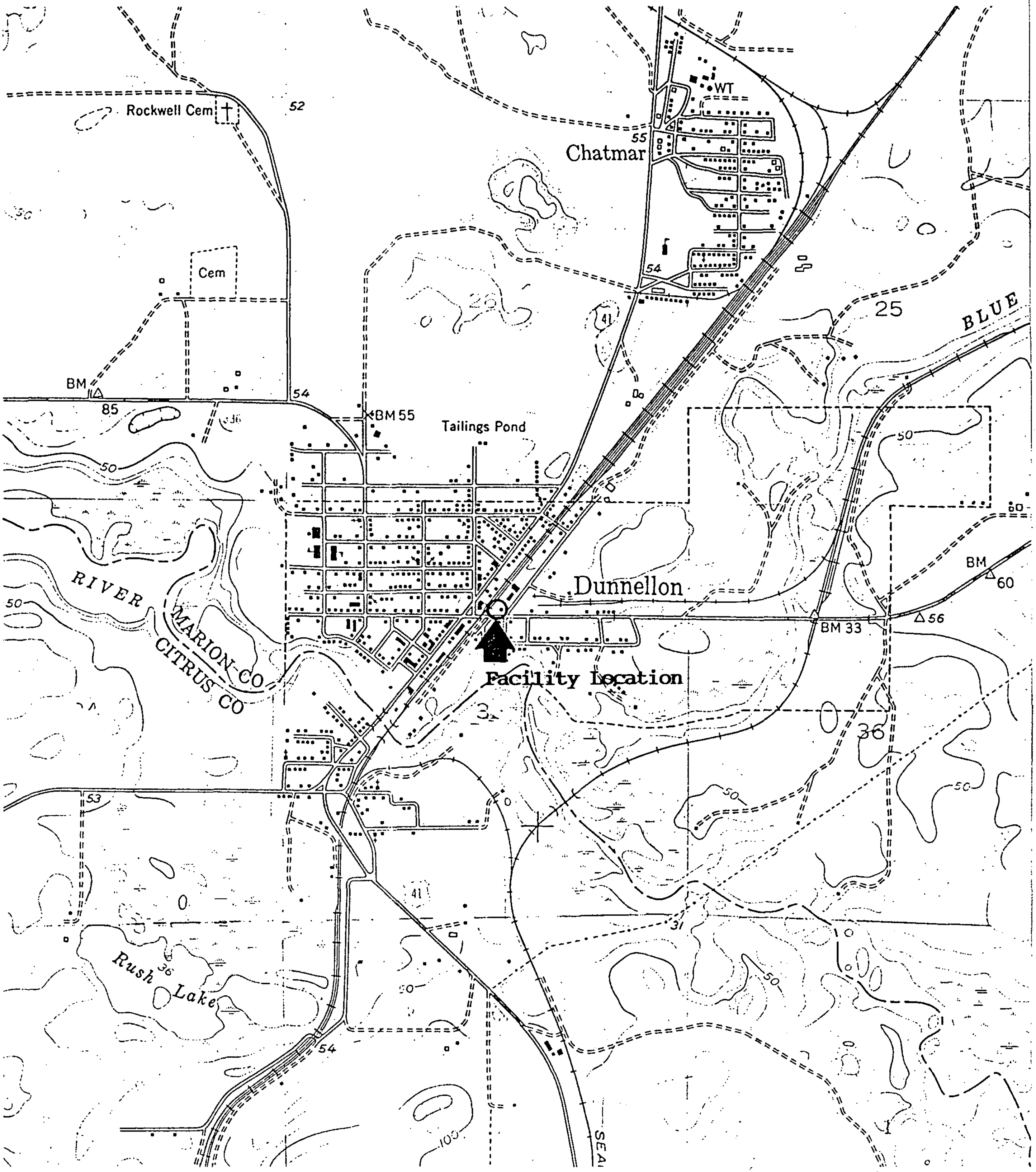
Control device is secondary combustion chamber. No combustion efficiency as such exists. Design calculations confirming sufficient volume in the secondary chamber combustion zone to provide 1.0 second gas residence time at 1800 degrees fahrenheit are included under Attachment 4.

B & L Systems, Inc.
Serving The Cremation & Incineration Industries
4505 131st Avenue North, #27 • Clearwater, Florida 34622
(813) 545-3707 • 573-6001 • FAX 572-1373 • 1-800-622-5411

CREMATION RETORT

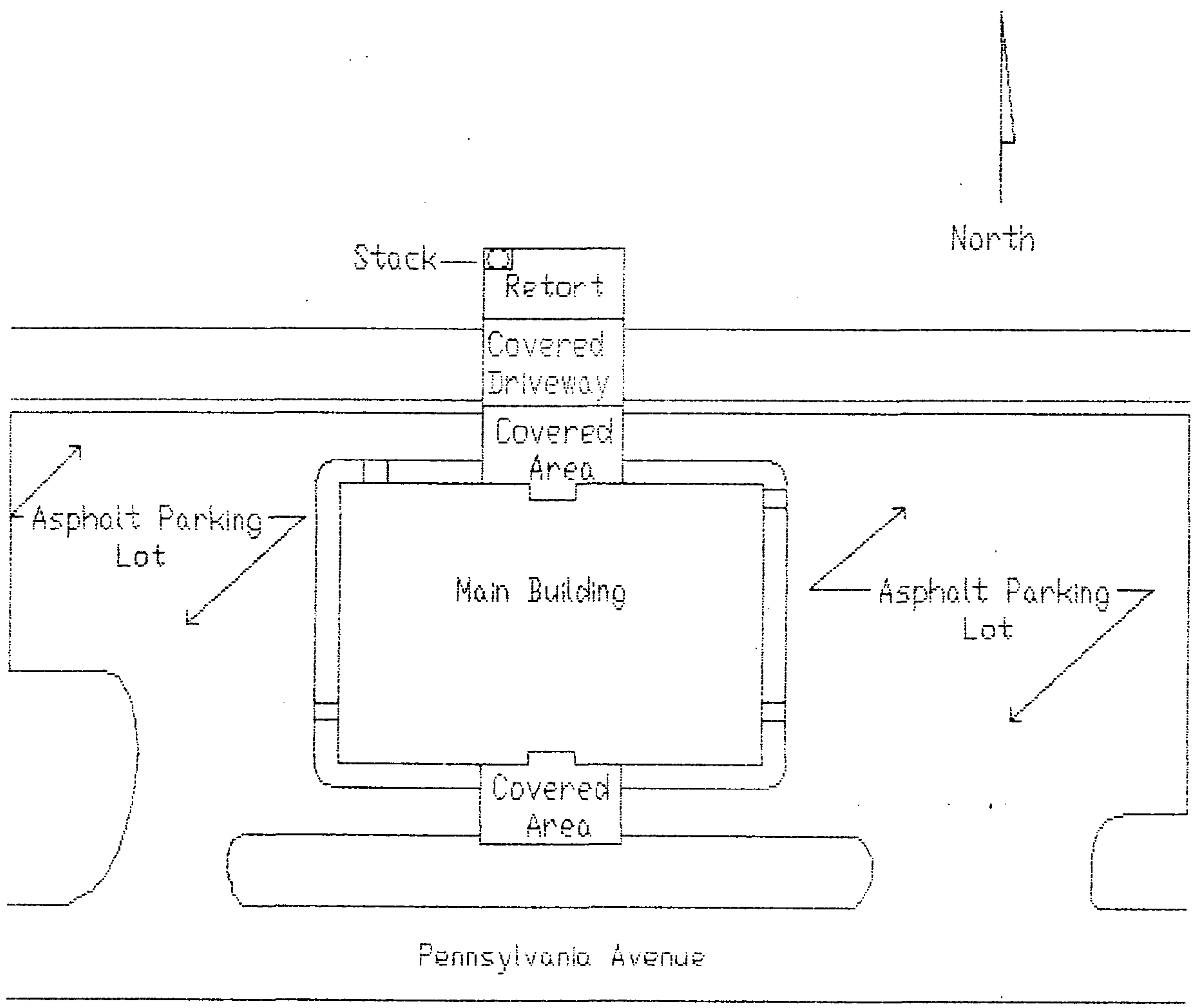
PROCESS FLOW DIAGRAM





Facility Location Map For:
ROBERTS FUNERAL HOME
19939 E. Pennsylvania Ave.
Dunnellon, Florida

SOUTHERN ENVIRONMENTAL
SCIENCES, INC.
1204 N. Wheeler Street
Plant City, Florida 33566-2354



Plot Plan For:
ROBERTS FUNERAL HOME
19939 E. Pennsylvania Ave.
Dunnellon, Florida

SOUTHERN ENVIRONMENTAL SCIENCES, INC.
1204 N. Wheeler Street
Plant City, Florida 33566-2354

B&L INCINERATION SYSTEMS
4505 - 131st Avenue North • Unit #27 • Clearwater, Florida 34622
1-800-622-5411 • 813-573-6001 • FAX 813-572-1373

February 26, 1993

Florida Department of Environmental Regulation
Pensacola, Florida
Mr. Kreigel
Fax#904-432-4093

Dear Sir:

In reference to our recent telephone conversation, the enclosed information will support the information given to you at that time. As requested, the following is a list of names and cities where we have identical equipment operating.

1. Watts Funeral Home, Palatka, Florida
2. Reese Funeral Home, Seminole, Florida
3. Wiegand Brothers Funeral Home, Sarasota, Florida
4. Davis Funeral Home, Inverness, Florida
5. Fountainhead Funeral Home, Melbourne, Florida
6. Manasota Memorial Park, Bradenton, Florida
7. Griffith-Kline Funeral Home, Bradenton, Florida

If you require any further information, please do not hesitate to contact me or Southern Environmental Engineering.

Sincerely,

Steve Looker
President

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

March 11, 1993

Steve Looker
B & L Systems Inc.
4505-131st Avenue North
Unit #27
Clearwater, Florida 34622

Re: The training and certification of Human Crematory operators as mandated by Rule 17-296 of the Florida Administrative Code

Dear Mr. Looker:

The content of your training program and your credentials submitted on October 22, 1992, have been determined by the Department to be adequate for the purpose of training human crematory operators at Mr. Dan Fairchild's Funeral Home in Tallahassee, Florida. The training program shall consist of no less than eight hours of instruction using the existing equipment at the facility stated above.

Upon successful completion of the training course each operator shall be issued a signed certificate of completion by the trainer (Steve Looker). A copy of each certificate for every operator shall be submitted to the Department prior to renewal of the operating permit.

This letter serves as certification of Steve Looker as a trainer using Mr. Looker's training program as submitted to the Department on October 22, 1992. Any modification of the training program or training done by Mr. Looker at any facility other than the one stated above will require a new submittal to the Department describing the new or modified conditions.

Should you have any questions regarding this letter or need additional information, please contact Mr. Michael Hewett at the address above or call 904/488-0114.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/mh

cc: E. Middleswart, NWD
D. Fairchild, D.F. Funeral Home

Recycled Paper

EMISSIONS TESTING
of the
CHAS. E. DAVIS FUNERAL HOME, INC.
Human Crematory
Inverness, Florida

May 5, 1993

FDER Permit No. AC09-221027

SES Reference No. 93S79

Project Participants

Byron E. Nelson
Charles R. Wilson
William D. McConnell

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TESTING
of the
CHAS. E. DAVIS FUNERAL HOME, INC.
Human Crematory
Inverness, Florida

May 5, 1993

TABLE OF CONTENTS

1.0 INTRODUCTION

Southern Environmental Sciences, Inc. conducted emissions testing of the Chas. E. Davis Funeral Home, Inc. human crematory on May 5, 1993. This plant is located at 3075 South Florida Avenue, Inverness, Florida. Testing was conducted for particulates, carbon monoxide and visible emissions. Oxygen concentrations were measured in order to correct results to 7% O_2. Testing was performed to determine if the plant was operating in compliance with requirements of the Florida Department of Environmental Regulation (FDER). The FDER was notified of the test date in advance of the test in order to provide an opportunity for an observer to be present during the testing.

2.0 SUMMARY OF RESULTS

The plant 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.

In accordance with the construction permit, particulate emissions from this source shall not exceed 0.080 grains per dry standard cubic foot (corrected to 7% O_2) nor 0.17 pounds per hour. The average measured particulate emission rate was 0.017 grains per dry standard cubic foot (corrected to 7% O_2) and 0.05 pounds per hour, well within the limits.

EMISSIONS TEST SUMMARY

Company: CHAS. E. DAVIS FUNERAL HOME, INC.
Source: Human Crematory

	Run 1	Run 2	Run 3
Date of Run	5/5/93	5/5/93	5/5/93
Process Rate (TPH)	145	147	147
Start Time (24-hr. clock)	1112	1338	1608
End Time (24-hr. clock)	1215	1441	1712
Vol. Dry Gas Sampled Meter Cond. (DCF)	46.268	44.451	46.551
Gas Meter Calibration Factor	1.021	1.021	1.021
Barometric Pressure at Barom. (in. Hg.)	30.12	30.09	30.06
Vol. Gas Sampled Std. Cond. (DSCF)	46.384	44.017	46.579
Vol. Liquid Collected Std. Cond. (SCF)	4.941	4.277	3.211
Moisture in Stack Gas (% Vol.)	9.6	8.9	6.4
Molecular Weight Dry Stack Gas	29.39	29.24	29.23
Molecular Weight Wet Stack Gas	28.29	28.24	28.51
Stack Gas Static Press. (in. H2O gauge)	-0.03	-0.03	-0.04
Stack Gas Static Press. (in. Hg. abs.)	30.12	30.09	30.06
Average Square Root Velocity Head	0.164	0.158	0.167
Average Orifice Differential (in. H2O)	2.147	1.946	2.164
Average Gas Meter Temperature (°F)	84.3	90.1	84.2
Average Stack Gas Temperature (°F)	517.1	539.1	552.3
Pitot Tube Coefficient	0.84	0.84	0.84
Stack Gas Vel. Stack Cond. (ft./sec.)	12.64	12.29	13.07
Effective Stack Area (sq. ft.)	1.77	1.77	1.77
Stack Gas Flow Rate Std. Cond. (DSCFM)	659	631	679
Stack Gas Flow Rate Stack Cond. (ACFM)	1,340	1,303	1,386
Net Time of Run (min.)	60	60	60
Nozzle Diameter (in.)	0.620	0.620	0.620
Percent Isokinetic	99.0	98.0	96.4
Oxygen (%)	13.2	14.0	14.7
Particulate Collected (mg.)	41.0	18.2	17.7
Particulate Emissions (gr./DSCF)	0.014	0.006	0.006
Particulate Emissions (gr./DSCF @ 7% O2)	0.024	0.013	0.013
Avg. Particulate Emissions (gr./DSCF @ 7% O2)		**0.017**	
Allowable Part. Emissions (gr./DSCF @ 7% O2)		**0.080**	
Particulate Emissions (lb./hr.)	0.08	0.03	0.03
Avg. Particulate Emissions (lb./hr.)		**0.05**	
Allowable Part. Emissions (lb./hr.)		**0.17**	
CO Emissions (ppm)	10.0	9.5	40.9
CO Emissions (ppm @ 7% O2)	17.9	19.0	90.5
Avg. CO Emissions (ppm @ 7% O2)		**42.5**	
Allowable CO Emissions (ppm @ 7% O2)		**100**	
CO Emissions (lb./hr.)	0.03	0.03	0.12
Avg. CO Emissions (lb./hr.)		**0.06**	
Allowable CO Emissions (lb./hr.)		**0.17**	

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

As specified in the permit conditions carbon monoxide emissions from this source shall not exceed 100 parts per million, dry basis (corrected to 7% O_2) on an hourly average basis nor 0.11 pounds per hour. The average measured carbon monoxide emission rate was 42.5 parts per million (corrected to 7% O_2) and 0.06 pounds per hour, within the limits.

3.0 PROCESS DESCRIPTION

The B & L Systems, Inc. Model N-20 series crematory incinerator cremates biological waste in an environmentally acceptable manner. The primary chamber is refractory lined with a natural gas burner and designed to operate at a temperature of 1800°F. Emissions are controlled by an afterburner. The afterburner is preheated and maintained at a minimum operating temperature of 1600°F prior to ignition of the primary chamber. The unit is designed to incinerate at a maximum rate of 150 pounds per hour of types I and IV wastes with a maximum heat input rate of 1.3 MMBTU per hour (primary chamber 0.3 MMBTU per hour, secondary chamber 1.0 MMBTU/hr). The time required for complete incineration depends upon the total weight of the waste. Process rates were determined by plant personnel and are included in the appendix.

4.0 SAMPLING PROCEDURES

4.1 Methods

All sampling was performed using methods currently acceptable to the FDER. 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 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 1. Particulate sampling was accomplished by conducting horizontal traverses through each of two ports located on the stack at a ninety degree angle from one another. Twenty 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.

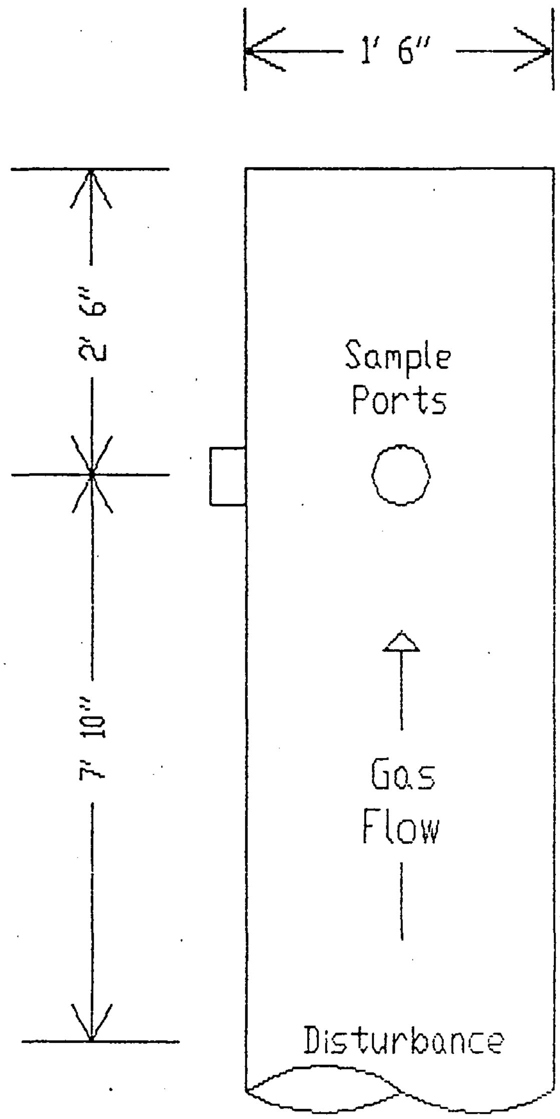


Figure 1. Stack dimensions and sample port locations, Chas. E. Davis Funeral Home, Inc., Human Crematory, Inverness, Florida.

4.3 Sampling Trains

The particulate sampling train consisted of a Nutech Corporation 3 foot water cooled probe utilizing a heated stainless steel liner, a heated glass fiber filter and four impingers arranged as shown in Figure 2. 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 CO 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

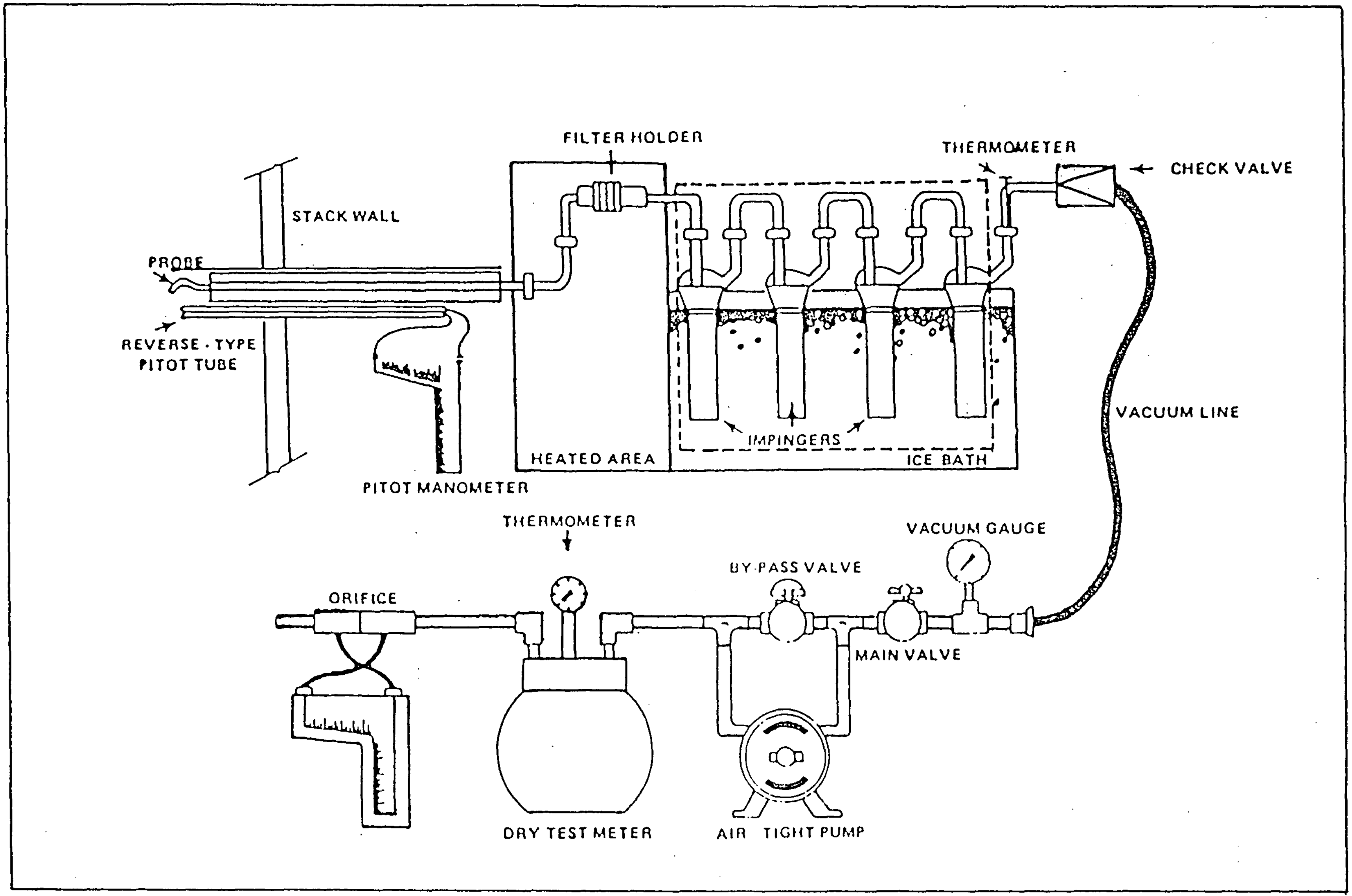


Figure 2. Method 5 Sampling Train.

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 three 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.

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 0.5 liters per minute for each run.

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

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

Field Data Sheets

Calibration Data

Calculations and Symbols

PROJECT PARTICIPANTS AND CERTIFICATION

CHAS. E. DAVIS FUNERAL HOME, INC.
Human Crematory
Inverness, Florida

May 5, 1993

Project Participants:

Byron E. Nelson Charles R. Wilson William D. McConnell	Conducted the field testing.
Steve Looker (B & L Systems, Inc.)	Provided process rates.
Charles R. Wilson	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.

Byron E. Nelson

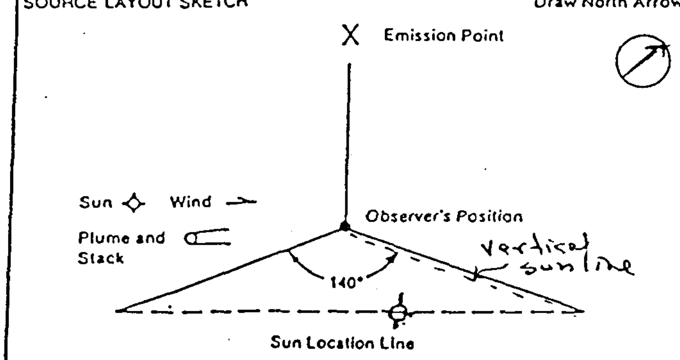
Southern Environmental Sciences, Inc.

VISIBLE EMISSIONS EVALUATION

COMPANY NAME	Chas. Davis Funeral Home
UNIT	Human Crematory
ADDRESS	3075 South Florida Ave. Inverness, Florida
PERMIT NO.	AC09-221027
COMPLIANCE	YES ☒ NO ☐
PROCESS RATE	145 lbs/hr
PERMITTED RATE	150 lbs/hr
PROCESS EQUIPMENT	Human Crematory
CONTROL EQUIPMENT	Afterburner B+L Systems model N-20 Series
OPERATING MODE	Propane Fired
AMBIENT TEMP.	START 80°F STOP 85°F
HEIGHT ABOVE GROUND LEVEL	START ~15' STOP ~15'
HEIGHT RELATIVE TO OBSERVER	START ~15' STOP ~15'
DISTANCE FROM OBSERVER	START ~100' STOP ~100'
DIRECTION FROM OBSERVER	START NW STOP NW
EMISSION COLOR	None
PLUME TYPE	CONTINOUS ☐ NA INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☒ YES ☐
IS WATER DROPLET PLUME	ATTACHED ☐ NA DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START Stack exit STOP Stack exit
DESCRIBE BACKGROUND	START Sky STOP Sky
BACKGROUND COLOR	START Blue STOP
SKY CONDITIONS	START 70% clouds STOP 75% clouds
WIND SPEED	START 0-3mph STOP
WIND DIRECTION	START Variable STOP
AVERAGE OPACITY FOR HIGHEST PERIOD	0%
RANGE OF THE OPACITY READINGS	MIN. 0% MAX. 0%

SOURCE LAYOUT SKETCH

Draw North Arrow



COMMENTS
SN 200-37-92

OBSERVATION DATE	START TIME	STOP TIME
5/5/93	10:12 AM	12:12 PM

MIN \ SEC	0	15	30	45	MIN \ SEC	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: FDER through ETA

Certified at: Tampa, Florida

Date certified: 2/93

Expiration date: 8/93

PROCESS WEIGHT STATEMENT

DATE 5/5/93 SAMPLING TIME: FROM 11:12 A.M. TO 5:12 P.M.

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME Chas. E. Davis Funeral Home

MAILING ADDRESS 3075 South Florida Avenue, Inverness, FL

SOURCE IDENTIFICATION Human Crematory

SOURCE LOCATION 3075 South Florida Avenue, Inverness, FL

DATA ON OPERATING CYCLE TIME:

START OF OPERATION, TIME ______

END OF OPERATION, TIME ______

ELAPSED TIME ______

IDLE TIME DURING CYCLE ______

DESIGN PROCESS RATING: PROCESS WEIGHT RATE (INPUT) 150 lbs/hr
PRODUCT (OUTPUT) ______

DATA ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:
(Include Specifications on Fossil Fuels)

MATERIAL DECEASED HUMAN REMAINS RATE* 145 lbs / hr

MATERIAL DECEASED HUMAN REMAINS RATE* 147 lbs / hr

MATERIAL DECEASED HUMAN REMAINS RATE* 147 lbs / hr.

TOTAL 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 [signature]

Title PRESIDENT, B&L Systems

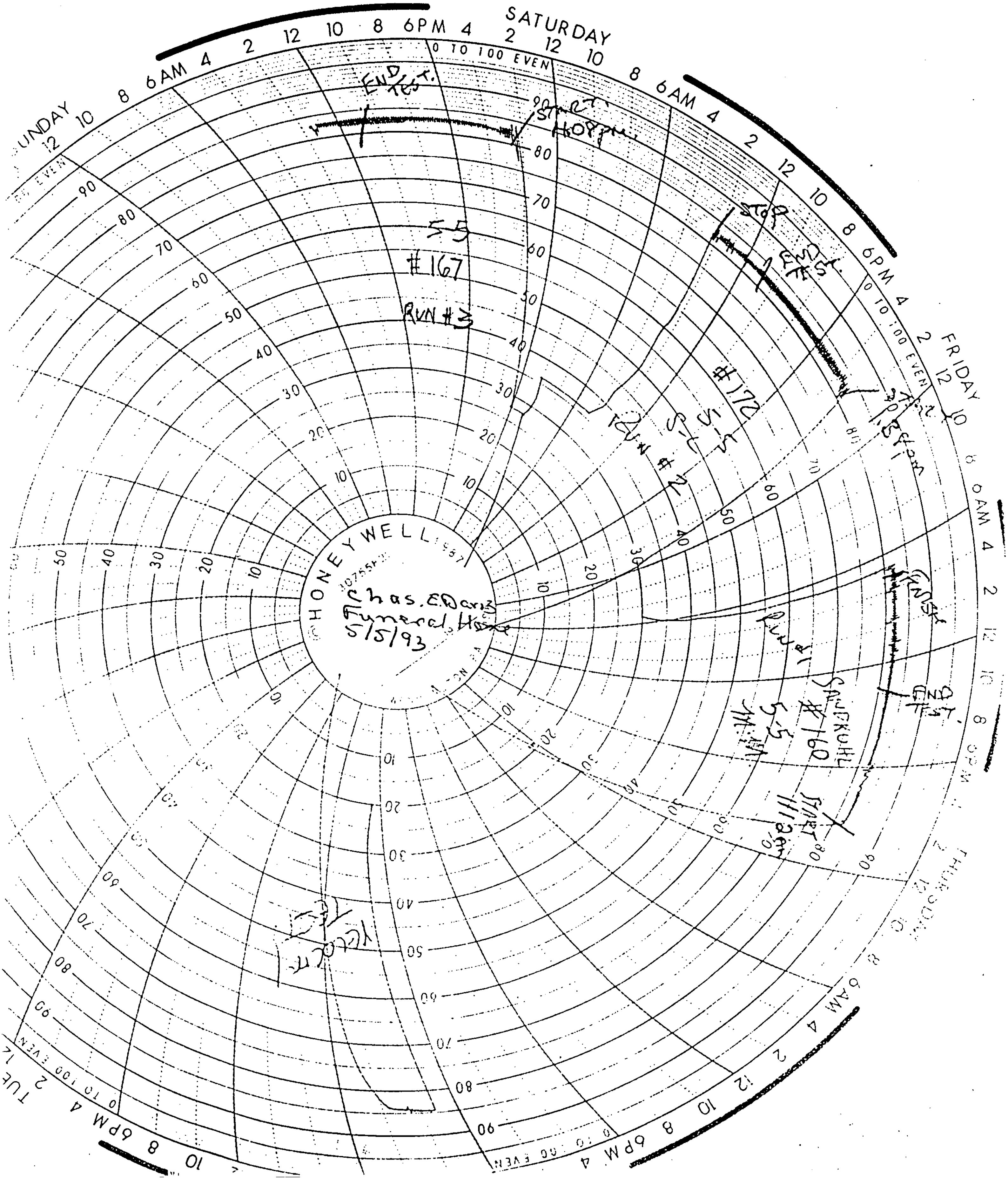
PROCESS WEIGHT CALCULATIONS

Run #1	Body weight	160 lbs.
	Approximate weight after 1 hour	15 lbs.
	Total per hour	145 lbs.
Run #2	Body weight	172 lbs.
	Approximate weight after 1 hour	25 lbs.
	Total per hour	147 lbs.
Run #3	Body weight	167 lbs.
	Approximate weight after 1 hour	20 lbs.
	Total per hour	147 lbs.

Best Available Copy

CHAS. E. DAVIS FUNERAL HOME, INC.

Afterburner Temperature
Full scale = 2000 deg. F



SOUTHERN ENVIRONMENTAL SCIENCES, INC.

PARTICULATE MATTER COLLECTED

Plant: CHAS. E. DAVIS FUNERAL HOME, INC.
Unit No. Human Crematory
Test Date: 5/5/93 Analyzed by: [signature]

Acetone blank container no.	57	Filter blank no.	2490
Acetone blank volume, ml.,(Va)	150	Filter blank tare weight, g.	0.3424
Acetone blank final weight, g.	102.7114	Filter blank final weight, g.	0.3424
Acetone blank tare weight, g.	102.7108	Filter weight diff., g.	0
Acetone blank weight diff.,g.,(ma)	0.0006		

Run No.	1
Filter No.	2487
Liquid lost during transport, ml.	0
Acetone wash container no.	54
Acetone wash volume, ml. (Vaw)	100
Acetone wash residue, g. (Wa)	0.0004

Container Number	WEIGHT OF PARTICULATE COLLECTED Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3691	0.3493	0.0198
2 (Wash)	105.7468	105.7252	0.0216
		TOTAL	0.0414
		Less acetone blank, g. (Wa)	0.0004
		Weight of particulate matter, g.	0.0410

Run No.	2
Filter No.	2488
Liquid lost during transport, ml.	0
Acetone wash container no.	55
Acetone wash volume, ml. (Vaw)	125
Acetone wash residue, g. (Wa)	0.0005

Container Number	WEIGHT OF PARTICULATE COLLECTED Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.358	0.3488	0.0092
2 (Wash)	103.3824	103.3729	0.0095
		TOTAL	0.0187
		Less acetone blank, g. (Wa)	0.0005
		Weight of particulate matter, g.	0.0182

Run No.	3
Filter No.	2489
Liquid lost during transport, ml.	0
Acetone wash container no.	56
Acetone wash volume, ml. (Vaw)	100
Acetone wash residue, g. (Wa)	0.0004

Container Number	WEIGHT OF PARTICULATE COLLECTED Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3567	0.3478	0.0089
2 (Wash)	104.95	104.9408	0.0092
		TOTAL	0.0181
		Less acetone blank, g. (Wa)	0.0004
		Weight of particulate matter, g.	0.0177

Southern Environmental Sciences, Inc.

MOISTURE COLLECTED

Plant Chas E. Davis

Unit CREMATORY
Date 5/5/93
Run No. ONE

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	187.0	108.0	0	266.5	CEW
Initial Weight (grams):	100.0	100.0	0	256.7	CEW
Difference (grams):	87.0	8.0	0	9.8	
Total Condensate (grams):				104.8	

Unit CREMATORY
Date 5/5/93
Run No. TWO

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	174.0	108.0	0	266.3	CEW
Initial Weight (grams):	100.0	100.0	0	257.6	CEW
Difference (grams):	74.0	8.0	0	8.7	
Total Condensate (grams):				90.7	

Unit CREMATORY
Date 5/5/93
Run No. THREE

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	152.0	106	0	263.1	CEW
Initial Weight (grams):	100.0	100.0	0	253.0	CEW
Difference (grams):	52.0	6.0	0	10.1	
Total Condensate (grams):				68.1	

Southern Environmental Sciences, Inc.

GAS ANALYSIS DATA FORM

PLANT: Chas, Davis Funeral Home

COMMENTS:

DATE: 5/5/93 TEST NO: 1

SAMPLING TIME (24-hr CLOCK): 11:12 - 12:15

SAMPLING LOCATION: Stack of human crematory

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS): Integrated bag

ANALYTICAL METHOD: Orsat

AMBIENT TEMPERATURE: 80°F

OPERATOR: B Nelson

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d.
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	5.4	5.4	5.3	5.3	5.4	5.4	5.37	44/100	2.36
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	18.6	13.2	18.6	13.3	18.6	13.2	13.23	32/100	4.234
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							81.40	28/100	22.792
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL	29.38

Southern Environmental Sciences, Inc.

GAS ANALYSIS DATA FORM

PLANT Chas, E. Davis

DATE 5/5/93 TEST NO 2

SAMPLING TIME (24-hr CLOCK) 1338-1441

SAMPLING LOCATION Human crematory stack

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Integrated bag

ANALYTICAL METHOD Orsat

AMBIENT TEMPERATURE 85 °F

OPERATOR B. Nelson

COMMENTS:

GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d,
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	4.2	4.2	4.3	4.3	4.3	4.3	4.27	44/100	1.88
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	18.2	14.0	18.3	14.0	18.3	14.0	14.00	32/100	4.48
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							81.73	28/100	22.88
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL	29.24

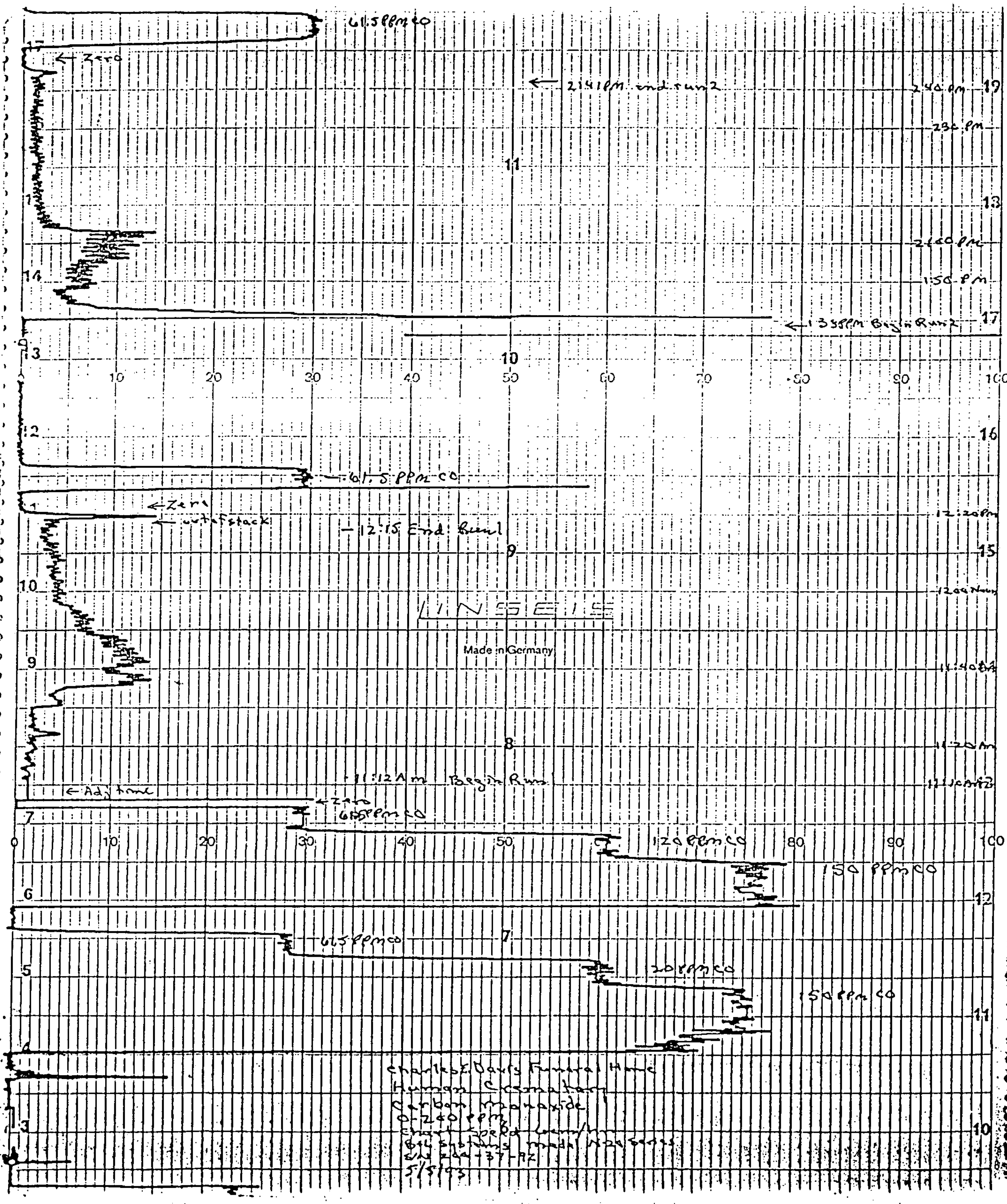
Southern Environmental Sciences, Inc.

GAS ANALYSIS DATA FORM

PLANT Chas. E. Davis Funeral Home COMMENTS:
DATE 5/5/93 TEST NO 3
SAMPLING TIME (24-hr CLOCK)
SAMPLING LOCATION Human Crematory Stack
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Integrated bag
ANALYTICAL METHOD Orsat
AMBIENT TEMPERATURE 80°F
OPERATOR B. Nelson

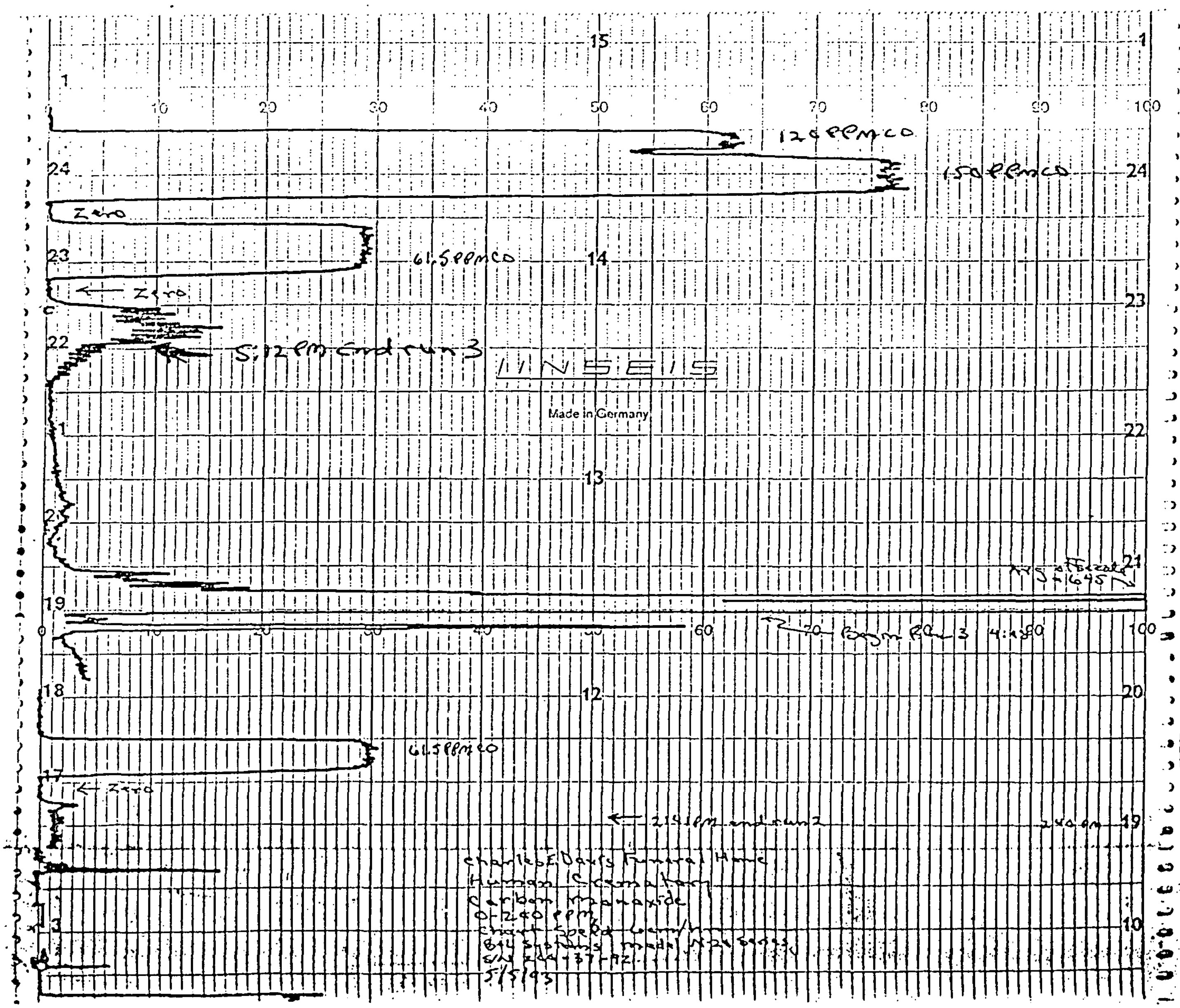
GAS \ RUN	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO_2	4.0	4.0	4.0	4.0	4.0	4.0	4.00	44/100	1.76
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	18.7	14.7	18.7	14.7 ~~18.7~~	18.6	14.6	14.67 ~~18.6~~	32/100	4.694
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							81.33	28/100	22.772
N_2 (NET IS 100 MINUS ACTUAL CO READING)								28/100	
								TOTAL	29.23

CHAS. E. DAVIS FUNERAL HOME, INC.
Human Crematory
Carbon Monoxide Data



Best Available Copy

CHAS E. DAVIS FUNERAL HOME, INC.
Human Crematory
Carbon Monoxide Data



COMPANY: CHARLES E. DAVIS, INC.
SOURCE: HUMAN CREMATORY
CO EMISSION TEST CALCULATIONS
TEST DATE:5/5/93
Data analyzed by: Ken Robert

RUN NO.	AVG. CO PPM	AVG. O2 PERCENT	AVG. CO2 PERCENT	AVG. CO @ 7% O2	STACK GAS MOL. WT.
1	10.0	13.2	5.4	18.0	29.38
2	9.5	14.0	4.3	19.1	29.24
3	40.9	14.7	4.0	90.4	29.23
AVERAGES	20.1	14.0	4.5	42.5	29.28

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

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

Southern Environmental Sciences, Inc.

FIELD DATA SHEET

Company: Chas E. Davis
Source: Crematory
Operator(s): C.Wilson + D. McConnel

Run Number: ONE
Date: 5/5/93
24 hr Time at Start: 1112
24 hr Time at End: 1215
Filter No(s).: 2487
Impinger Set No.: —
Barometric Press. ("Hg): 30.12
Ambient Temperature (°F): 78°F

Duct Dimensions: ☑ Dia. ☐ L x W — 18"
Stack Static Press. ("H_2O): -.03
Meter Box No.: 004
Meter ΔH@: 1.883
Meter Correction Factor: 1.021
Pitot Cp: .84
Nozzle ID: 1-Piece Glass
Nozzle Dia. (inches): .620
Probe Length/Liner: 3Ft/WC-Glass

Assumptions:
% moisture: 10
stack temp.: 500
meter temp.: 90
Md/Ms: 1.04
K Factor: 77.24

Sample Train Leak Check:
Initial: 0.008 CFM @ 15 "Hg
Final: 0.004 CFM @ 8 "Hg
Init. Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time, θ (min)	Meter Vol., V_M (ft³/m³)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., T_S (°F)	Meter Temp., T_M (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)
1	0.0	850.459	.03	2.32	490	77	244	65	3.5
2	3	852.92	.04	3.09	524	77	254	58	4.5
3	6	855.72	.04	3.09	539	78	264	58	4.5
4	9	858.55	.04	3.09	528	79	268	62	5.0
5	12	861.33	.05	3.86	543	81	252	62	5.5
6	15	864.39	.03	2.32	528	82	249	63	4.0
7	18	866.83	.02	1.55	438	83	257	62	3.5
8	21	868.87	.02	1.55	358	84	261	62	3.5
9	24	870.81	.01	.77	372	84	266	62	2.5
10	27	872.25	.01	.77	403	84	263	62	2.5
11 1	30	873.68	.04	3.09	586	85	251	64	5.5
12 2	33	876.42	.03	2.32	625	85	250	60	5.0
13 3	36	878.87	.03	2.32	631	86	255	60	5.0
14 4	39	881.33	.04	3.09	609	87	267	60	6.0
15 5	42	884.17	.04	3.09	595	88	264	60	6.0
16 6	45	886.94	.03	2.32	577	89	268	61	5.5
17 7	48	889.43	.03	2.32	622	89	269	61	5.5
18 8	51	891.89	.02	1.55	525	90	265	62	4.5
19 9	54	893.82	.01	.77	462	89	258	62	3.5
20 10	57	895.29	.01	.77	387	88	249	62	3.5
21	60	896.727	—	—	—	—	—	—	—
22									
23									
24									

Southern Environmental Sciences, Inc.

FIELD DATA SHEET

Company: CHAS E. DAVIS
Source: CREMATORY
Operator(s): C. WILSON + D. McCONNEL

Run Number: TWO
Date: 5/5/93
24 hr Time at Start: 1338
24 hr Time at End: 1441
Filter No(s).: 2488
Impinger Set No.: —
Barometric Press. ("Hg): 30.09
Ambient Temperature (°F): 85°F

Duct Dimensions: ☑ DIA. ☐ LxW 18"
Stack Static Press. ("H_2O): -.03
Meter Box No.: 004
Meter ΔH@: 1.883
Meter Correction Factor: 1.021
Pitot Cp: .84
Nozzle ID: 1-Piece GLASS
Nozzle Dia. (inches): .620
Probe Length/Liner: 3Ft/WC-GLASS

Assumptions:
% moisture: 10
stack temp.: 500
meter temp.: 90
md/ms: 1.04
K Factor: 77.24

Sample Train Leak Check:
Initial 0.008 CFM @ 15 "Hg
Final 0.002 CFM @ 7 "Hg
Init. Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

K = 66.80 @ 650°F - Ts

Point No.	Sample Time, θ (min)	Meter Vol., V_M (ft³/m³)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., T_S (°F)	Meter Temp., T_M (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)
1	0.0	898.672	.03	2.32	544	84	253	66	4.0
2	3	901.15	.03	2.32	578	84	264	58	4.0
3	6	903.63	.04	3.09	597	85	269	58	5.0
4	9	906.41	.04	3.09	569	86	258	60	5.0
5	12	909.19	.03	2.32	559	87	250	62	4.5
6	15	911.68	.03	2.32	545	88	249	62	4.5
7	18	914.14	.02	1.55	524	89	255	62	3.5
8	21	916.17	.02	1.55	468	90	258	62	3.5
9	24	918.16	.01	.77	432	90	260	62	2.5
10	27	919.62	.01	.77	363	90	258	62	2.5
11 1	30	921.07	.03	2.32	598	90	255	64	4.5
12 2	33	923.57	.03	2.32	639	91	255	58	4.5
13 3	36	926.09	.04	3.09	652	92	258	60	5.5
14 4	39	929.05	.03	2.00	667	93	261	62	4.5
15 5	42	931.31	.03	2.00	599	93	259	62	4.5
16 6	45	933.61	.03	2.00	628	93	259	62	4.5
17 7	48	935.92	.03	2.00	569	94	260	62	4.5
18 8	51	938.21	.02	1.55	462	94	258	62	3.5
19 9	54	940.09	.01	.77	422	94	257	63	2.5
20 10	57	941.71	.01	.77	367	95	262	64	2.5
21	60	943.123	—	—	—	—	—	—	—
22									
23									
24									

Southern Environmental Sciences, Inc.

FIELD DATA SHEET

Company: ChAS E. DAVIS
Source: CREMATORY
Operator(s): C WilSON & D. McCONNEL

Duct Dimensions: ☑ DIA. ☐ LxW 18"
Stack Static Press. ("H_2O): -.04
Meter Box No.: 004
Meter ΔH@: 1.883
Meter Correction Factor: 1.021
Pitot Cp: .84
Nozzle ID: 1-Peice/Glass
Nozzle Dia. (inches): .620
Probe Length/Liner: 3Ft/WC-Glass

Run Number: THREE
Date: 5/5/93
24 hr Time at Start: 1608
24 hr Time at End: 1712
Filter No(s).: 2489
Impinger Set No.: —
Barometric Press. ("Hg): 30.06
Ambient Temperature (°F): 73°F

Assumptions:
% moisture: 10
stack temp.: 500
meter temp.: 90
md/ms: 1.04
K Factor: 77.24

Sample Train Leak Check:
Initial 0.006 CFM @ 15 "Hg
Final 0.000 CFM @ 6 "Hg
Init. Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

K=66.80 @ 650°F - Ts

Point No.	Sample Time, θ (min)	Meter Vol., V_M (ft^3/m^3)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., T_S (°F)	Meter Temp., T_M (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)
1	0.0	945.116	.03	2.32	529	82	248	60	3.5
2	3	947.63	.04	3.09	546	81	241	55	4.5
3	6	950.48	.04	3.09	551	82	247	56	4.5
4	9	953.35	.04	3.09	627	82	267	60	5.0
5	12	956.15	.04	3.09	605	83	264	62	5.0
6	15	958.95	.03	2.32	565	83	267	64	4.0
7	18	961.42	.03	2.32	465	83	262	63	4.0
8	21	964.01	.02	1.55	422	84	255	62	3.5
9	24	965.89	.01	.77	386	84	254	62	2.5
10	27	967.34	.01	.77	254	83	255	62	2.5
11 1	30	968.89	.04	3.09	644	83	253	62	4.5
12 2	33	971.62	.04	2.67	701	83	252	58	4.5
13 3	36	974.23	.04	2.67	707	84	258	60	4.5
14 4	39	976.87	.04	2.67	718	85	260	59	4.5
15 5	42	979.55	.04	2.67	712	86	262	62	4.5
16 6	45	982.17	.03	2.00	687	87	265	62	4.0
17 7	48	984.46	.03	2.00	616	87	264	62	4.0
18 8	51	986.74	.02	1.55	542	87	263	62	3.5
19 9	54	988.74	.01	.77	422	87	259	62	2.5
20 10	57	990.21	.01	.77	346	87	252	62	2.5
21	60	991.667							
22									
23									
24									

Calibration Analysis
CHARLES E. DAVIS, INC.
Thermo-Environmental Model 48H CO Analyzer

TEST DATE: 5/5/93
Analysis performed by: Ken Rabert

cal. gas conc. (x)	analyzer response (y)	expected response (y')	percent diff. {(y-y')/y'}x100
0	0	-1	0.00
61.5	59.5	61	-3.10
120	121	121	0.12
150	152	151	0.44

Regression Output:

Constant		-1.09342
Std Err of Y Est		1.624648
R Squared		0.999613
No. of Observations		4
Degrees of Freedom		2
Degrees of Freedom		1
X Coefficient(s)	1.016210	
Std Err of Coef.	0.014135	
Std Err of Coef.	0	

Southern Environmental Sciences, Inc.

NOZZLE CALIBRATION

Date: 5/5/93 by: B Nelson

Nozzle ID	Run no.	D_1 (in.)	D_2 (in.)	D_3 (in.)	ΔD (in.)	D_a (in.)
Glass	All	.618	.622	.620	.004	.620

where:

D_1, D_2, D_3 = nozzle diameter measured on a different diameter (in.). Tolerance = 0.001 in.

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

D_a = average of D_1, D_2, and D_3

SAMPLE POINT LOCATIONS

Company: Chas. E. Davis
Source: CREMATORY
Date: 5/5/93
Duct Dia.: 18"

Point no.	Distance from Duct wall (in.)	
1	.50	8.5"
2	1.48	9.5
3	2.63	10.63
4	4.07	12.07
5	5.76	13.76
6	11.84	19.84
7	13.93	21.93
8	15.37	23.37
9	16.52	24.52
10	17.50	25.5

SOUTHERN ENVIRONMENTAL SCIENCES, INC.
DRY GAS METER CALIBRATION FORM

Meter Box Number: 004 STD TEST METER #:656687
Date:12/17/92
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	5.050	5.010	71.0	71.0	13.00	1.007	1.851
1.00	5.081	5.004	71.5	72.3	9.33	1.014	1.883
1.50	10.201	10.003	72.5	74.3	15.32	1.020	1.889
2.00	10.230	10.010	72.8	76.3	13.30	1.024	1.883
3.00	10.302	10.005	73.8	77.0	10.95	1.028	1.892
4.00	10.357	10.015	74.3	78.0	9.55	1.031	1.899
					AVG	1.021	1.883
						MAX DIFF	0.048

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

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

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 FORM

Meter Box Number:004 Dry Gas Meter #:656687
Date:5/12/93 Pretest Y: 1.021
Barometric Pressure, Pb: 29.96

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	Gas volume: 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	10.042	10.001	74.25			71.50	15.03	1.00	0.995
1.50	10.014	10.009	76.00			75.00	15.03	1.00	0.995
1.50	10.003	10.019	78.00			79.00	15.02	1.00	0.997

Y = 0.996
Diff = 0.025

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

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
72.0	73.0	74.0	70.0	70.0
diff.	1.0	2.0	-2.0	-2.0

Quality Control Limits: +/- 5 deg F

Southern Environmental Sciences, Inc.

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube ID number WC-3
Inspection Date 7/3/92
Inspected by C Wilson

Pitot tube assembly level? ✓ yes ____ no

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

$\alpha 1$ = 0.0 ° (<10°), $\alpha 2$ = 0 ° (<10°), $\beta 1$ = 0.0 ° (<5°),

$\beta 2$ = 0.0 ° (<5°)

γ = 0.0 °, θ = 0.5 °, A = 0.74 cm (in.)

$z = A \sin\gamma$ = 0 cm (in.); 0.32 cm (<1/8 in.),

$w = A \sin\theta$ = .006 cm (in.); <.08 cm (<1/32 in.)

P_A 0.370 cm (in.) P_b 0.370 cm (in.)

D_t = 0.243 cm (in.)

Comments: ____

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.

EMISSIONS TEST CALCULATIONS

Plant: CHAS. E. DAVIS FUNERAL HOME, INC.   Test Date: 5/5/93
Unit: Human Crematory   Data Input By: [signature]
Run No: 2

===

```
Pbar = (Pbar at barom.) - (Elev. diff. barom. to manom., ft.)*(.1/100)
     =      30.09     -          0      *    (0.1/100)
     =      30.09

Pm = Pbar + Delta H          =      30.09    +    1.946
            --------                              -------
              13.6                                 13.6

   =      30.23

Vm(std) = (Vm)*(Y)*(Tstd,~R)*(Pm)
                   ------------
                   (Tm,~R)*(Pstd)
        =  44.451   *     1.021    *        528    *    30.23
                                      -----------------------
                                          550.1    *    29.92
        =  44.017

Vw(std) = Vlc*(.04715)   =    90.7    *    0.04715    =    4.277

Bws =      Vw(std)                          4.277
           -----------------    = -----------------------    =    0.089
           Vw(std) + Vm(std)        4.277     +    44.017

Bws @ saturation =    0.99
1 - Bws =    0.911                    USE LOWER BWS

Md = 0.44(%CO2) + .32(%O2) + .28(%N2+%CO)
   =       .44 *       4.27     +    .32  *       14    +    0.28  *    78
   =      assume      29.24

Ms = Md(1-Bws) + 18(Bws)   =         29.24     *     0.911    +    18        *     0.089
   =        28.24

Ps = Pbar + (Pg, in. H2O)  =         30.09     +     -0.03    =    30.09
            -------------                            -------
                13.6                                   13.6

Vs = 85.49*(Cp)*(avg sqrt delta P)*sqrt((Ts,~R)/(Ps)(Ms))
   =        85.49    *       0.84    *      0.158  *sqrt  999.1    /    30.09    *    28.24
   =        12.29

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

   =      0.002096
```

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TEST CALCULATIONS

Plant: CHAS. E. DAVIS FUNERAL HOME, INC. Test Date: 5/5/93
Unit: Human Crematory Data Input By: [signature]
Run No: 2

==========

%I =(.09450)(Ts,~R)(Vm(std)
------ ------------------
(Ps)(Vs)(An)(Sample Time)(1-Bws)

= 0.0945 * 999.1 * 44.017

30.09 * 12.29 * 0.002096 * 60 * 0.911

= 98.0

As = (Stack Diam., ft.)^2 * 3.14159 / 4 = (1.5)^2 * 3.14159 / 4

= 1.77

As.eff = As(total No. pts.-No. neg. pts.) / (Total No. pts.) = 1.7671 * (20) - (0) / (20)

= 1.77

Q = 60(As,eff)(Vs) 60 * 1.77 * 12.29

= 1302.9

Qstd = (Q)(Tstd)(Ps)(1-Bws) / (Ts,~R)(Pstd) = 1302.89 * 528 * 30.087 * 0.9114 / 999.1 * 29.92

= 631.1

Cs = (.01543)(mn, mg) / Vm(std) = 0.01543 * 18.2000 / 44.0170 = 0.006

PMR = (Cs)(Qstd)(60) / 7000 = 0.006 * 631.0954 * 60 / 7000 = 0.0345

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
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

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

NOMENCLATURE USED IN STACK SAMPLING CALCULATIONS (Continued)

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

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

June 24, 1993

RECEIVED JUN 1993 D.P. Central District

Mr. Alan Zahn
FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION
Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Re: Construction Permit Application
Roberts Funeral Home of Dunnellon, Inc.

Dear Mr. Zahn:

Enclosed are 4 original construction permit applications and a check for $250.00 to process the application for a human crematory at Roberts Funeral Home of Dunnellon, Inc.

Please feel free to call if I can assist with any questions you may have.

Sincerely,

SOUTHERN ENVIRONMENTAL
SCIENCES, INC.

Kim G Thompson

Kim G. Thompson, P.E.
Environmental Engineer

KGT/bm

Enclosures

cc: Kenneth E. Roberts
Steve Looker

Florida Department of
Environmental Protection

Lawton Chiles
Governor

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Virginia B. Wetherell
Secretary

July 16, 1993

Roberts Funeral Home of Dunnellon, Inc.
P. O. Box 2073
Dunnellon, Fl 34430

Dear Gentlemen:

Enclosed please find your check No. 12910 in the amount of $250.00. This check is being returned to you for the following reason(s):

Please resubmit to our Tampa office:

DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHWEST DISTRICT
3804 COCONUT PALM DR
TAMPA, FL 33619-8218

Your cooperation in this matter is appreciated.

Sincerely,

Kris Tulloch

KT/

Enclosure
Check No. 12910