

0102Permit1989 - Box No. —

⑩ 1989 01-02

Alamance County

01021989



State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

November 28, 1989

Mr. Larry Parker, President
Thermal Reduction Systems, Inc.
P.O. Box 2070
Chapel Hill, NC 27515

RE: Amendment to Permit No. 01-02-I, Thermal Reduction Systems,
Inc., Alamance County

Dear Mr. Parker:

Enclosed is an Amended Solid Waste Permit and Conditions of the
Permit for the referenced facility.

The amendment approves the replacement of the two existing 600
pound per hour units with two 1911 pounds per hour units. In
addition, the conditions of the permit have been revised to reflect
current requirements and regulations.

If there are any questions, please contact me at (919) 733-0692.

Sincerely,

A handwritten signature in cursive script that reads "James C. Coffey".

James C. Coffey, Supervisor
Technical Operations Branch
Solid Waste Section

JCC/mj

cc: Julian Foscue
Terry Waddell

AMENDMENT TO PERMIT NO. 01-02-I
DATE ISSUED 11/28/89

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
SOLID WASTE MANAGEMENT DIVISION

P.O. BOX 27687

RALEIGH, NC 27611

S O L I D W A S T E P E R M I T

Thermal Reduction Systems, Inc.

is hereby issued a permit to operate

Two Natural Gas-Fired, 1911 Pounds Per Hour Maximum Permitted
Charging Capacity Each, Multiple Chamber Infectious
Waste Incinerators

located

Porter Avenue, Graham, Alamance County

in accordance with Article 9, Chapter 130A, of the General Statutes
of North Carolina and all rules promulgated thereunder and subject to
the conditions set forth in this permit.



William L. Meyer, Director

Amendment to Permit No. 01-02-I
Date Issued 11/28/89

S O L I D W A S T E P E R M I T

CONDITIONS OF PERMIT

GENERAL

1. This facility is permitted to receive solid waste as defined in 10 NCAC 10G .0101(15), except hazardous waste and other wastes that were not identified in the permit application are prohibited.
2. This facility shall be designed and operated in a manner so as to prevent the creation of a nuisance or potential health hazard.
3. This facility shall be situated, equipped, operated and maintained as to minimize interference with other activities in the area.
4. An Air Quality Permit shall be maintained and all operations conducted in strict adherence to the conditions of the permit.
5. Any water which comes in contact with solid waste will be contained on-site or disposed of in accordance with all pertinent rules and regulations.
6. This permit shall be reviewed when proposed revisions to the medical waste rules are adopted. Modifications, where necessary, shall be required in accordance with Rules in effect at the time of review.

OPERATIONS

1. Effective vector control measures shall be applied to control flies, rodents, insects or vermin.
2. Equipment shall be provided in the storage and charging areas and elsewhere as needed or as may be required in order to maintain the facility in a sanitary condition and to protect the public health and environment.

Conditions of Permit

Page 2

3. This facility shall have adequate storage facilities for infectious waste. Prior to incineration, non-refrigerated waste shall be stored in one secure, locked, leakproof, trailer within the security fence at the facility for up to 96 hours. Refrigerated waste stored in the same manner shall be stored for up to 240 hours at a temperature of 45 degrees Fahrenheit or less. Storage within the incinerator building shall not exceed 96 hours prior to incineration.
4. All operating personnel shall be trained for their specific functions in proper procedures for facility operation, maintenance, trouble-shooting, and repair. A list of all positions, personnel, their qualifications and training shall be provided and maintained at the facility.
5. The entire site shall be adequately secured by means of gates and fences to prevent unauthorized entry.
6. An emergency response plan shall be developed and incorporated into the employee operating manual and each operator or plant employee will familiarize himself with the plan. A copy of the plan shall be maintained at the facility and provided to all organizations which would respond to any emergency at the facility.
7. A maintenance and preventative maintenance program for plant equipment and instrumentation to assure reliable operations shall be implemented and maintained at the facility. Instruments shall be maintained and calibrated as per factory recommendations by certified personnel.

COMBUSTION ASH MANAGEMENT

1. This facility shall maintain a comprehensive combustion ash management plan. All pertinent personnel shall be trained in the procedures contained in the plan. The plan must meet the following conditions:
 - a. Appropriate and reasonable measures shall be taken to eliminate fugitive dust emissions within the facility and the storage combustion ash area. All pertinent personnel shall be equipped to provide them with appropriate protection from fugitive dust emissions and trained in the proper use of such protective devices.
 - b. At all times, all combustion ash shall be properly quenched or wetted to prevent dust emissions. Over-wetting must be avoided.

- c. All containers or vehicles used for the transportation of ash shall be leak resistant and closed or covered to prevent dust emissions during transportation.
 - d. Ash moisture content shall be such that after unloading at the approved landfill, the ash remains sufficiently wetted until covered with soil or suitable dust suppressant. Ash shall be covered immediately following the last load of each day.
2. This facility shall maintain an ash sampling and analysis plan and shall meet the following conditions:
- a. Procedures and methods necessary to obtain ash samples, which are representative of both the variability of ash over time and the horizontal and vertical extent of the ash in the storage area, shall be developed and implemented.
 - b. Upon initial start-up, after any significant change in facility design or operation, or after a change in waste source, combustion ash samples shall be sampled weekly. Weekly representative samples shall be composited into a monthly sample and analyzed at the end of each month for three consecutive months.
 - c. For the remainder of the first year of operation, representative monthly samples shall be composited into a quarterly sample and analyzed at the end of each quarter.
 - d. After the first year, representative samples shall be analyzed at least twice a year.
 - e. The combustion ash shall be analyzed for the following:
 1. E.P. Toxicity, as specified in USEPA manual SW-846 for regulated metals.
 2. Total concentrations for arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc.
 3. Semi-volatile organics by EPA approved methods.
 - f. The ash sampling and analysis plan will be subject to review annually and revised in accordance with State and EPA guidelines and regulations in effect at that time.



COPY 2

State of North Carolina
Department of Natural Resources and Community Development
Division of Environmental Management
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
William W. Cobey, Jr., Secretary

R. Paul Wilms
Director

September 12, 1989

Mr. Larry Parker, President
Thermal Reduction Systems, Inc.
Post Office Box 2070
Chapel Hill, North Carolina 27515

Dear Mr. Parker:

Subject: Air Permit No. 5896R2
Thermal Reduction Systems, Inc.
Graham, North Carolina
Alamance County

In accordance with your completed application received May 25, 1989, we are forwarding herewith Permit No. 5896R2 to Thermal Reduction Systems, Inc., Graham, North Carolina for the construction and operation of air emission sources or air cleaning devices and appurtenances.

If any parts, requirements, or limitations contained in this permit are unacceptable to you, you have the right to request an adjudicatory hearing within thirty (30) days following receipt of this permit, identifying the specific issues to be contended. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, Post Office Drawer 11666, Raleigh, North Carolina 27604. Unless such demand is made, this permit shall be final and binding.

This permit shall be effective from September 12, 1989, until July 1, 1993, is nontransferable to future owners and operators, and shall be subject to the conditions and limitations as specified therein.

Sincerely,

A handwritten signature in cursive script that reads "R. Paul Wilms".

R. Paul Wilms

Enclosures

cc: Mr. Larry Coble

COPY

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT, HEALTH, & NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT

A I R P E R M I T N O. 5896R2

Issue Date: September 12, 1989 Effective Date: September 12, 1989
Expiration Date: July 1, 1993 Replaces Permit: 5896R

To construct and operate air emission sources or air cleaning devices, and for the discharge of the associated air contaminants into the atmosphere. In accordance with the provisions of Article 21B of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules and Regulations,

PERMISSION IS HEREBY GRANTED TO

Thermal Reduction Systems, Inc.
Porter Avenue
Graham, Alamance County, North Carolina

FOR THE

construction and operation of air emission sources or air cleaning devices and appurtenances consisting of:

two impingement plate type wet scrubbers (110 gallons per minute of NaOH solution, ID A & B) with mist eliminators installed one each on two natural gas-fired, 1,911 pounds per hour maximum permitted charging capacity each, type 0 and 4 waste, multiple chamber incinerators each with a 2.3 million BTU per hour maximum heat input primary burner and a 5.3 million BTU per hour maximum heat input secondary burner,

to be constructed and operated in accordance with the completed application received May 25, 1989, and in conformity with the plans, specifications, and other supporting data, all of which are filed with the Department of Environment, Health, & Natural Resources and are incorporated as part of this Permit.

This Permit shall be subject to the following specified conditions and limitations including any testing, reporting, or monitoring requirements:

A. SPECIFIC CONDITIONS AND LIMITATIONS

1. The Permittee shall comply with applicable Environmental Management Commission Regulations, including 15 NCAC 2D .0505, .0516, .0521, .0522, and .0535.
2. Visible emissions from the incinerators shall not be more than 20 percent opacity when averaged over a six-minute period, except that six-minute periods averaging not more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period.

COPY

3. This Permit may be revoked unless the incinerators are constructed in accordance with the approved plans, specifications and other supporting data. If the proposed operational date of January 31, 1990 is not met, then the Permittee must notify in writing the Regional Supervisor of the new operational date. Existing equipment being replaced is permitted to operate in compliance until the replacement equipment is operational.
4. Under the provisions of North Carolina General Statutes 143-215.108 the incinerators, while charging at least 90 percent of the maximum charging capacity, shall be tested for visible and particulate emissions using EPA Method(s) 9 and 1, 2, 3, and 5 and the results submitted in accordance with the approved procedures of the Environmental Management Commission within 90 days after the initial operation date. This Permit may be revoked, with proper notice to the Permittee, if the results of the test(s) indicate that the facility does not meet applicable limitations. The Method 1 requirements of 40 CFR 60, Appendix A, "Sample and Velocity Traverses for Stationary Sources", should be considered during any construction and be met for emissions testing purposes. All associated testing costs are the responsibility of the Permittee.
5. To afford the Division of Environmental Management Regional Office the opportunity to have an observer present, the Permittee shall provide the Regional Office in writing at least 15 days notice of any required performance test(s).
6. As required by 15 NCAC 2D .0535, when particulate, visible, or odorous emissions exceed Environmental Management Regulations for more than four hours the Regional Supervisor, Division of Environmental Management, Winston-Salem Region, (919)761-2351, shall be notified as promptly as possible but in no case later than 24 hours of becoming aware of the occurrence. Such notice shall specify the facility name and location, the nature and cause of the excess emissions, the time when first observed, the expected duration, and the estimated rate of emissions. This reporting requirement does not allow the operation of the facility in excess of Environmental Management Commission Regulations.
7. The Permittee shall provide written notice within 15 days of start-up of the new facilities to the Regional Supervisor, Division of Environmental Management.

COPY

8. Operation of the incinerators shall be in accordance with the following conditions and stipulations:
 - a. The Permittee shall not exceed a maximum charge weight of 1,911 pounds per hour to each incinerator. Records indicating the hourly (beginning on the hour) weight charged to the incinerators shall be maintained and available for inspection by the Division of Environmental Management.
 - b. The Permittee shall not charge any waste into the incinerator until the proper operating temperature of 1,800 degree F is attained in the secondary chamber.
 - c. Continuous temperature recorders shall be maintained for the primary and secondary chambers of each incinerator.
 - d. Pressure drop across the wet scrubbers shall be monitored and recorded hourly.
 - e. No waste shall be maintained on site greater than 12 hours unless refrigerated, and no waste shall be stored on site for longer than 10 days.
 - f. The incinerators stack height shall be a minimum of 65 feet above ground level.
9. This Permit does not replace, set aside, or otherwise relieve the Permittee of any obligation to the Environmental Protection Agency as set out in the Federal New Source Performance Standards (40 CFR 60).
10. The Permittee must comply with any applicable Federal, State, or local requirements governing the handling, disposal, or incineration of hazardous wastes, including the Resource Conservation and Recovery Act (RCRA).

B. GENERAL CONDITIONS AND LIMITATIONS

1. All reports, test data, monitoring data, notifications, and requests for renewal shall be submitted to the:

Regional Supervisor
North Carolina Division of Environmental Management
8025 North Point Boulevard, Suite 100
Winston-Salem, North Carolina 27106

COPY

2. Reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Regional Supervisor, Division of Environmental Management at such intervals and in such form and detail as may be required by the Division. Information required in such reports may include, but is not limited to process weight rates, firing rates, hours of operation, and preventive maintenance schedules.
3. Any changes in the information submitted in the application regarding facility emissions, or any changes that modify equipment or processes of existing permitted facilities, or any changes in the quantity or quality of materials processed that will result in previously unpermitted, new, or increased emissions must be reported to the Regional Supervisor, Division of Environmental Management. If appropriate, modifications to the permit may then be made by the Division of Environmental Management to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.
4. This Permit is subject to revocation or modification by this Division upon a determination that information contained in the application or presented in support thereof is incorrect, conditions under which this Permit was granted have changed, or violations of conditions contained in this Permit have occurred. The facility shall be properly operated and maintained at all times in such a manner to effect an overall reduction in air pollution.
5. Under the statutory authority of G.S. 143-215.3 (a)(2), no person shall refuse entry or access to any authorized representative of the Division of Environmental Management who requests entry for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representative while in the process of carrying out his official duties. Refusal of entry may constitute grounds for permit revocation and assessment of civil penalties.
6. This Permit is nontransferable by the Permittee. Future owners and operators must obtain a new air permit from the Division of Environmental Management.
7. This Permit does not relieve the Permittee of the responsibility of complying with all applicable requirements of any Federal, State, or Local water quality or land quality control authority.

COPY

Permit No. 5896R2
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8. The Permittee at least ninety (90) days prior to the expiration of this Permit shall request its extension by letter. The letter should include the permit number, the appropriate renewal fee, description of any modifications, and should be sent to the Regional Supervisor, Division of Environmental Management.
9. A violation of any term or condition of this Permit shall subject the Permittee to enforcement procedures contained in North Carolina General Statutes 143-215.114, including assessment of civil penalties.

Permit issued this the 12 day of September, 1989.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

R. Paul Wilms

R. Paul Wilms, Director
Division of Environmental Management
By Authority of the Environmental Management Commission

Air Permit No. 5896R2



North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

September 8, 1989

Mr. Larry Parker, President
Thermal Reduction Systems, Inc.
P.O. Box 2070
Chapel Hill, N.C. 27515

RE: Extension of Variance to Solid Waste Permit #01-02-I

Dear Mr. Parker:

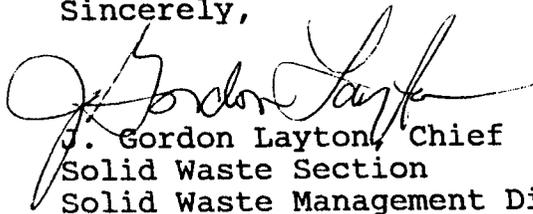
Regarding your request of August 1, 1989, we are extending the variance to conditions 4 and 5 of the Thermal Reduction System, Inc. Permit #01-02-I. The variance will allow Thermal Reduction Systems, Inc. to:

1. Store non-refrigerated medical waste in one secure, locked, leakproof trailer within the security fence at the facility for up to 96 hours prior to incineration.
2. Store refrigerated medical waste in one secure, locked, leakproof trailer within the security fence at the facility for up to 240 hours prior to incineration provided the temperature of the trailer is maintained at 45 degrees Fahrenheit or less.
3. Store medical waste within the incinerator building for up to 96 hours prior to incineration.

The variance is granted until September 1, 1990. The original permit conditions will be reinstated immediately if the variance results in violations of 10 NCAC 10G .0201(d). These conditions may also be revoked or modified based on rule changes.

If you have questions, please call me at (919) 733-0692.

Sincerely,


J. Gordon Layton, Chief
Solid Waste Section
Solid Waste Management Division

JGL/mj

cc: Terry Waddell
Julian Foscue

RECORD OF COMMUNICATION

PHONE CALL DISCUSSION FIELD TRIP CONFERENCE
 OTHER (SPECIFY)

(Record of item checked above)

TO: Julian Joscaie

FROM: Jerry Waddell

DATE: 8/25/89
TIME:

SUBJECT: Thermal Reduction Systems Inc.

SUMMARY OF COMMUNICATION

Julian,

I visited Thermal Reductions Inc. on 8/3, 8/21, 8/25 and saw no reason that the 96 hour holding variance on Condition # 5 of TRS solid waste Permit should not be extended.

According to J.W. Hill the longest time medical waste has ever been held is about 52 hours.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

I recommend the variance in question be extended.

INFORMATION COPIES

TO:

8-2-89

To: Gordon

From: JULIAN

RE: TRS VARIANCE EXTENSION

TEMMY WADDELL IS TO MAKE SEVERAL INSPS. DURING THE NEXT
TWO WKS + WRITE A REPORT CONCERNING ANY PROBLEMS
W/ THE VARIANCE - I'LL TAKE THESE COMMENTS +
RESPOND - FOR YOUR S/E - THANKS!! JLC

THERMAL
REDUCTION
SYSTEMS
INCORPORATED



Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179

August 1, 1989

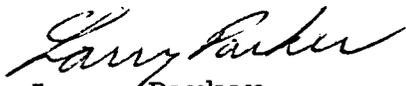
Mr. Gordon Layton, Head
Solid Waste Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602

Subject: Extension of Variance to Solid Waste Permit #01-02-I

Dear Mr. Layton:

Enclosed is a copy of the subject variance. It is requested that this variance be extended until September 1, 1990 under the same conditions.

Sincerely,


Larry Parker
President

Enclosure

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THERMAL
REDUCTION
SYSTEMS
INCORPORATED

Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179

May 26, 1989



Mr. J. Gordon Layton, Supervisor
Solid Waste Branch
Solid Waste Management Section
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602

Dear Mr. Layton:

We are requesting modification of the Solid Waste Permit #01-02-I for the Graham facility. Two natural gas fired incinerators rated at 600 pounds per hour are scheduled for replacement by Joy Energy System Units with Sly scrubbers and 2.02 second retention time in the secondary chamber.

A full copy of the air permit application is enclosed for information.

Sincerely,

Larry Parker
President

Enclosure

SOLID WASTE PERMIT MODIFICATION

General

1. Thermal Reduction Systems, Inc. solid waste incineration facility is located on Porter Avenue in Porter Industrial Park, Graham, N.C., Alamance County (lat. 36 08, long. 79 30).
2. This facility is currently regulated under N.C. Solid Waste Permit #01-02-I.
3. TRS is requesting a modification of the existing permit to enlarge this facility to accomodate two replacement incinerators with storage and management/administrative support services.
4. This facility will receive types 0 and 4 medical waste:

Type 0 Infectious Waste

Dry paper
Wet paper
Plastics
Cardboard
Glass
Cans
Food particles
Moisture
Contaminated waste

- Sharps, including needles, tubing with needles attached, scalpel blades, glassware, and syringes that have been removed from their original sterile containers.
- Biological waste, including blood and blood products, excretions, exudates, secretions, suctionings, and other body fluids which may not be directly discarded into a municipal sewer system.
- Isolation waste, including all waste from the care or treatment of patients isolated to prevent the spread of communicable diseases except reverse (protective) isolation.
- Cultures and stocks of microorganisms and associated biologicals, including specimen cultures, waste from production of biologicals and serums, and discarded live or attenuated vaccines.
- Laboratory waste which has come in contact with pathogenic organisms, including culture dishes, transfer devices, paper, and cloth.

- Surgical waste, including all materials discarded from surgical procedures, disposable gowns, soiled dressings, sponges, casts, lavage tubes, drainage sets, underpads, and surgical gloves.
- Chemotherapeutic waste.

Type 4 Pathological Waste

Moisture
 Plastics
 Wet paper
 Cardboard
 Glass

5. This facility is designed and will continue to be operated in a manner which will prevent the creation of a nuisance or potential health hazard (see TRS application for modification of air permit attached). The new incinerators with a 2 second residence time in the upper chambers and a wet scrubber on each unit will produce air emissions which are significantly below N.C. emission standards (15 NCAC 2D .0505, .0521(d), .0522, .0535).

6. A modification to our existing air quality permit (5896R) has been requested. TRS will maintain this permit and operate the incinerators in strict adherence to the conditions of this permit.

7. Water discharges will be handled in the following manner:

- All washdown and cleanup water will be piped to an underground storage tank (see building plan) and will subsequently be pumped into the primary chamber of one incinerator for combustion.
- The drainage water from the roll-on/roll-off dumpsters will be piped back as makeup to one of the incinerator ash hoe pits. This is a closed loop with no discharge.
- Scrubber blowdown water and NaCl (2 gal/min) will be cooled in a heat exchanger below 150 F before discharge to the City of Graham sewer system (approval attached).

Operations

1. Superior housekeeping has been a management policy since TRS opened this facility. All waste delivered to this facility will be transported, stored and burned in heavy-duty leakproof containers with polyliners. Spills, if they occur, will be disinfected and cleaned up immediately. All employees will be trained in good housekeeping procedures. These actions will effectively control flies, rodents, insects or vermin.

2. Floor drains are provided in all waste storage and charging areas. These drains discharge to a special holding tank. All liquids in this tank will be pumped to one of the incinerators and burned. No cleanup water or liquid spills will be discharged outside the facility. Adequate cleaning supplies, cleaning equipment, and disinfectants will be available at all times to maintain the facility in a sanitary condition.

3. As provided in our current permit (Variance to Solid Waste Permit #01-02-I, signed by Mr. J. Gordon Layton on January 17, 1989) no medical waste will be stored in the refrigerated storage area longer than 240 hours prior to incineration. Most delivered waste (95%) will be burned in 48 hours. Only one incinerator at a time will be taken out-of-service for scheduled maintenance. During these shutdowns, waste deliveries will be scheduled so as not to overload refrigerated storage of waste.

4. All operating personnel will be trained for their specific functions. Training will include facility operation, maintenance, trouble-shooting, repair and emergency response.

5. The entire site will be fenced. A dispatcher will control and record the entry and exit of all vehicles.

6. An emergency response plan will be developed and incorporated into an employee operating manual. Each employee will be required to familiarize himself with this plan. Emergency response drills will be held at least once every six months. A copy of the emergency response plan will be maintained at the facility and a copy will be provided to the City of Graham Fire Department and Police Department.

7. A maintenance and preventative maintenance program for plant equipment and instrumentation will be implemented at the facility. All electrical components of the equipment will be UL listed and all burner safety systems will meet FM insurance requirements. All electrical components and wiring will meet JIC and NEC requirements.

Each incinerator will be equipped with remote diagnostics to the engineering department of Joy Energy Systems. A dedicated telephone line, with computer modem, will allow the manufacturer to pinpoint CPU and I/O faults, and to identify incinerator malfunctions and recommend corrections to the operator.

Combustion Ash Management

1. This facility has a comprehensive combustion ash management plan. This plan includes:

- a. Appropriate and reasonable measures will be taken to eliminate fugitive dust emissions within the facility and the storage combustion ash area. Ash is discharged from each incinerator into an ash pit containing water (float valve to control water level). The automatic ash hoe moves wetted ash from the pit to a metal container. A forklift will be used to dump the wetted ash from the container into a 26 cubic yard roll-off/roll-on dumpster. This dumpster is rated for sludge service with a sealable dump gate and roll tarp cover. At maximum operating capacity, approximately 24 tons of combustion ash (7.5% of waste burned) will be generated each week.
- b. Approval has been obtained to dispose of combustion ash in the Alamance County Landfill (approval letter, dated 5/18/89 shown in Appendix 1). The ash delivered to the landfill will be sufficiently wet to eliminate dust emissions.

2. This facility has developed an ash sampling and analysis plan. This plan includes:

- a. Ash sampling will be accomplished by taking a daily sample for 14 consecutive days from each incinerator in operation. The samples from each incinerator will be composited into a sample for testing. Samples will be taken 60 days prior to the anniversary testing date to allow adequate time for testing and submission of results to the Solid Waste Branch, Solid Waste Management Section, Division of Health Services, Department of Human Resources, State of North Carolina (Solid Waste Branch).
- b. Core samples of ash will be taken from the roll-off dumpsters used for collection of ash in the facility. A tube not less than 10 feet in length and 3 inches in diameter will be used to obtain the samples. Variability of samples over time of day and position within the pile will be scheduled and recorded with each sample taken. Each sample will be crushed to pass a 3/8 inch screen. A 1000 gram aliquot will be made and sent to an Independent Testing Laboratory for analysis.
- c. Combustion ash will be analyzed for the following:
 1. E. P. Toxicity, as specified in USEPA manual SW-846 for regulated metals.
 2. Total concentrations for arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver and zinc.
 3. Semi-volatile organics by EPA approved methods.

All analyses will be performed by an Independent Testing Laboratory properly certified to perform the specified analyses.

- d. All test results from independent testing will be submitted by Thermal Reduction Systems, Inc. to the Solid Waste Branch.



THERMAL
REDUCTION
SYSTEMS
INCORPORATED

Post Office Box 2070.
Chapel Hill, North Carolina 27515
919/942-5179

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May 24, 1989



Mr. Mike Sewell, Supervisor
Air Permit Unit
Department of Natural Resources and Community Development
Division of Environmental Management
512 North Salisbury Street
Raleigh, NC 27611

Re: Modification of Air Permit No. 5896R

Dear Mr. Sewell:

We are enclosing an air permit application and processing fee of \$100.00 for the replacement of two natural gas fired, 600 pounds per hour, multiple chamber incinerators in our facility on Porter Avenue, Graham, North Carolina, Alamance County.

The new replacement incinerators are multiple chamber Joy Energy System Units with Sly scrubbers and 2.02 second retention time in the secondary chamber.

Sincerely,


Larry Parker
President

cc: N.C. Solid and Hazardous Waste Management Section

MODIFICATION OF AIR PERMIT NO. 5896R

Contents

Air Permit Application (Form AQ-22)

City of Graham Building Permit

Property Boundary Map: Philip Post and Associates

Building Plan: Holt Construction Company

Permission to Discharge Scrubber Blowdown to Sewer System:
City of Graham

Incinerator Proposal/Specifications: Southern Corporation

Scrubber Proposal/Specifications: W. W. Sly Manufacturing
Company

Operational Procedures

Zoning

Operational Procedures/Shutdown in a Worst Case Malfunction

Appendices

AIR PERMIT APPLICATION*

GENERAL INFORMATION

INSTRUCTIONS ON BACK

*To construct and operate Air Emission Sources and Control Devices in accordance with N. C. General Statutes Chapter 143, Article 21.

PLEASE TYPE OR PRINT. ATTACH APPROPRIATE EMISSION SOURCE AND CONTROL DEVICE FORMS FOR EACH SOURCE LISTED IN ITEM 6 BELOW.

1. Facility Name (Company, Establishment, Town, Etc.): Thermal Reduction Systems, Inc.				Date	FOR DEM USE ONLY DATE RECEIVED: _____ PERMIT NUMBER: _____ DATE ISSUED: _____
2. Site Location (St./Rd./Hwy.): Porter Avenue		City Graham	Zip Code 27253	County Alamance	
Latitude 36°08'	Longitude 79°30'	SIC Code 4953			
3. Mailing Address (P. O. Box/St./Rd./Hwy.): P. O. Box 2070					
City Chapel Hill	State NC	Zip Code 27515	Phone with Area Code 919-942-5179		
4. Applicant Technical Contact: Larry Parker		Title President	Phone with Area Code 919-942-5179		
5. Description of operation conducted at above facility: Solid Waste Incineration					

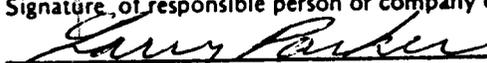
6. List each EMISSION SOURCE and CONTROL DEVICE for which application is made. Assign an ID NUMBER to each emission source and control device which uniquely identifies that source. Attach appropriate emission source and control device forms for each.

EMISSION SOURCE	ID NO.	CONTROL DEVICE	ID NO.
Incinerator	A	Impingement plate scrubber	A
Incinerator	B	Impingement plate scrubber	B
Two (2) Joy incinerators with Sly scrubbers will be installed to replace two existing incinerators currently permitted under Air Permit No. 5896R. All entries in the application form are values for each incinerator with its associated scrubber.			

USE SEPARATE SHEET(S) IF NEEDED

7. Maximum facility operation: 24 Hours/Day 7 Days/Week 50 Weeks/Year

8. Name and address of engineering firm that prepared application or plans:
Joy Energy Systems, Inc. 11900 Westhall Drive Charlotte, NC 28217

9. Signature of responsible person or company official:

 Signer's Name (TYPE OR PRINT) Title Date May 24, 1989
 Larry Parker President Phone with Area Code
 919-942-5179

AIR POLLUTION CONTROL DEVICE

PLEASE TYPE OR PRINT. ATTACH TO GENERAL INFORMATION FORM "A". SUPPLY DESIGN DATA, SPECIFICATIONS, AND AVAILABLE ENGINEERING DRAWINGS.

1. Air Control Device and ID No. (FROM GENERAL INFORMATION FORM "A", ITEM 6)

Sly IMPINJET Gas Scrubber, A, B

2. If there are several devices in series, list each unit in series starting at the emission source.

(1) Scrubber (2) _____ (3) _____ TOTAL UNITS 1

3. Indicate Emission Source and ID No. that Control Device(s) is installed on:

Joy Incinerator, Model 2500 TES

4. Narrative Description of Control Device(s):

Flue gases pass up through the openings in perforated plates. HCl gases and particulates are removed with NaOH solution. Gases exit through a fixed blade mist eliminator.

Manufacturer	Model Name	Model Number
The W. W. Sly Manufacturing Company,	Sly IMPINJET gas scrubber	260

5. Estimated Cost of Control Device

\$ 100,000

Period of Time Control Device is Estimated to be Adequate:

over 10 Years

6. Permit Application is made for (CHECK ONE ONLY):

New Source Existing Source Modification — Last Permit No. _____

Commence Construction Date July 15, 1989 Operation Date December 1, 1989

7. Emission Parameters:

Pollutant(s) Controlled	PART. ()	SO ₂ ()	NO _x ()	CO ()	VOC ()	LEAD ()	OTHER HCl	OTHER
Emission Rate Before Control (lb/hr) =	<u>10.59</u>	_____	_____	_____	_____	_____	<u>30</u>	_____
Emission Rate After Control (lb/hr) =	<u>1.05</u>	_____	_____	_____	_____	_____	<u>0.6</u>	_____
Removal Efficiency Percent (%) =	<u>90</u>	_____	_____	_____	_____	_____	<u>98</u>	_____

Particle Size Distribution of Particulates Entering Control Device (% Micron):

15 0-1 85 1-10 _____ 10-25 _____ 25-50 _____ 50-100 _____ Over 100

8. Gas Conditions at Control Device:

	INLET	INTERMEDIATE LOCATIONS	OUTLET
Flow Rate (ACFM) =	<u>28,837</u> @ <u>14.66</u> psia	_____	<u>12,931</u>
Temperature (Deg. F) =	<u>1,800</u>	_____	<u>171</u>
Velocity (ft./sec.) =	<u>70</u>	_____	<u>58.5</u>
Pressure Drop (in. H ₂ O) =	<u>-1.0</u>	_____	<u>-6.4</u>
Moisture (%) =	<u>6.3</u>	_____	<u>41.7</u>

9. Describe Ultimate Disposal of Collected Materials:

Liquid discharge (2 gallons/hour) will be cooled below 150°F and piped to a holding tank before discharge to sanitary sewer.

10. Stack or Emission Point Data:

Height Above Ground (ft.)	Inside Area (sq. ft.)	Direction of Exit (up, down, or horizontal)	Are there obstructions over the stack? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, (specify)
<u>45</u>	<u>6.28</u>	<u>Up</u>	

Is scaffolding available for sources testing?

No Yes

Are sampling ports available?

No Yes

11. Comments:

SUPPLEMENTAL DATA FOR AIR CONTROL DEVICES

***** "CYCLONE" (MECHANICAL SEPARATORS) *****

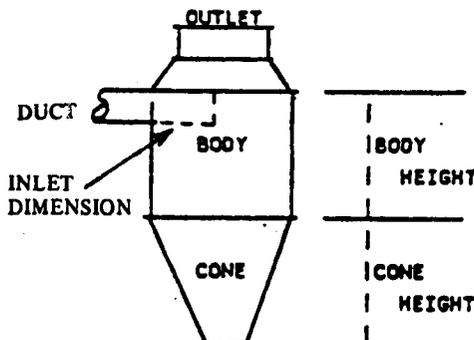
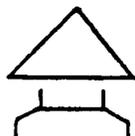
Efficiency (%)	Volumetric Flow Rate (ACFM)	Pressure Drop (in. H ₂ O)	Baffles or Louvers (specify)	Position in Series # _____ of _____ Units	
Cyclone Dimensions (inches) Inlet Outlet		Cyclone Body Diameter (inches)	Cyclone Body Height (ft.)	Cyclone Cone Height (ft.)	
Wet Spray () No () Yes	No. of Nozzles	Liquid Used (specify)	Flow Rate (GPM)	Makeup Rate (GPM)	% Recirculated

A process flow diagram must be attached. If cyclone is routed to another cyclone or other equipment, show sketch of entire system.

CYCLONE DIAGRAM

CHECK APPROPRIATE OUTLET CONFIGURATION BELOW

SKETCH OTHER CONFIGURATION ON DIAGRAM Below



13.

***** "MULTICYCLONE" *****

Efficiency (%)	Volumetric Flow Rate (ACFM)	No. of Cones	Pressure Drop (In. H ₂ O)	Position in Series # _____ of _____ Units	
Leakage () No () Yes	Inlet Dimension of Individual Cyclone (inches)	Outlet Dimension of Individual Cyclone (inches)	Individual Cyclone Diameter (inches)	Inlet Temperature (Deg. F)	

14.

***** "FILTRATION" (BAGHOUSE) *****

Efficiency (%)	Volumetric Flow Rate (ACFM)	Filter Surface Area (sq. ft.)	Air-to-Filter Area Ratio (ft./min.)	Pressure Drop (in. H ₂ O)
TYPE OF FILTER		FILTER MATERIAL		BAG CLEANING
<input type="checkbox"/> Fabric Filter (BAGHOUSE) <input type="checkbox"/> Packed Bed <input type="checkbox"/> Mat Filter <input type="checkbox"/> Panel Filter <input type="checkbox"/> Other _____		<input type="checkbox"/> Fiberglass <input type="checkbox"/> Nylon <input type="checkbox"/> Nomex <input type="checkbox"/> Teflon <input type="checkbox"/> Wool <input type="checkbox"/> Dacron <input type="checkbox"/> Cotton <input type="checkbox"/> Orlon <input type="checkbox"/> Other _____		<input type="checkbox"/> Mechanical <input type="checkbox"/> Sonic <input type="checkbox"/> Reverse Flow <input type="checkbox"/> Air Pulse <input type="checkbox"/> Simple Bag <input type="checkbox"/> Ringed Bag Collapse Collapse <input type="checkbox"/> Other _____
No. of Compartments	Time Between Cleaning (mins./hr.)	Inlet Temperature (Deg. F)	Position in Series # _____ of _____ Units	

15.

***** "AFTERBURNER" (FUME INCINERATOR) *****

Type of Afterburner: () Direct Flame () Catalytic () Other _____	Efficiency (%)	Volumetric Flow Rate (CFM)	Position in Series # _____ of _____ Units
Maximum Burner Rating (Million BTU/hr)	Combustion Chamber Temp. (Deg. F)	Retention Time (sec.)	Fuel Type _____ Usage _____
Combustion Chamber Dimensions (ft.): _____ Length _____ Diameter _____			

SUPPLEMENTAL DATA FOR AIR CONTROL DEVICES — continued

*** "SCRUBBER" ***

Type of Scrubber: <input type="checkbox"/> Venturi <input checked="" type="checkbox"/> Impingement Plate <input type="checkbox"/> Packed Tower <input type="checkbox"/> Gravity Tower <input type="checkbox"/> Mist Eliminator		<input type="checkbox"/> Orifice Type <input type="checkbox"/> Cyclonic <input type="checkbox"/> Condenser <input type="checkbox"/> Other _____		Efficiency (%) 90% Particle 98% HCl	Volumetric Flow Rate (ACFM) 28,837	Position in Series # 1 of 1 Units
		Pressure Drop (in. H ₂ O) 5.4	Inlet Temperature (Deg. F) 1800	Mist Eliminator Filter Area (sq. ft.) 28.27		
Gas Flow <input checked="" type="checkbox"/> Countercurrent <input type="checkbox"/> Concurrent	Liquid Scrubbing Medium and Additives (specify) 50% NaOH plus water		Total Liquid Injection (GPM) 110	Make Up Rate (GPM) 24		
Venturi Scrubber Data:	Inlet Area (sq. in.)	Throat Area (sq. in.)	Throat Velocity (ft./sec.)	<input type="checkbox"/> Fixed Throat <input type="checkbox"/> Variable Throat		
Packed or Plate Tower Data:	Surface Area (sq. ft.) 13.2	Packing Depth (ft.)	Type of Packing: <input type="checkbox"/> Rings <input type="checkbox"/> Saddles <input type="checkbox"/> Other _____	No. of Plates 2	Type of Plates impingement	

17.

*** "ELECTROSTATIC PRECIPITATOR" ***

Efficiency (%)	Volumetric Flow Rate (CFM)	Total Collection Plate Area (sq. ft.)	Pressure Drop (in H ₂ O)	Inlet Temperature (Deg. F)	
Resistivity of Pollutant (OHM-CM)	Gas Viscosity (poise)	Charging Field Strength (volts)	Collecting Field Strength (volts)		
PRECIPITATOR TYPE <input type="checkbox"/> Single Stage <input type="checkbox"/> Two Stage <input type="checkbox"/> Other _____			CLEANING METHOD <input type="checkbox"/> Low Voltage <input type="checkbox"/> High Voltage <input type="checkbox"/> Hot Side <input type="checkbox"/> Cold Side <input type="checkbox"/> Plate Rapping <input type="checkbox"/> Plate Vibrating <input type="checkbox"/> Washing <input type="checkbox"/> None <input type="checkbox"/> Other _____		
Corona Power (Watts/1000 cfm)	Electrical Usage (kw./hr.)	No. of Compartments	No. of Cells/Comp.	Position in Series # _____ of _____ Units	

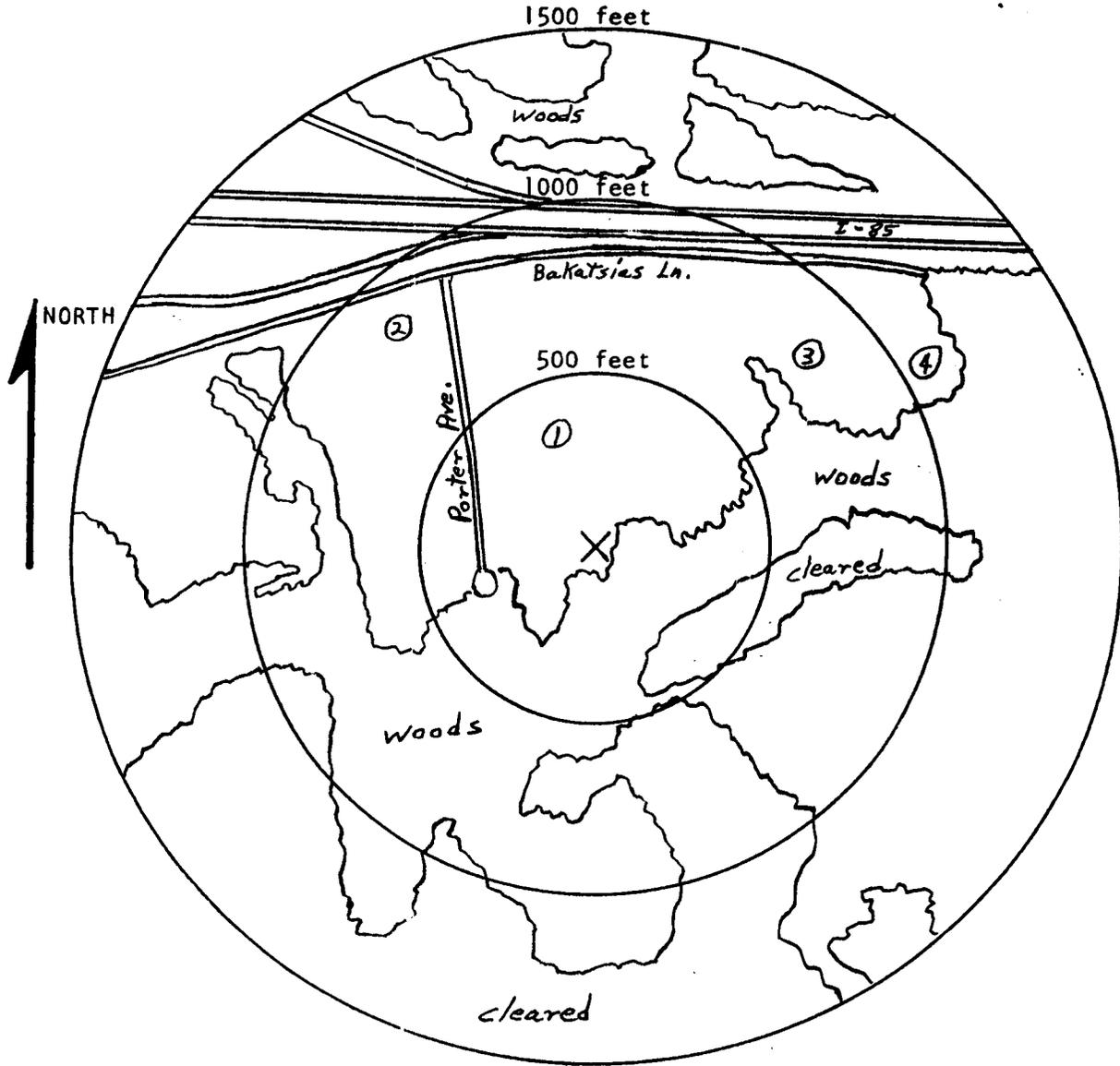
18.

*** "ADSORPTION" ***

Type of Adsorption: <input type="checkbox"/> One-Pass Regenerative <input type="checkbox"/> One-Pass Nonregenerative		<input type="checkbox"/> Recirculating <input type="checkbox"/> Other _____		Efficiency (%)	Volumetric Flow Rate (ACFM)
Regenerative Method: <input type="checkbox"/> Discarded <input type="checkbox"/> Chemical <input type="checkbox"/> Other _____		Adsorption Material: <input type="checkbox"/> Thermal (dry heat) <input type="checkbox"/> Thermal (steam) <input type="checkbox"/> Activated Carbon <input type="checkbox"/> Hydrous Silicated <input type="checkbox"/> Other _____		Position in Series # _____ of _____ Units	
Pressure Drop (in H ₂ O)	Inlet Temperature (Deg. F)	No. of Compartments	How are emissions controlled during regeneration? _____		
Size of Adsorbent Bed (ft.) Length _____, Width _____, Height _____, Diameter _____					
Regenerative Schedule: Maximum Time for Desorption _____ Length of Time to Maximum Saturation _____					

AREA DIAGRAM

Show all surrounding buildings and roads within 1500 feet of the equipment covered by this application. Attach a site diagram identifying each emission source location(s), property boundaries and building (structure) dimensions (height, width, and length).



INSTRUCTIONS

1. Indicate location and type of building by the use of small numbered circles with the description below.
2. Show roads as lines representing the road edges. Indicate street names and highway numbers.
3. Show wooded or cleared area by approximate boundary lines and the words "woods", "cleared", "cornfield", etc.

CODE

- | CODE | DESCRIPTION |
|------|-----------------------------|
| (1) | Irradiation Service Company |
| (2) | Manufacturing Company |
| (3) | Fabricating Company |
| (4) | Restaurant |
| (5) | |
| (6) | |
| (7) | |
| (8) | |
| (9) | |
| (10) | |

Example:

- | | |
|-----|-----------|
| (1) | Church |
| (2) | Residence |

INCINERATOR

PLEASE TYPE OR PRINT. ATTACH TO THE GENERAL INFORMATION FORM "A". IF APPLICABLE, ATTACH AIR POLLUTION CONTROL DEVICE FORM "C".

1. Emission Source and ID NO. (FROM GENERAL INFORMATION FORM "A", ITEM 6):

Incinerator A, B

2. Incinerator Description:

Dual Chamber Controlled Air

Manufacturer

Joy Energy Systems, Inc.

Model Name

T-Series

Model Number

2500 TES

3. Permit Application is made for (CHECK ONE ONLY):

New Source Existing Source Modification – Last Permit No. _____

Commence Construction Date July 15, 1989 Operation Date December 1, 1989

4. Maximum Source Operation: 24 Hours/Day 7 Days/Week 50 Weeks/Year

5. Type of Waste Burned: (See codes on next page)	Maximum Charging Rate (lb/hr)		Tons/Year Burned	Total Waste Generated (lb/day)
	Design	Actual		
0, 4	1911	1911	8000	3,440 (ash)

6. Combustible 75% **Noncombustible** 15% **Moisture** 10% **Heat Value** 8500 (BTU/lb)

7. Primary Chamber:	Secondary Chamber:	Secondary Chamber Retention Time:	Type of Feed
Volume <u>925</u> cu. ft. Temperature <u>1450</u> °F	Volume <u>970</u> cu. ft. Temperature <u>1800</u> °F	Seconds <u>2.28@2000</u> °F <u>2.02 @1800</u> °F	<input type="checkbox"/> Manual <input checked="" type="checkbox"/> Automatic

Burner Data:	BURNER RATING (BTU/HR)		AIR FLOW (CFM)		Excess Air (%)
	Primary	Secondary	Overfire	Underfire	
	2,300,000	5,300,000	4340	1080	141

9 Is there a preheat timer? No Yes, Preheating Time 90 Min.

10. Auxiliary Fuel Data: Primary Fuel Type(s) Natural Gas
Secondary Fuel Type(s) _____

FUEL TYPE	FUEL USAGE			Max. % Sulfur	Max. % Ash	BTU Value
	Max. Design	Max. Actual	Annual			
Natural Gas	(SCF) 7600	(SCF) 7600	(SCF/yr) 6,000,000	Neg.	Neg.	(BTU/SCF) 1000
#2 Fuel Oil	(gal/hr)	(gal/hr)	(gal/yr)			(BTU/gal)
Other						

11. Air Contaminants Emitted:	Maximum Actual Emissions		Emission Estimate Method*	Control Device**	Control Efficiency %
	Before Control (lbs/hr)	After Control (lbs/hr)			
Particulates	10.59	1.05	2	Scrubber	90
Sulfur Dioxide	1.49				
Nitrogen Dioxide	9.56				
Carbon Monoxide	Neg.				
Hydrocarbons (VOC)	Neg.				
Lead					
Other (HCl)	30	0.6	2	Scrubber	98
Other ()					

*REFER TO BACK OF GENERAL INFORMATION FORM "A" FOR EMISSION ESTIMATION CODE
**ATTACH APPROPRIATE AIR CONTROL DEVICE FORM "C"

INCINERATOR — continued

12. Describe any liquid or solid wastes generated and method of disposal:

Ashes to Landfill

13. Stack or Emission Point Data:

Height Above Ground (ft.) 40 Ft.	Inside Area (sq. ft.) 12.56	Gas Temperature (Deg. F) 1800° F	Direction of Exit (up, down, or horizontal) Up
Volumetric Flow Rate (ACFM) 28,837 ACFM@1800° F	Velocity (ft./sec.) 37.3	Are sampling ports available? () No (X) Yes	Is rain cap or other obstruction over stack? () No (X) Yes, (specify) Spark Arrestor

14. Is a RCRA permit required by the N. C. Department of Human Resources? (X) No () Yes

If yes, has a RCRA permit application been submitted? _____ Date _____, 19____

15. List ALL incinerated HAZARDOUS WASTE specified in the RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (40 CFR 261) in the comments section below:

16. Comments:

*** TYPE OF WASTE BURNED CODE TABLE ***

CODE	Principal components, usual source, and typical moisture content
0	Highly combustible waste, paper, wood, cardboard cartons, (including up to 10% treated papers, plastic or rubber scraps); from commercial and industrial sources; 10% moisture.
1	Combustible waste, paper, cartons, rags, wood scraps, combustible floor sweepings; from domestic, commercial, and industrial sources; 25% moisture.
2	Rubbish and garbage; from residential sources; 50% moisture.
3	Predominantly animal and vegetable waste; from restaurants, hotels, markets, institutional, commercial and club sources; 70% moisture.
4	Carcasses, organs, solid organic wastes; from hospitals, laboratories, slaughterhouses, animal pounds, and similar sources; 85% moisture.
5	Gaseous and semi-liquid industrial process waste; variable moisture. Describe in detail under comments. Solid and semi-solid by-product waste, such as rubber, plastics, wood waste, etc., from industrial operations; variable moisture. Describe in detail under comments.



THERMAL
REDUCTION
SYSTEMS
INCORPORATED

Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179

(TYPICAL) BIOHAZARD WASTE CONTRACT

May 24, 1989

<facility>
address
city, state zip

A. GENERAL INFORMATION

- A.1. Thermal Reduction Systems, Inc. is a North Carolina corporation holding N.C. Air Quality Permit No. 5896R, N.C. Solid Waste Permit No. 01-02-I and an Alamance County Landfill Permit dated October 10, 1986.
- A.2. Thermal Reduction Systems will pickup and incinerate (treat) your biohazard waste from May 24, 1989 through May 23, 1990.
- A.3. All biohazard waste delivered to TRS from <facility> will be transported, treated and the residues disposed of in conformance with the Solid Waste Rules of North Carolina (10 NCAC 10G. 0107).

B. PICKUP SCHEDULE

- B.1. Biohazard waste will be picked up 3 times weekly on a schedule agreed to by <facility> and Thermal Reduction Systems.
- B.2. Emergency pickups can be arranged by calling Graham (919/578-0302).

C. SERVICES AND FEES

C.1. Supply and delivery of empty containers:

18"x18"x24" cardboard carton w/liner	No charge
1 gal sharps container <brand name> 24 per case	\$ _____
1 gal sharps container <brand name> 22 per case	\$ _____
2 gal sharps container <brand name> 16 per case	\$ _____
2 gal sharps container <brand name> 12 per case	\$ _____
Other _____	\$ _____

NOTE: All above sharps containers are disposed of by placing them in the cardboard carton with other waste. Carton disposal cost is listed in C.2. The above prices are good for 60 days.

- C.2. Disposal of containers where the containers are provided to you within the disposal price:

18"x18"x24" cardboard carton w/liner	\$ _____	each
1 gal sharps container	\$ _____	each
2 gal sharps container	\$ _____	each
5 gal infectious waste bucket	\$ _____	each
15 gal fibreboard drum (chemotherapy waste)	\$ _____	each
20 gal fibreboard drum (chemotherapy waste)	\$ _____	each
Other _____	\$ _____	

- C.3. Supply and installation of brackets:

Brand name @ _____ each

- C.4. There is a minimum monthly charge of \$ _____ for disposal of containers.

D. CONTRACT TERMS

- D.1. An invoice will be submitted at the end of each month for the cost of supplies and services used or \$ _____ whichever is greater.
- D.2. All containers, including sharps containers, must be approved by Thermal Reduction Systems, Inc.
- D.3. <facility> must supply Thermal Reduction Systems with an affidavit, signed by an official with the authority to bind the institution, stating that the biohazard waste delivered to TRS will not contain any radioactive substances; hazardous chemical waste as defined by the Resource Conservation and Recovery Act of 1976 (P.L. 94-580 as amended); or chemotherapy waste not covered by the attached TRS policy.
- D.4. The terms and fees of this contract are firm for the period May 24, 1989 through May 23, 1990.
- D.5. Changes to this contract or any of its terms or conditions may be made only by written amendments stipulating the changes to be made, the effective date, and signed by both <facility> and Thermal Reduction Systems, Inc.

E. INVOICES

- E.1. Payment is 30 days net. A 1.5% service charge is automatically applicable for late payment.

E.2. Invoices should be mailed to:

For Thermal Reduction Systems: For <facility>:

Signature

Signature

Name

Name

Title

Title

Date

Date

<facility>
address
city, state zip

AFFIDAVIT

I certify that no radioactive waste, hazardous chemical waste as defined by the Resource Conservation and Recovery Act of 1976 (P.L. 94-580 as amended); or chemotherapy waste not covered by TRS policy will be delivered to Thermal Reduction Systems, Inc., Incinerator Facility, Graham, North Carolina.

Signature

Date

Name

Title

THERMAL
REDUCTION
SYSTEMS
INCORPORATED

Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179

CHEMOTHERAPY (ANTINEOPLASTIC) WASTE POLICY

Based on guidance from the North Carolina Solid and Hazardous Waste Management Branch, Department of Human Resources and the National Institutes of Health (NIH) proposed guidelines, Thermal Reduction Systems will pickup, transport, and incinerate the following solid waste containing trace amounts of antineoplastic drugs:

- Needles, syringes, tubing
- Mixing bags
- Empty drug vials and ampuls
- Gloves, Gowns
- Cleaning cloths
- Alcohol swabs

Solid waste containing any of the following materials are regulated as hazardous waste and TRS will not pickup and/or incinerate these materials:

- Pure discarded commercial antineoplastic drugs in vials, ampuls, or other containers.
- Dialysate solution containing antineoplastic drugs.
- Intravenous solutions containing antineoplastic drugs.

All solid waste containing trace amounts of antineoplastic drugs must be discarded in a separate container which is clearly labeled.

Additional guidance on chemotherapy waste can be obtained from Mr. Terry Dover, N.C. Solid and Hazardous Waste Management Branch, Raleigh, N.C. (919/733-2178).

RECEIVED MAY 24 1989

THE W.W. SLY MANUFACTURING CO.

P.O. Box 5939 • Cleveland, Ohio 44101 • (216) 238-2000



CAR-383 (R3)

May 22, 1989

Thermal Reduction Systems
P.O. Box 2070
Chapel Hill, NC 27515

Attention: Mr. Al Turner

Sly IMPINJET Gas Scrubber for
Medical Waste Incinerator

Gentlemen:

We thank you for your continued interest in Sly's scrubbers and for the opportunity to submit this revision of our proposal dated April 18, 1989 as requested of our representative Mr. Richard Whitlock. As requested we are quoting the shell and tube heat exchanger to cool the hot blowdown water from the recirculation tank using the fresh make up water as the cooling fluid. Also we are requoting the fan for use with a variable frequency controller supplied by others.

We quote as follows, all in accordance with the attached terms and conditions:

- 1 - Shell and tube heat exchanger of 316-L SS to cool up to 2 GPM of 171°F water to below 150°F using 24 or 25 GPM of fresh water at 80°F.

PRICE, F.O.B. POINT OF SHIPMENT -----\$

* * * * *

- 1 - New York Blower, Size 404, Series 20, General Industrial Fan with LS wheel, Arrangement No. 1, complete with flanged inlet and outlet, quick opening access door, drain, and shaft and bearing guard. All air stream parts to have a baked phenolic coating. Fan complete with inlet box and drain and a unitary base (no isolation).

CAR-383 (R3)

-2-

May 22, 1989

Fan to deliver 12,950 CFM and an assumed 7.1" SP at 1166 RPM and 25.2 BHP at 171°F. saturated. (10" SP and 35.7 BHP at 0.075 lb/cf density)

- 1 - V-belt drive and General Traffic guard.
- 1 - 40 HP, 1800 RPM, high efficiency TEFC motor, Frame 324-T for 3-60-230/460 with slide base.

PRICE, F.O.B. POINTS OF MANUFACTURE -----\$

* * * * *

VALIDITY:

The prices contained herein are valid for a period of 30 days, after which we reserve the right to review our quote.

TERMS:

NET 30 DAYS. Prices are firm for acceptance within 90 days of date of proposal and shipment as noted below. Order is subject to attached "Terms and Conditions". Purchase order must be issued in the name of: W. W. Sly Manufacturing Company.

SHIPMENT:

10 to 12 weeks after receipt of approval drawings. Drawings for approval will be submitted 3 to 4 weeks after date of order acknowledgement and scheduling. NOTE: ABOVE SUBJECT TO VERIFICATION AT TIME OF ORDER.

* * * * *

If you should have any questions regarding this quotation or any further requirements, please contact our office or our representative, Mr. Richard G. Whitlock at:

Whitlock Industrial Equipment
516 Amanda Drive
Matthews, NC 28105
Office: (704) 846-4841

CAR-383 (R3)

-3-

May 22, 1989

With over 115 years of experience on over 60,000 baghouses and scrubbers, we look forward to putting Sly's equipment and experience to work for you in the near future.

Very truly yours,

THE W. W. SLY MANUFACTURING COMPANY

A handwritten signature in cursive script, appearing to read "Ralph Hosler".

Ralph Hosler
Sales Manager, Wet Scrubbers

RH/dad/5403M

7

ALAMANCE COUNTY HEALTH DEPARTMENT

Graham-Hopedale Road
Burlington, North Carolina 27215-2971
Phone Number 227-0101

BOARD OF HEALTH

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Cary D. Allred, County Commissioner
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Health Director

May 18, 1989

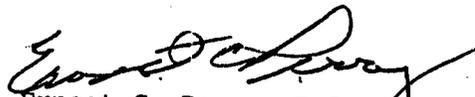
Mr. Larry Parker, President
Thermal Reduction Systems, Inc.
P. O. Box 2070
Chapel Hill, NC 27515

Re: Letter of May 9, 1989

Dear Mr. Parker:

Approval for increased ash disposal at the Alamance County Landfill is given subject to the same requirements of my letter of November 15, 1988, and Division of Health Services letter of October 31, 1988.

Sincerely,



Ernest C. Perry, R.S., Director
Environmental Health Section

ECP:bj

cc: Jim Conner
Robert Smith

RECEIVED NOV - 2 1988



North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

October 31, 1988

Larry E. Parker, President
Thermal Reduction Systems, Inc.
P. O. Box 2070
Chapel Hill, NC 27515

Subject: Disposal of 1 ton per week of incinerator ash
at the Alamance County Landfill (Permit #01-01) or
Orange County Landfill (Permit #68-01)

Dear Mr. Parker:

The Solid Waste Management Section has received a request for characterization of the subject waste. Based upon the submitted information, the waste appears to be non-hazardous. The Solid Waste Management Section has no objection of the sanitary landfill disposal of this waste, if in accordance with the conditions listed below:

1. The owner/operator of the landfill approves the disposal.
2. The waste contains no free liquids and can be confined, compacted, and covered in accordance with the Solid Waste Management Rules (10 NCAC 10G).
3. Additionally, a submittal of the Waste Determination Form and supportive analytical data, is required on each anniversary of this approval.

Failure to meet these conditions may result in revocation of this approval and, subsequently, an administrative penalty. The approval is subject to change if new regulations were to prohibit this practice. If the process which generates the waste changes or if the composition of the waste changes significantly, this approval is void and reevaluation of the waste will be required prior to subsequent disposal.

Larry E. Parker
Page 2
October 31, 1988

If you have further questions, please contact this office at (919) 733-0692.

Sincerely,



Terry F. Dover
Eastern Area Supervisor
Solid Waste Branch
Solid Waste Management Section

TFD/gbf

cc: Terry Waddell, Waste Management Specialist
Dexter Matthews, Waste Management Specialist
Ernest Perry, Alamance County Landfill
Bruce Heflin, Orange County Landfill

CITY OF GRAHAM, N. C.
OFFICE OF BUILDING INSPECTOR

No. 5751

PERMIT TO BUILD

UPON APPLICATION NO. 5751 PERMISSION HAS BEEN GRANTED TO
 MR. Hermael Redution Spas AS OWNER, TO ALTER, ERECT, MOVE A 1 STORY
 ROOF BUILDING ON Porter Ave STREET, BETWEEN _____ AND CONTAINS 3 ROOMS
 AND _____ STREET: TO BE USED AS indust. bldg. AND CONTAINS 3 ROOMS
 AND AT AN ESTIMATED COST OF \$ 490,000.

This building is to be altered, erected or moved in accordance with the ordinances of the CITY OF GRAHAM, N. C., and the general building laws of the STATE OF NORTH CAROLINA, as they relate to construction, health and safety.

SIZE OF BUILDING: Frontage 200 Ft.; Depth 175 Ft. SIZE OF LOT: Frontage _____ Ft.; Depth _____ Ft.
 REQUIRED YARD SIZES MEASURED FROM PROPERTY LINE TO BUILDING

Front Yard _____ Ft. Rear Yard _____ Ft. Two Side Yards _____ Ft. Each.

Name of Contractor Holt Const. Co.

Wired With _____

No. of Plumbing Fixtures _____

Heated by _____

Chimneys _____ Flues _____

FEE COLLECTED _____

Building _____

Driveways _____

Floor Furnaces _____

Tanks _____

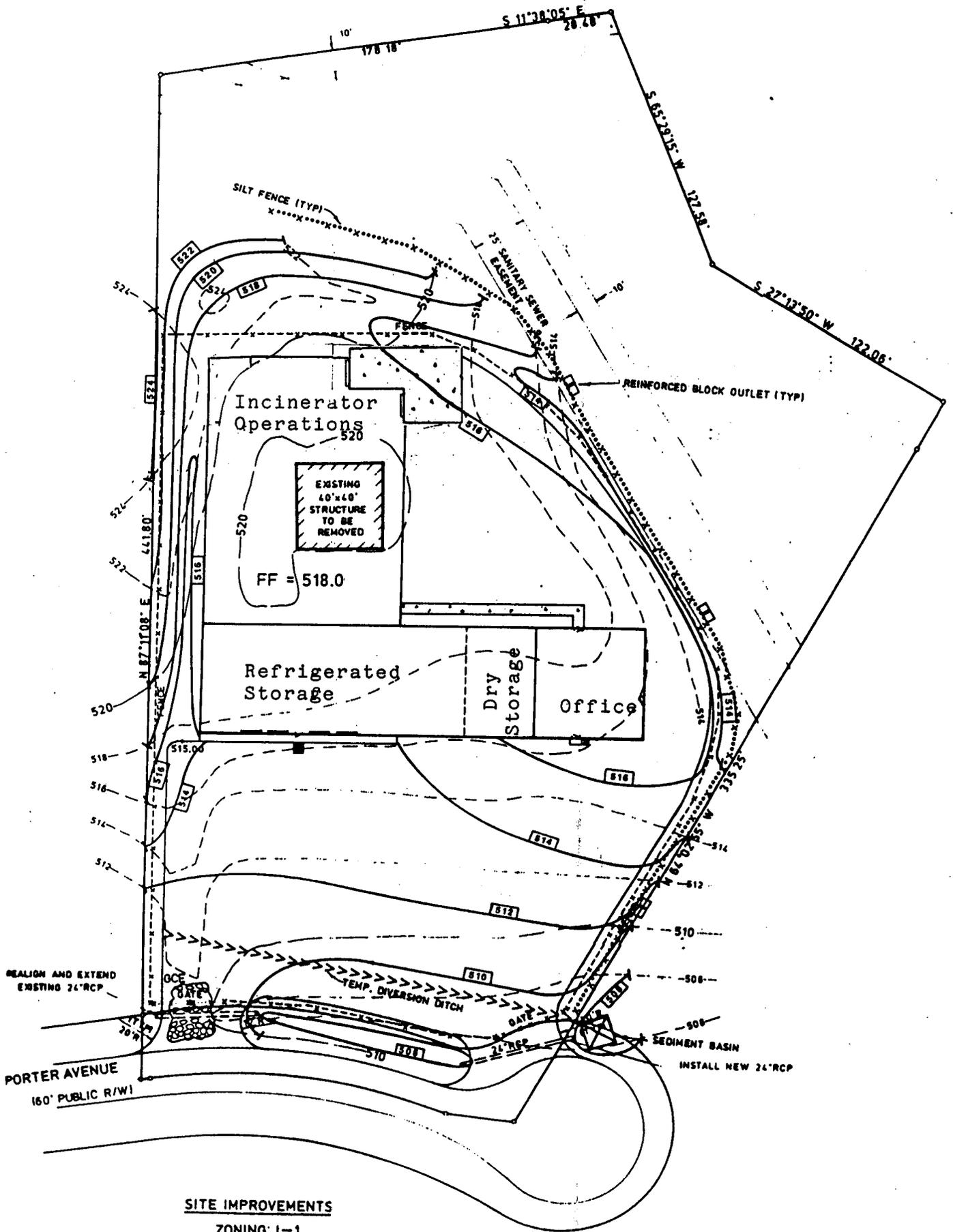
Signs _____

REMARKS:
erect new bldg
(pre-job)

TOTAL \$ 593.00

Larry Mitchell
 City Inspector of Buildings

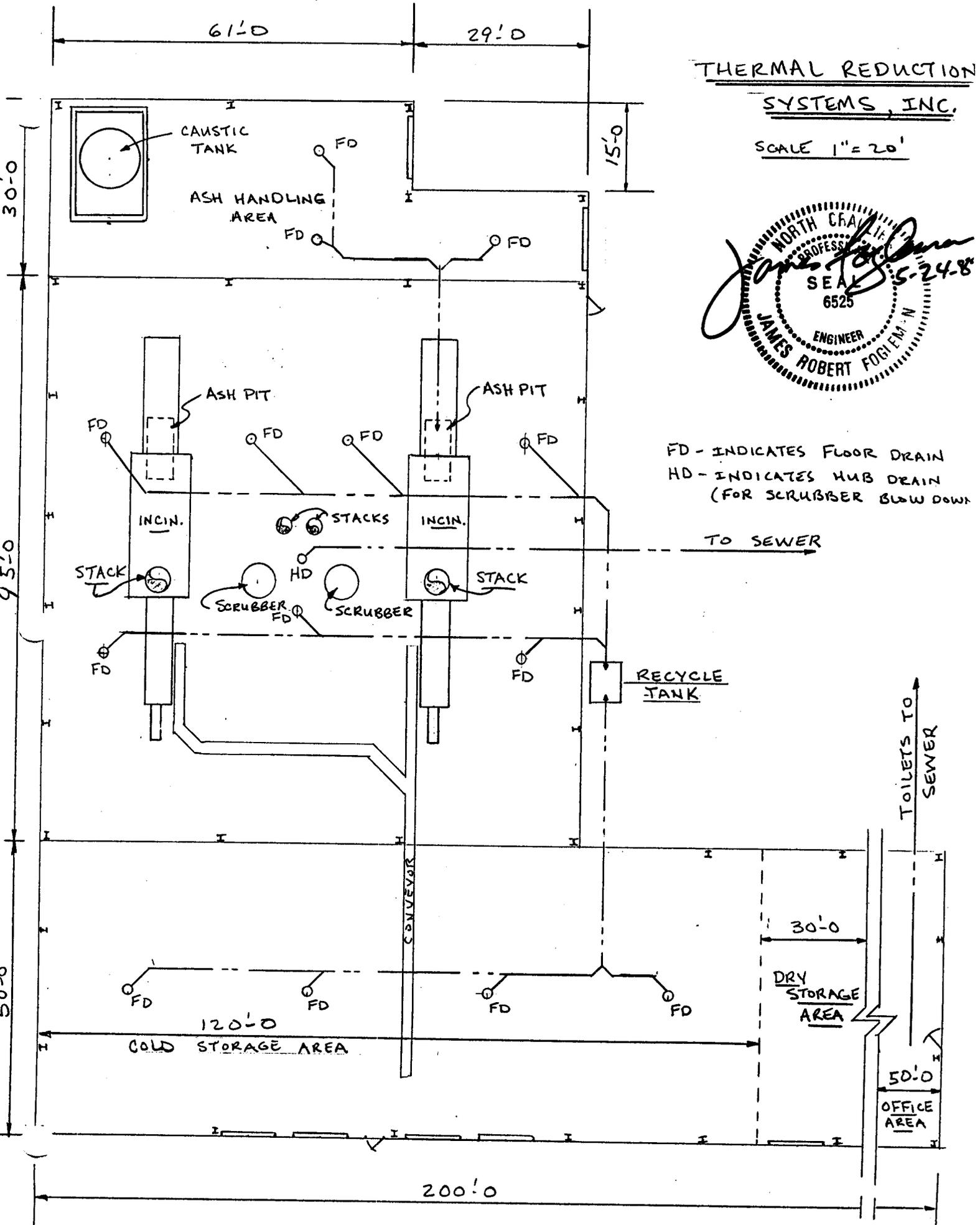
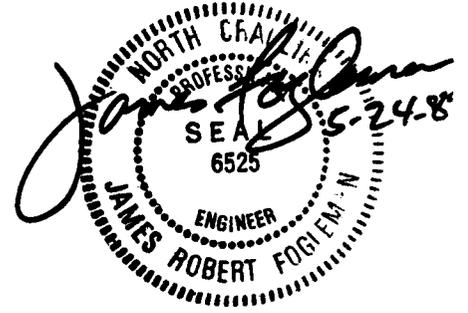
Boundary Map



SITE IMPROVEMENTS
 ZONING: I-1
 GROSS LOT SIZE: 3.0 ACRES

THERMAL REDUCTION
SYSTEMS, INC.

SCALE 1" = 20'



FD - INDICATES FLOOR DRAIN
HD - INDICATES HUB DRAIN
(FOR SCRUBBER BLOW DOWN)

TO SEWER

TOILETS TO SEWER

EQUIPMENT & DRAIN PLAN

Holt Construction Company, Inc.



. . . GENERAL CONTRACTORS . . .

P. O. BOX 118
Graham, N. C.
27253

919/226-3718

May 2, 1989

City of Graham
P.O. Drawer 357
Graham, N.C. 27253

Attention: Mr. Davy Mitchell

Re: Thermal Reduction Holding Tank

Dear Sir:

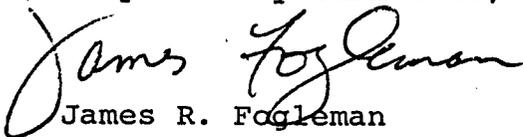
As determined by Mr. Martin Wilson from the Sanitary Sewer Use Survey completed for the above named project a holding tank must be added. This tank will be of sufficient capacity to ensure discharge water to the sewer to be less than 150°F.

In discussion with the owner he assured me that the capacity and therefore the temperature requirement would be designed into the system by the incinerator manufacturer with a confirmation letter from them at that time.

I understand that this assurance completes the requirements for the issue of a building permit.

Thank you for your assistance in these matters.

Respectfully submitted,


James R. Fogleman

JRF/sdm

cc Mr. Joe Green
City of Graham

Mr. Larry Parker, President
Thermal Reductions

THERMAL REDUCTION SYSTEMS, INC.
INCINERATOR SPECIFICATIONS
2500TES

I. Incinerator

A. General

1. Design

The incinerator shall be modular, dual chamber, controlled-air, natural gas-fired, designed for substoichiometric operation in the primary chamber and excess air operation in the secondary chamber; allowing for intimate mixing of the air with the hydrocarbon volatiles for efficient thermal oxidation at a rate to match the burning rate capacity of the unit.

The incinerator shall be complete with burners, blowers, stack, controls, and necessary appurtenances to facilitate terminal point connection of utilities.

2. Capacity

The incinerator shall have a burning capability of 1911 lbs./hr. when charged with Type 0 waste (8500 BUT/lb.) The incinerator must be designed for and capable of operating 24 hrs./day and 7 days/week at full-rated capacity. The daily capacity must be 45,864 lbs./day when charged with Type 0 waste. The minimum heat release capacity of the incinerator shall be 16,243,500 BTU/hr. The maximum volumetric heat release capacity shall be 10,000 BTU/ft.³/hr. based on the combined volume of both chambers.

3. Standards

To the extent they are referenced in the specifications, the standards of the following organizations are a part of these specifications.

(AMCA) Air Movement and Control Association
(ASME) American Society of Mechanical Engineers
(ASTM) American Society for Testing Materials
(AWS) American Welding Society
(FM) Factory Mutual
(NFPA) National Fire Protection Association
(NEMA) National Electrical Manufacturer's Assoc.
(OSHA) Occupational Safety and Health Adm.
(UBC) Uniform Building Code
(UL) Underwriters Laboratory
(JIC) Joint Industrial Council
(NEC) National Electrical Code

4. Manufacturer's Responsibilities

The incinerator manufacturer shall design, fabricate, and ship the incineration system. The manufacturer's Field Service Technician shall supervise the unloading and erection of the system. The manufacturer's Field Service Technician shall start up the system, adjust all controls, cure the refractory and provide three (3) days of operator training. The manufacturer's Field Service Technician shall also be present, in a supervisory capacity during performance or compliance testing of the system. These duties are to be performed by a Field Service Technician directly employed by the manufacturer or certified by the manufacturer or by the duly authorized manufacturers agent or dealer.

B. Primary Chamber

1. Refractory

Primary chamber refractory shall be not less than 5" thick, castable, rated at 2800°F (minimum) with a density of not less than 128 lbs./ft.³.

2. Hearth

Primary chamber hearth area shall be minimum of 6" high-quality firebrick with an A.P.C.E. Cone 33-34. The hearth waste loading rate shall not exceed 20 lbs./ft.²/hr.

3. Refractory Anchors

Anchors shall be of Type 310 stainless steel, Y-type and spaced at no greater than 12" centers.

4. Insulation

Mineral wool block insulation of no less than 2" thickness and rated at 1900°F shall be installed between the refractory and steel shell in those areas where castable refractory is used. A minimum of 1" thickness, high-density board insulation shall be used in hearth area beneath all firebrick installation.

5. Charging Door

A guillotine charging door shall be constructed of steel with no less than 4" of 2800°F, 128#/ft.³ density castable refractory, backed by 1" of 1900°F mineral wool block insulation. Guillotine door shall be hydraulically actuated and interlocked with the incinerator control circuit to prevent

door opening when the incinerator is in a "preheat" or "stop load" condition. Guillotine door shall further be interlocked with an adjustable timer and high-temperature overload relay to prevent overloading of the incinerator. Door opening shall be consistent with the mechanical charging device.

6. Access Door

An access door shall be incorporated into the rear of the primary chamber, refractory-lined, 32" x 48" opening, with clamps and gasketing to provide positive sealing. The primary chamber shall be equipped with two high-temperature viewports with blastgate.

7. Steel Shell

Construction of the shell shall be of not less than 3/8" steel plate per ASTM-A36 with structural members not less than 1/4" steel per ASTM-A36. The shell shall have an arched roof to maintain the structural integrity of the refractory.

8. Automatic Underfire Air Port Cleaning

The underfire air ports shall be automatically cleared of any blockage due to waste, ashes or slag by an automatic rodding device which shall be controlled by a programmable timer located in the main control panel. It shall not be necessary for the operator to manually clean underfire air ports during the operation of the incinerator.

9. Internal Ash Transfer Rams

There shall be at least two (2) internal ash transfer rams with "full stroke" capability, to

assure proper movement of waste and ashes through the primary chamber. Rams shall be full width of the hearth.

C. Secondary Chamber

1. Refractory

Secondary chamber refractory shall be not less than 5" thick, castable, rated at 2800°F (minimum) with a density of not less than 128 lbs./ft.³.

2. Refractory Anchors

Anchors shall be of Type 310 stainless steel, Y-type and spaced at no greater than 12" centers.

3. Insulation

Mineral wool block insulation of no less than 2" thickness and rated at 1900°F shall be installed between the refractory and steel shell.

4. Access Door

An access and inspection door shall be incorporated into the end of the secondary chamber refractory-lined, 24" x 24" opening, with clamps and gasketing to provide positive sealing. The secondary chamber shall be equipped with one high-temperature view-port with blastgate.

5. Steel Shell

Construction of the shell shall be of not less than 3/8" steel plate per ASTM-A36, with structural members not less than 1/4" steel per ASTM-A36. Shell heads shall not be less than 1/4", domed

configuration. The shell shall be cylindrical to maintain the structural integrity of the refractory.

6. Retention Time

The retention time of the secondary chamber shall be no less than 2.28 seconds at 2000°F when burning the specified waste at the rated capacity. The manufacturer shall submit calculations to verify compliance with the requirement. These calculations shall be submitted with manufacturer's proposal. The volume of breeching or stack shall not be included in these calculations.

Specific vol. of dry flue gas @ 2000°F=61.9 ft³/lb.
Specific vol. of water vapor @ 2000°F=99.7 ft³/lb.

D. Blowers

Operation

Air blowers shall be of the centrifugal type, providing independent air flow to each burner, primary air and secondary air. Burner air blowers will only operate when the burners are on. Primary air blower shall automatically shut off when the loading door is opened. Secondary air blower will operate continuously, except during preheat.

Primary air shall be fully modulated to provide air flow changes when temperature dictates a change in air flow. Specifically, primary air flow shall decrease when temperature in the primary chamber is

rising and increase when temperature is decreasing.

Secondary air supply shall be fully modulated to provide air flow changes when temperature dictates a change in air flow. Specifically, secondary air flow shall increase when temperature in the secondary chamber is rising and decrease when temperature is decreasing.

E. Burners

Burners shall be UL listed consisting of one burner with 2.3 BTU capacity in the primary chamber and one burner with 5.3 BTU capacity in the secondary chamber minimum. Each burner shall be controlled by temperature to automatically shutdown when stable operating temperatures are attained in the respective chambers, and conversely, to start when low temperature set points are reached. Secondary burner shall be fully modulated. Primary burner shall be on-off operation with low-fire start. Burners shall be capable of preheating the secondary chamber to a temperature of 2000°F prior to charging waste.

F. Controls

All electrical components shall be UL listed with all burner safety systems capable of meeting FM insurance requirements. All electrical and wiring shall meet JIC and NEC requirements. Where control panels are protected from weather, NEMA 12 panels shall be used. Where control panels are exposed to weather, NEMA 3R panels

shall be used. Control voltage will be provided by a stepdown transformer supplied in the control panel.

The free standing control panel shall incorporate the following:

1. Operational Modes

Operational modes to include "purge", "preheat", "load", "stop load", "auto shutdown", "manual override", and "emergency stop".

2. Loading Safeties

Automatically lock closed the operation of the loading door and/or the ram feeder mechanism if the unit has not reached minimum incinerator temperature or has exceeded maximum incinerator temperature.

3. Draft Indicator

Indicate primary chamber draft with panel mounted draft gauge.

4. Temperature Recorder

Indicate and record both chamber temperatures on circular chart. Include one year supply fo charts. Accuracy + or - 1.0% of span.

Reproductibility 0.5% of span.

Span Step Response Time 10 seconds maximum; 9
seconds minimum (60 Hz).

Input Thermocouple (Type R)

Chart Circular, 10.34" diameter, 4" calibrated
radius

Chart Speed 24 hours per revolution

5. Programmable Temperature Controllers

Microprocessor based and field configurable controllers for regulating temperature with an accuracy of + or - 0.2% of span, vacuum fluorescent display, Type R thermocouple input capability and current proportional control output to control process variable. Controller must have self-diagnostics capability and keyboard security.

6. Touchscreen operator interface

Mounting - flush panel mounting in NEMA 12 enclosure.

Display - 12-inch diagonal, high-contrast amber monochrome.

Character Sets - 95 displayable ASCII characters
-161 graphic characters
-Squares and rectangles

Video Attributes - Monochrome: Reverse, dim, normal, and highlight intensities for both foreground and background.

Communications-RS-232, 9600 BAUD, full handshaking
User Memory - 64 bytes battery-backed CMOS for screen storage.

Program/Edit - Self contained, stand-alone display/graphics editor using English-language commands.

Time-Date - Battery-backed clock and calendar for display and remote access by host.

Keyboard - 65 position, full ASCII sealed membrane keyboard.

7. Programmable logic controller

The CPU shall be a single-slot machine with eight diagnostic LEDs, two serial ports, a three position

key-switch (RUN, STOP, and OIU), plug-in program memory cartridges, and full battery-backup.

A comprehensive self-diagnostic routine shall detect CPU and I/O faults, and pinpoint their location.

Diagnostics

LEDs shall indicate CPU and I/O status and shall be color coded to inform the operator of critical and non-critical conditions.

- o PWR - power to the CPU
- o RUN - CPU is in the RUN mode
- o CPU - watchdog timer time-out
- o DIAG - internal fault detected by CPU
- o BATT - CPU or memory cartridge battery is low
- o MEM - memory error detected
- o I/O - I/O bus error detected
- o COMM - communication error detected

Memory Cartridges

- o EPROM - 4K words program/4K registers, min.

Two built-in ports

Two serial ports shall allow access to external devices or internal system status. One port shall be dedicated to the Operator Interface Unit; the second shall be an RS-232 interface.

ASCII/BASIC Module

An ASCII/BASIC module with 32K of user logic on board shall be expandable to 56K by using the CPU memory cartridges. This module shall be programmable in BASIC. Two serial ports shall enable data communications with terminals, or other ASCII/BASIC devices.

I/O Modules

All I/O modules shall perform continuous self-checking routines. Diagnostic LEDs on each module will indicate any abnormality in the module's operation as well as minor faults ranging from loose terminal block to blown output fuses.

G. Stack

Stack sections are to be in 5' lengths lined with 3" of 50#/ft.³ density insulating castable refractory, rated 2500°F. Steel shells shall be 11-gauge steel. Stack sections shall be complete with bolted connection flanges.

H. Breeching

Ten (10) feet of horizontal breeching shall be furnished.

I. Paint

All exposed steel shall be cleaned, primed and painted with high-grade heat resistant machinery enamel suitable for elevated temperature service.

J. Quality Control and Factory Inspection

The unit shall be completely assembled in the factory to insure matching of components prior to shipment and field erection. Prior to disassembly, the system shall be inspected, at the factory, by the owner.

All electrical circuitry shall be proven in factory.

All motors shall be run in the factory.

The hydraulic feed ram shall be bolted to the incinerator and the hydraulics proven before shipment.

Burner pilots shall be proven as well as all control valves.

K. Performance Testing

Performance testing shall be conducted under the supervision of the manufacturer's field service technician.

Particulate Emissions

A Method Five Particulate Emissions Test will be conducted by an independent laboratory acceptable to the owner and the manufacturer. The owner will

supply two (2) laborers to work under the supervision of the manufacturer's field service technician during the testing. The cost of the Method Five Test shall be borne by the owner. Should the incinerator fail the initial test, the manufacturer shall bear the cost of all necessary modifications, repairs, and subsequent tests until the incinerator passes.

The incinerator shall not emit solid particulate emissions in excess of 0.20 grains per dry standard cubic foot of flue gas corrected for 12% CO₂, based on EPA Method Five testing protocol, excluding condensibles impinger catch and including CO₂ contribution from the combustion of auxiliary fuel, when burning the specified waste at the rated capacity and when operated according to the manufacturer's instructions.

2.8 CUBIC YARD
HYDRAULIC RAM FEEDER
SPECIFICATIONS
SR-62H

I. Ram Feeder

The Ram Feeder shall be constructed with minimum 1/4 HRS plate. The Hopper shall have a volume of 2.8 cubic yards minimum. The Hatch charging opening shall be 50" wide x 72" long minimum. The incinerator charging opening shall be 50" wide x 36" high minimum. The Ram Feeder control shall include a push-button manual override control. The Ram Feeder fire protection system shall include an ultraviolet flame detector with automatic water spray function.

II. Hydraulic System

The Ram Feeder shall be complete with a self-contained hydraulic power pack which will motivate the Hydraulic Charging Ram, the Hatch Cover, the Guillotine Charging Door, the Internal Ash Transfer Ram and any other hydraulic ancillaries. All hydraulic cylinders shall be of heavy-duty, industrial grade construction manufactured to NFPA standards. Minimum rating shall be 3000 PSI. Cylinders shall be clevis mounted, with viton seals, solenoid operated directional control valves and flow control valves. Hydraulic unit shall be complete with J.I.C. L-shaped reservoir, level gauge, filler breather, inlet strainer, return line filter, pressure gauge and pressure relief valve. Hydraulic fluid shall be fire resistant, water/glycol formulation.

III. Control

- A. The Ram Feeder Hatch Cover shall open upon the Ram completing its cycle and coming to rest. Closure of the Hatch Cover shall be by push-button which must be held to affect complete closure.

- B. Control Interlocks will prevent the operation of the Ram Feeder if the Hatch Cover is open, the Guillotine Charging Door is closed, or the Incineration Controls are not in a "Load" mode.

- C. The Ram Feeder cycle shall be:
 - 1. Hatch Cover closes.
 - 2. Incinerator is in "Load" mode.
 - 3. Charging Door opens.
 - 4. Ram moves forward through the open charging door to a penetration of the incinerator of approximately 30 inches.
 - 5. Ram moves backward to an intermediate position just clear of the Charging Door.
 - 6. Charging Door closes.
 - 7. Ram returns to normal rest position.
 - 8. Hatch Cover automatically opens to accept new waste load.

- D. An automatic water spray will actuate if the ultraviolet scanner detects any flame in the Ram Feeder.

- E. Should the Guillotine Charging Door fail to close due to waste material obstructing a full closure, the Ram will recycle and make another penetration of the Charging Door opening prior to the Hatch Cover opening.

SCHEDULE A

TYPE 0:

Trash, a mixture of highly combustible waste such as paper, cardboard, cartons, wood boxes, and combustible floor sweepings, from commercial and industrial activities. The mixtures contain up to 10% by weight of plastic bags, coated paper, laminated paper, treated corrugated cardboard, oily rags and plastic or rubber scraps.

This type of waste contains 10% moisture, 5% incombustible solids and has a heating value of 8500 BTU per pound as fired.

TYPE 1:

Rubbish, a mixture of combustible waste such as paper, cardboard cartons, wood scrap, foliage and combustible floor sweepings, from domestic, commercial and industrial activities. The mixture contains up to 20% weight of restaurant or cafeteria waste, but contains little or no treated papers, plastic or rubber wastes.

This type of waste contains 25% moisture, 10% incombustible solids and has a heating value of 6500 BTU per pound as fired.

TYPE 2:

Refuse, consisting of an approximately even mixture of rubbish and garbage by weight.

This type of waste is common to apartment and residential occupancy, consisting of up to 50% moisture, 7% incombustible solids, and has a heating value of 4300 BTU per pound as fired.

TYPE 3:

Garbage, consisting of animal and vegetable waste from restaurants, cafeterias, hotels, hospitals, markets and like installations.

This type of waste contains up to 70% moisture, up to 5% incombustible solids, and has a heating value of 2500 BTU per pound as fired.

TYPE 4:

Human and animal remains, consisting of carcasses, organs and solids, organic wastes from hospitals, laboratories, abattoirs, animal pounds, and similar sources, consisting of up to 85% moisture, 5% incombustible solids, and having a heating value of 1000 BTU per pound as fired.

T THERMAL
COMBUSTION PARAMETERS

WEIGHT FRACTION CARBON	= .432
WEIGHT FRACTION HYDROGEN	= .058
WEIGHT FRACTION OXYGEN	= .36
WEIGHT FRACTION NITROGEN	= 0
WEIGHT FRACTION SULFUR	= 0
WEIGHT FRACTION CHLORINE	= 0
WEIGHT FRACTION NONCOMBUSTIBLES	= .05
WEIGHT FRACTION CONTAINED MOISTURE	= .1
EXCESS AIR FOR FOLLOWING CONDITIONS	= 115.5
COMPOSITE HEAT OF COMBUSTION, BTU/#	= 8500

THE FOLLOWING EFFLUENT CHARACTERISTICS
APPLY TO THE ABOVE DEFINED WASTE:

MOLES CARBON DIOXIDE (CO2)	= 3.597003E-02
MOLES FORMED WATER (H2O)	= 2.876984E-02
MOLES FREE OXYGEN (O2)	= 4.516621E-02
MOLES FREE NITROGEN (N2)	= .3170201
MOLES SULFUR DIOXIDE (SO2)	= 0
MOLES HYDROCHLORIC ACID (HCL)	= 0
MOLES CONTAINED WATER (H2O)	= 5.550622E-03

TOTAL MOLES OF EFFLUENT	= .4324768
-------------------------	------------

POUNDS OF CARBON DIOXIDE (CO2)	= 1.583041
POUNDS OF FORMED WATER (H2O)	= .5183175
POUNDS OF FREE OXYGEN (O2)	= 1.445319
POUNDS OF FREE NITROGEN (N2)	= 8.881634
POUNDS OF SULFUR DIOXIDE (SO2)	= 0
POUNDS OF HYDROCHLORIC ACID (HCL)	= 0
POUNDS OF CONTAINED WATER (H2O)	= .1

POUNDS OF EFFLUENT PER POUND OF WASTE	= 12.52831
---------------------------------------	------------

VOLUME PERCENTAGE OF CARBON DIOXIDE (CO2)	= 8.317216
VOLUME PERCENTAGE OF CONTAINED WATER (H2O)	= 7.935794
VOLUME PERCENTAGE OF OXYGEN (O2)	= 10.44362
VOLUME PERCENTAGE OF NITROGEN (N2)	= 73.30338
VOLUME PERCENTAGE OF SULFUR DIOXIDE (SO2)	= 0
VOLUME PERCENTAGE OF HYDROCHLORIC ACID (HCL)	= 0

WEIGHT PERCENTAGE OF CARBON DIOXIDE (CO2)	= 12.63571
WEIGHT PERCENTAGE OF CONTAINED WATER (H2O)	= 4.935362
WEIGHT PERCENTAGE OF OXYGEN (O2)	= 11.53642
WEIGHT PERCENTAGE OF NITROGEN (N2)	= 70.89251
WEIGHT PERCENTAGE OF SULFUR DIOXIDE (SO2)	= 0
WEIGHT PERCENTAGE OF HYDROCHLORIC ACID (HCL)	= 0

T THERMAL

DRY AIR PER POUND OF WASTE	11.57725
DRY EFFLUENT PER POUND OF WASTE	11.90999
TOTAL CONTAINED WATER PER POUND OF WASTE	.1
TOTAL FORMED WATER PER POUND OF WASTE	.5183175
POUNDS (THEORETICAL) OF ASH PER POUND OF WASTE	.05
COMBUSTION TEMPERATURE, DEG. F. (THEORETICAL)	2000

WASTE BURNING RATE, LBS/HR	1911
LBS OF FLUE GAS/LB OF WASTE	12.52831
LBS OF DRY FLUE GAS/LB OF WASTE	11.90999
LBS OF WATER VAPOR/LB OF WASTE	.6183175
REFERENCE TEMPERATURE, DEGREES F.	2000
SECONDARY CHAMBER VOLUME, FT ³	970
SPECIFIC VOLUME DRY FLUE GAS, FT ³ /LB	61.92992
SPECIFIC VOLUME WATER VAPOR, FT ³ /LB	99.74623
DRY FLUE GAS PRODUCED, LBS/SECOND	6.322222
WATER VAPOR PRODUCED, LBS/SECOND	.3282235
DRY FLUE GAS VOLUME, FT ³ /SECOND	391.5347
WATER VAPOR VOLUME, FT ³ /SECOND	32.73906
RETENTION TIME, SECONDS	2.28626

City of Graham

P.O. Drawer 357
Graham, North Carolina 27253
Telephone - (919) 228-8362

Sec. 10-223. I-1 Light Industrial District.

(a) *Generally; permitted uses.* The I-1 Light Industrial District is established for those areas of the Graham planning area in which the principal use of land is for industries operated in a manner that will not be obnoxious to adjacent residential or business districts. This district is designed to prohibit the use of land for heavy industry, or for any other use which would substantially interfere with the development of industrial uses permitted in this district. Uses permitted in this district are indicated in section 10-289, Table of Permitted Uses.

(b) *Area, height, and yard requirements.* These requirements are indicated in section 10-288, Table of Area, Height and Yard Regulations.

(c) *Screening.* There shall be a buffer strip at least ten (10) feet wide planted with an opaque screen of evergreen shrubs or trees which at maturity will be between eight (8) and twelve (12) feet high along the side or rear property line of any use that abuts any property in any residential zone.

(d) *Off-street loading space.* Off-street loading and unloading space shall be provided as required in section 10-287 of this article.

(e) *Off-street parking space.* Off-street parking space shall be provided as required in section 10-286 of this article.

(f) *Performance standards.* Within the I-1 zone, all uses shall conform with all of the following performance standards:

- (1) *Dust, dirt, fly ash or other air pollutants.* There shall be no emission of dust, dirt, fly ash, gases, fumes, vapors or other air pollutants into the atmosphere that could cause damage to the public health, or to animals, or to vegetation, or to other forms of property.
- (2) *Electrical interference.* There shall be no electrical disturbances affecting the operation of any equipment other than that of the creator of such disturbances.
- (3) *Heat and glare.* There shall be no heat or glare perceptible to human senses at the property line of any use creating heat or glare.
- (4) *Landscaping.* All front yards and side yards shall be suitably landscaped.
- (5) *Enclosure.* All processing shall be within a building.
- (6) *Liquid or solid waste.* There shall be no discharge of any liquid or solid waste into any stream except as authorized by the State of North Carolina.
- (7) *Noise.* The sound-pressure level of sound radiated from an establishment, measured at the lot line, shall not exceed the values in any octave band of frequency that are specified in the table below. The sound-pressure level shall be measured with a sound

level meter and an associated octave band analyzer conforming to standards prescribed by the American Standards Association.

<i>Frequency Band (cycles per second)</i>	<i>Decibels</i>
20— 75	69
75— 150	57
150— 300	52
300— 600	46
600— 1200	42
1200— 2400	37
2400— 4800	33
4800—10,000	30

- (8) *Odor.* There shall be no objectionable odors perceptible to the human senses at or beyond the property line of any use that may create odors.
 - (9) *Radioactivity.* There shall be no radioactive emission that would be dangerous to health.
 - (10) *Smoke.* There shall be no emission into the atmosphere of smoke from any operation of a shade darker than No. one on the Ringelmann Smoke Chart as published by the United States Bureau of Mines, except that smoke of a shade not darker than No. three (3) on said chart may be emitted for not more than two (2) minutes in any thirty-minute period.
 - (11) *Traffic.* There shall be no industrial vehicular traffic on any minor residential street.
 - (12) *Vibration.* There shall be no vibration perceptible to human senses at the property line of any use that may create vibration.
- (Code 1978, Ch. J, Art. II, § 36; Ord. of 9-1-81)

Sec. 10-224. I-2 Heavy Industrial District.

(a) *Generally; permitted uses.* The I-2 Heavy Industrial District is established to provide areas where the principal use of the land is for manufacturing and processing activities having special need of accessibility to major transportation facilities and utilities and other public services. It is the intent of this district to separate such activities from residential activities for their mutual benefit. Uses permitted in this district are indicated in section 10-289, Table of Permitted Uses.

(b) *Area, height, and yard requirements.* These requirements are indicated in section 10-288, Table of Area, Height, and Yard Regulations.

(c) *Screening.* There shall be a buffer strip at least ten (10) feet wide planted with an opaque screen of evergreen shrubs or trees which at maturity will be between eight (8) and twelve (12) feet high along the side or rear property line of any use that abuts any property in any residential zone.

CITY OF GRAHAM
SANITARY SEWER USE SURVEY

SIC # 4953
MAP # 511 page 672
ACCT. # 104740
Permit #

Company Name Thermal Reduction Systems, Inc.

Mailing Address P. O. Box 2070, Chapel Hill, NC 27515

Address of Premises (if different from mailing address) _____

Porter Ave., Graham, NC

Authorized Official Larry Parker Title President

Phone 919-942-5179

Technical Coordinator _____ Title _____

Phone _____

Operational Information

Brief description of manufacturing or service activity on premises:

Incineration of solid waste

Hours of Operation per Day 24 Days of Operation per Week 7

Average number of employees per shift: 10 1st 4 2nd
4 3rd

Shift Times (start and finish): 8 am - 4pm 1st 4pm - 12pm 2nd 12pm - 8am 3rd

Check (✓) shifts normally worked each day:

	Mon	Tues	Wed	Thur	Fri	Sat	Sun
1st	✓	✓	✓	✓	✓	✓	✓
2nd	✓	✓	✓	✓	✓	✓	✓
3rd	✓	✓	✓	✓	✓	✓	✓

Raw Materials (Add additional sheet(s) if necessary)

<u>Description</u>	<u>Amounts Used per Year</u>
<u>Medical Waste</u>	<u>16,000 tons</u>

Catalysts, Intermediates (Add additional sheet(s) if necessary)

<u>Description</u>	<u>Amounts Used per Year</u>
<u>50% NaOH Solution</u>	<u>87,360 gallons</u>

CITY OF GRAHAM
SANITARY SEWER USE SURVEY

Products and By Products (Add additional sheet(s), if necessary)

<u>Description</u>	<u>Amounts Produced per Year</u>
Incinerator Ash	2400 tons

Type of Process: incineration Continuous Batch
 Is there a scheduled shutdown? No When?
 Is production seasonal? No If yes, explain, indicating months of peak operation.

Industrial Wastes:

What waste products are disposed to sanitary sewer? Domestic sewage and process water containing NaCl in approx. 10% solution

What waste products are disposed of by other means? Identify method of disposal. Incinerator ash to sanitary landfill

Is discharge to sanitary sewer: Intermittent Steady
 Quantity/Day 5,280 Est. or measured Est.

Are wastes pretreated? If so, which and how (add additional sheet if necessary)? No

Plant Sewer Connections to City of Graham Sanitary Sewer System (Attach Sketch)

	<u>Size</u>	<u>Material</u>	<u>Location in Plant</u>	<u>Connected To</u>
(1)	4"	PVC	SW Corner	Existing sanitary sewer
(2)				
(3)				

CITY OF GRAHAM
SANITARY SEWER USE SURVEY

Water Use

Source(s) of water City of Graham

Water used for:

			Recirculated
Sanitary Purposes	<u>2,400</u>	<u>gpd</u>	
Air Conditioning	<u>None</u>	<u>gpd</u>	
Process water	<u>69,120</u>	<u>gpd</u>	<u>Yes</u>
Jacketed Cooling Water	<u>None</u>	<u>gpd</u>	
Other <u>Cleanup</u>	<u>250 gpd injected into incinerator</u>		

Water disposal other than sanitary sewer evaporation - 96 % of total

Is water consumed in product? Yes Amount/day 66,240

Have the waste streams been previously analyzed? If so, attach summary of analytical results No

Are radioactive isotopes used in your process? Specify:

No

Are any of the pollutants listed in Table I being used at this facility in manufacturing of the product or in a by-product which may be discharged into the sanitary sewer? If so, please indicate by a check mark on Table I. None

Do you have a wastewater discharge permit (NPDES permit) issued by the North Carolina Division of Environmental Management? No

The information contained in this questionnaire is familiar to me and to the best of my knowledge and belief, such information is true, complete, and accurate.

April 24, 1989 Larry Parker
Date Signature of Official

President
Title

65 Priority Pollutants Referenced in 307(a) of the
Clean Water Act of 1977

Acenaphthene	Endrin and metabolites
Acrolein	Ethylbenzene
Acrylonitrile	Fluoranthene
Aldrin/Dieldrin	Haloethers
Antimony and compounds	Halomethanes
Arsenic and compounds	Heptachlor and metabolites
Asbestos	Hexachlorobutadiene
Benzene	Hexachlorocyclopentadiene
Benzidine	Hexachlorocyclohexane
Beryllium and compounds	Isophorone
Cadmium and compounds	Lead and compounds
Carbon tetrachloride	Mercury and compounds
Chlordane	Naphthalene
Chlorinated benzenes	Nickel and compounds
Chlorinated ethanes	Nitrobenzene
Chlorinalkyl ethers	Nitrophenols
Chlorinated naphthalene	Nitrosamines
Chlorinated phenols	*Pentachlorophenol
Chloroform	Phenol
2-chlorophenol	Phthalate esters
Chromium and compounds	Polychlorinated byphenyls (PCB)
Copper and compounds	Polynuclear aromatic
Cyanides	hydrocarbons
DDT and metabolites	Selenium and compounds
Dichlorobenzenes	Silver and compounds
Dichlorobenzidine	2,3,7,8,-Tetrachlorodibenzo-
Dichloroethylene	p-dioxin (TCDD)
2, 4-dichlorophenol	Tetrachloroethylene
Dichloropropane &	Thallium and compounds
Dichloropropene	Toluene
2, 4-dimethylphenol	Toxaphene
Dinitrotoluene	Trichloroethylene
Diphenylhydrazine	Vinyl chloride
Endosulfan & metabolites	Zinc and compounds

List any other corrosive, toxic, or potentially harmful pollutants known or anticipated to be present in the wastewater discharge.

SOUTHERN CORPORATION



MANUFACTURERS' AGENTS

10 SOUTHERN PLACE
CLOVER, SOUTH CAROLINA 29710
803-831-1770
FAX: 803-831-7178

Date: 4/19/89
Quote No.: S-86401
Page No.: 1

PROPOSAL
PREPARED FOR
THERMAL REDUCTION SYSTEMS, INC.
CHAPEL HILL, NORTH CAROLINA

I. MATERIAL TO BE INCINERATED

- A. Heating Value: 8500 BTU/#
- B. Quantity: 1911 #/Hr. 22.9 Tons/Day
- C. Burning Time: 24 Hrs./Day 7 Days/Wk.
- D. Heat Release: 16,243,500 BTU/Hr.

II. UTILITIES

- A. Auxiliary Fuel: Natural Gas
- B. Controls: FM
- C. Electrical: 460 Volts 3 Phase 60 Hertz
- D. Gas Pressure Required: 14" H₂O Col.

III. EQUIPMENT

INCINERATOR MODEL: 2500TES

Date: 4/19/89

Quote No.: S-86401

Page No.: 2

PROPOSAL
PREPARED FOR
THERMAL REDUCTION SYSTEMS, INC.
CHAPEL HILL, NORTH CAROLINA

	Lower <u>Primary Chamber</u>	Upper <u>Secondary Chamber</u>
A. Physical Properties:		
1. Chamber Volume, Ft. ³	925	970
2. Refractory Type	Castable	Castable
(1) Thickness, In.	5	5
(2) Temp. Rating, °F	2800	2800
(3) Density, Lbs/Ft. ³	128	128
3. Insulation Type	Mineral Wool Block	
(1) Thickness, In.	2	2
4. Retention Time, Sec.	N/A	2.28 @ 2000°F
5. Shell Thickness, In.	3/8	3/8
6. Charging Door, In.	30 x 50	N/A
7. Rear Access Door, In.	32 x 48	24 x 24
8. Viewports	4	2
B. Special Features:		
1. Energy Shrouds	No	No
2. Modulated Air Supply	Yes	Yes
3. Burner Operation	Auto/On-Off	Auto/Modulated
4. Ash Transfer Ram	Yes (2)	N/A
5. Steam Injection	No Optional	N/A
6. Brick Lined Hearth	Yes	N/A
7. Temperature Recorder	Yes	Yes
8. Touch Screen		Yes
9. Telephone Modem		Yes

Date: 4/19/89
Quote No.: S-86401
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PROPOSAL
PREPARED FOR
THERMAL REDUCTION SYSTEMS, INC.
CHAPEL HILL, NORTH CAROLINA

	Lower <u>Primary Chamber</u>	Upper <u>Secondary Chamber</u>
C. Burners:		
1. Number	1	1
2. BTU Rating	2.3 MM/Hr.	5.3 MM/Hr.
D. Temperature Controllers:		
1. Thermocouple Type	R	R
2. Temp. Range, °F	0-3000	0-3000
3. Solid State Programmable	Yes	Yes
E. Loader: <u>Yes</u>		
1. Model: <u>SR-62H</u>		
2. Hopper Dimensions (In.): <u>50</u> W <u>72</u> L <u>30</u> D		
3. Volume: <u>2.3</u> cu. yds. (or) <u>62</u> cu. ft.		
4. Flame Detection: <u>Yes</u>		
5. Automatic Water Spray: <u>Yes</u>		
6. Manual Override Controls: <u>Yes</u>		
F. Automatic Ash Removal Module: <u>Yes</u>		
1. Model: <u>ARW-AP</u>		
2. Type: <u>Wet</u>		
3. Internal Ash Transfer Ram: <u>Yes</u> Qty: <u>2</u>		
4. Ash Carts: <u>No</u>		

Date: 4/19/89
Quote No.: S-86401
Page No.: 4

PROPOSAL
PREPARED FOR
THERMAL REDUCTION SYSTEMS, INC.
CHAPEL HILL, NORTH CAROLINA

G. Stack: Yes

1. Dimensions: I.D. 48" O.D. 54" Height 40' overall
2. Spark Screen: Yes Material: Iconel 601
3. Test Ports: Yes Quantity: 2
4. Horizontal Breeching: 10'
5. Hot Damper: Optional

H. Underfire Air Port Cleaning Mechanism:

1. Hydraulically Activated
2. Modular Construction

IV. ENERGY RECOVERY: No

V. AIR POLLUTION CONTROL DEVICE: No

VI. INSTALLATION:

1. Includes rigging, erection, and assembly. (Does not include any foundations, utilities, gas meter or regulator, buildings, wiring, or water piping).
2. Start up and operator instruction and two manuals. Three days are included. Should start up take longer than three days due to delays beyond the control of Southern Corporation, owner will be invoiced at \$360/day, plus expenses.

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THE W. W. SLY MANUFACTURING CO.

See us at

**Powder &
Bulk Solids**
CONFERENCE EXHIBITION

Conference: May 15-18, 1989
Exhibition: May 16-18, 1989
Rosemont Exposition Center
Rosemont, Illinois



P.O. Box 5939 • Cleveland, Ohio 44101 • (216) 238-2000

CAR-383 (R2)

April 18, 1989

Thermal Reduction Systems
P.O. Box 2070
Chapel Hill, NC 27515

Attention: Mr. Al Turner

Sly IMPINJET Gas Scrubber
for Medical Waste Incinerator

Gentlemen:

We thank you for your interest in Sly's scrubbers and for the opportunity to submit this revised proposal as requested on the telephone on March 29. Some of Sly's experience is shown on the enclosed list.

We understand that the proposed scrubber is to collect 30 lb./hr. of HCl and 10.59 lb./hr. of particles from 28,837 ACFM at 1800°F including 6.3% (vol.) water vapor from a medical waste incinerator. We calculate that the outlet will be 12,931 ACFM saturated at 171°F and 23 GPM will be evaporated. See the enclosed sketch for water and material balances. Based on a typical particle size distribution from a hospital incinerator we expect that the proposed scrubber will collect over 90% of the particles. The scrubber is also expected to collect over 98% of the HCl if the appropriate concentration of caustic is fed to the scrubber.

We quote as follows, all in accordance with the attached terms and conditions:

- 1 - No. 260 Sly IMPINJET Gas Scrubber, to clean 28,837 ACFM at 1800°F., with a pressure drop of 5.4" w.g., at an outlet of 12,931 ACFM at 171°F. saturated.

2 stages will be provided, and the shell will be all welded 11 ga. stainless steel type 316-L. The unit will be 6'0" diameter, 9'9" straight side, with 30° top and bottom cones, giving an overall height of 12'9", as shown in enclosed Catalog No. 152.

Bolted access doors will be provided above and below each plate stage for inspection and access to plates and sprays. The inlet and outlet will have 3/16" stainless steel flanges.

CAR-383 (R2)

-2-

April 18, 1989

1 - Fixed blade mist eliminator, with blades of 16 ga. type 316-L stainless steel.

2 sets of type 316 stainless steel impingement baffle plates.

1 - Set of internal spray nozzles of type 316 stainless steel, piping and fittings of type 316-L stainless steel, with inlet and outlet water connections installed to receive plant service piping, will be provided. Recirculated alkaline solution requirements will be: Inlet to plates 60 GPM at free flow; inlet to sprays 50 GPM at 20 PSIG.

1 - Set of carbon steel support lugs or pads.

PRICE, F.O.B. MATHISTON, MISSISSIPPI -----

Estimated Shipping Weight: 2,750 lbs.

1 - Set of structural steel support legs, 5'0" high.

PRICE, F.O.B. MATHISTON, MISSISSIPPI -----

Estimated Shipping Weight: 600 lbs.

1 - New York Blower, Size 404, Series 20, General Industrial Fan with LS wheel, Arrangement No. 1, complete with flanged inlet and outlet, quick opening access door, drain, and shaft and bearing guard. All air stream parts to have a baked phenolic coating.

Fan to deliver 12,950 CFM and an assumed 7.1" SP at 1158 RPM and 25.0 BHP at 171°F. saturated. (10" SP and 35.0 BHP at 0.075 lb/cf density)

1 - V-belt drive and OSHA guard.

1 - 40 HP, 1800 RPM, TEFC motor, Frame 324-T for 3-60-230/460 with slide base.

PRICE, F.O.B. POINTS OF MANUFACTURE -----

CAR-383 (R2)

-3-

April 18, 1989

- 1 - Worthington Model D512, Size 2 x 1-1/2 x 4 horizontal end suction centrifugal pump of 316 stainless steel with mechanical seal, baseplate, coupling, coupling guard and 3 HP, 3600 RPM, TEFC motor for 3-60-230/460 volts.

Pump to deliver 110 GPM at an assumed 64 feet total head.

PRICE, F.O.B. POINT OF MANUFACTURE -----\$

* * * * *

- 1 - Open top tank of polypropylene with a capacity of 155 gallons, approximately 36" diameter x 36" high, with screwed connection for pump.

PRICE, F.O.B. NORTH BABYLON, NEW YORK -----\$

* * * * *

- 1 - Great Lakes Instruments Model 671 pH Analyzer with pH meter, to control pump for addition of alkaline solution to recirculation system. Analog output signals proportional to pH value are 0-1 mA, 0-5 VDC, and non-isolated 4-20 mA. Two relays are provided, one a control relay and one an alarm relay with high and low alarm points. Enclosure is PVC, NEMA 4X.

- 1 - Great Lakes Instruments Model 6050PO Flow-Thru pH Probe, encapsulated style, vinyl-ester in a CPVC union assembly and 1-1/2" CPVC "T" with 10' cable.

- 1 - Chemical Metering Pump, Liquid Metronics Liquifram Series D-131-20S, acrylic and PVC, 1/2" connections, with suction and supply tubing, anti-syphon valve and 110 volt motor to deliver up to 8 GPH alkaline solution to recirculation system.

PRICE, F.O.B. MILWAUKEE, WISCONSIN -----\$

* * * * *

ESTIMATED FREIGHT BY TRUCK TO CHAPEL HILL, NC -----\$

Freight will be prepaid and invoiced at cost accompanied by copies of freight bills.

* * * * *

CAR-383 (R2)

-4-

April 18, 1989

VALIDITY:

The prices contained herein are valid for a period of 30 days, after which we reserve the right to review our quote.

TERMS:

NET 30 DAYS. Prices are firm for acceptance within 90 days of date of proposal and shipment as noted below. Order is subject to attached "Terms and Conditions". Purchase order must be issued in the name of: W. W. Sly Manufacturing Company.

SHIPMENT:

10 to 12 weeks after receipt of approval drawings. Drawings for approval will be submitted 3 to 4 weeks after date of order acknowledgement and scheduling. NOTE: ABOVE SUBJECT TO VERIFICATION AT TIME OF ORDER.

* * * * *

If you should have any questions regarding this quotation or any further requirements, please contact our office or our representative, Mr. Richard G. Whitlock at:

Whitlock Industrial Equipment
516 Amanda Drive
Matthews, NC 28105
Office: (704) 846-4841

With over 115 years of experience on over 60,000 baghouses and scrubbers, we look forward to putting Sly's equipment and experience to work for you in the near future.

Very truly yours,

THE W. W. SLY MANUFACTURING COMPANY


Ralph Hosler
Sales Manager, Wet Scrubbers

RH/dad/5079M

Enclosures: Terms & Conditions
Catalog 152
Sketch CAR-383-A
Incinerator List

TERMS AND CONDITIONS

DESIGNATION OF PARTIES: The term Company whenever used herein refers to The W. W. Sly Manufacturing Company, incorporated under the laws of the State of Ohio and having its principal office in the City of Cleveland, Ohio. The term Purchaser whenever used herein refers to the person, firm or corporation to whom the equipment herein specified is sold.

AGREEMENTS AND REPRESENTATIONS: The proposal hereto attached covers only such material, equipment and services as are specifically mentioned herein, and when executed as herein provided shall constitute the contract between the parties hereto.

No written or verbal agreements or representations heretofore made by any person for or on behalf of the Company or Purchaser shall affect or in any way vary or modify the terms or conditions hereof.

GUARANTEE: The equipment described in the attached proposal is guaranteed only against defective workmanship or material, for a period of one (1) year from date of shipment. In the event defects develop within said period under normal and proper use, the Company will furnish without charge, F.O.B. its plant, parts required to replace material found to have been defective. Under no circumstances will the Company be responsible for the cost of labor to install such parts, or, for loss of production occasioned by failure of such parts. Nothing in the above is to be construed as a guarantee of the service life or parts or equipment not found to be defective.

DRAWINGS:

- (1) Certified construction drawings will be forwarded to customer for approval. One copy of drawings properly initialed, or all copies if changes are made, shall be returned to Company within ten days from date issued.
- (2) Said drawings not received by Company within ten days may necessitate removal of order from production schedule and thereby may affect date of shipment.
- (3) Should any changes be made after approved drawings have been entered for production, normal engineering charges will then be added to customer's order.
- (4) Foundation and erecting diagrams, repair part sheets and full operating instructions will be furnished by the Company when required.

TIME OF SHIPMENT: The shipment promise contained in the proposal shall date from receipt from the Purchaser of approved general arrangement drawings and the furnishing of all further information necessary to enable the Company to proceed with the manufacture of the specified equipment.

DELAYS: The Company shall not be responsible for losses or delays caused by strikes, accidents, delays in transportation or other causes beyond its control.

ERECTION: Except when erection is included in contract price, the Company will furnish at the option of the Purchaser a competent superintendent to supervise the erection of the equipment described herein. For this superintendent's services the charges will be:

- (a) - for each 8-hour week day; time and one-half for work in excess of 8 hours on such days and for Saturdays; double time for Sundays and Holidays; day travel time will be included.
- (b) Travel and living expenses: Fare from Cleveland or from last point of assignment to Purchaser's plant and from Purchaser's plant to Cleveland or next point of assignment, provided the points of assignment are nearer than Cleveland to Purchaser's plant; living expenses to include all meals, lodging and ordinary incidental expenses.

FOUNDATIONS; ETC.: Unless otherwise specified Purchaser shall install foundations including foundation bolts and furnish all tools and supplies required for the proper erection of the equipment herein specified, and assume all responsibility for the strength of building in which equipment is to be located.

SHORTAGE AND CLAIMS: The Purchaser shall within ten days report to and have verified by delivering carrier any shortage in or damage to shipment and make claim therefor to carrier. Any other claims shall be reported to the Company within 30 days after receipt of shipment; otherwise bills of lading and packing lists shall govern settlement.

TERMS OF PAYMENT: Invoices for equipment are payable net within 30 days from date; invoices for erection superintendence and labor net 10 days from date of invoice.

TAXES: Taxes imposed by Federal, State or other taxing authority upon the manufacture, sale or use of the articles covered by our quotation and/or our invoice (Excise, Sales and Use Taxes) shall be an extra charge to be paid by the purchaser.

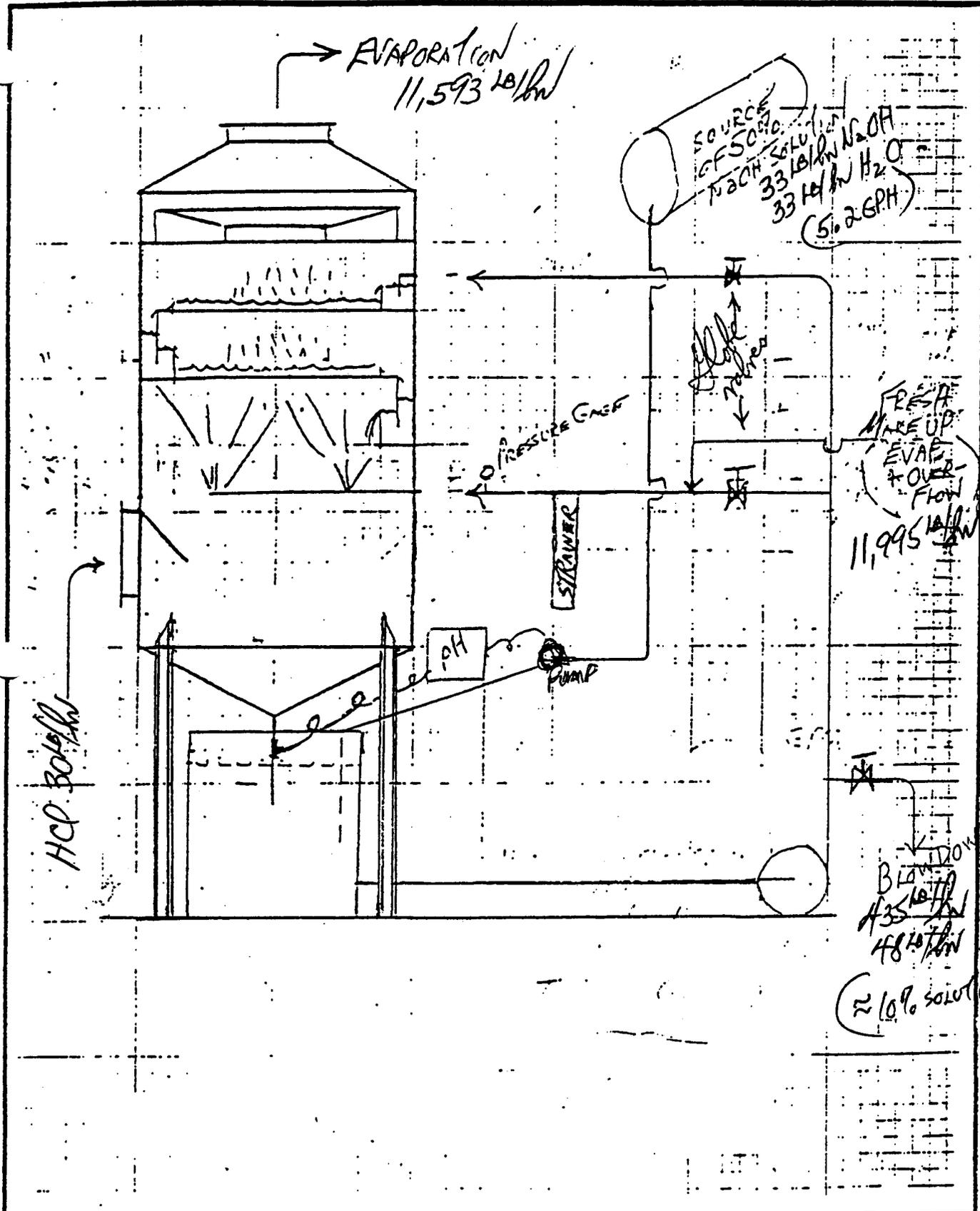
ACCEPTANCE: The proposal attached hereto is for immediate acceptance and is subject to change or withdrawal without notice, and is not binding on the Company until accepted at the home office by a duly authorized officer or agent of the Company.

THE W. W. SLY MANUFACTURING COMPANY

P.O. BOX 5939

CLEVELAND, OHIO 44101

THE W. W. SLY MANUFACTURING CO.
CLEVELAND, OHIO



TITLE	No. 260 SLY IMPINJET GAS SCRUBBER		
SCALE	NTS	BY	RNH
		DATE	3-16-89
		NO.	CAR-383-A



North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

January 17, 1989

Ronald H. Levine, M.D., M.P.H.
State Health Director

Mr. Larry Parker, President
Thermal Reduction Systems, Inc.
P.O. Box 2070
Chapel Hill, N.C. 27515

RE: Variance to Solid Waste Permit #01-02-I

Dear Mr. Parker:

Regarding your requests of December 15, 1988, and January 5, 1989, we are granting a variance to conditions 4 and 5 of the Thermal Reduction System, Inc. Permit #01-02-I. The variance will allow Thermal Reduction Systems, Inc. to:

1. Store non-refrigerated medical waste in one secure, locked, leakproof trailer within the security fence at the facility for up to 96 hours prior to incineration.
2. Store refrigerated medical waste in one secure, locked, leakproof trailer within the security fence at the facility for up to 240 hours prior to incineration provided the temperature of the trailer is maintained at 45 degrees Fahrenheit or less.
3. Store medical waste within the incinerator building for up to 96 hours prior to incineration.

The variance is granted on a trial basis until September 1, 1989. The original permit conditions will be reinstated immediately if the variance results in violations of 10 NCAC 10G .0201(d).

If you have questions, please call me at (919) 733-0692.

Sincerely,


J. Gordon Layton, Supervisor
Solid Waste Branch
Solid Waste Management Section

JGL/mj

c: Terry Waddell
Julian Foscue



THERMAL
REDUCTION
SYSTEMS
INCORPORATED



Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179

January 5, 1989

Mr. Gordon Layton, Head
Solid Waste Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602

Subject: Modification of December 15, 1988 Request for a
Variance to Solid Waste Permit No. 01-02-I, issued
November 30, 1986.

Dear Mr. Layton:

A waste company operating in North Carolina wishes to deliver waste in a refrigerated trailer to our facility in Graham. The trailer would be kept refrigerated and stored within the security fence. We would incinerate waste from the trailer until it is empty.

The purpose of this letter is to request a variance for the maximum amount of time deemed appropriate for the storage of trailer refrigerated waste at the incinerator site. I can be reached at (919) 942-5179 for further discussion of this matter.

Sincerely,

Larry Parker
President

(REQUESTS 10 days)
[Handwritten initials]

cc: Julian M. Foscue, III, Western Area Supervisor
Terry Waddell, Waste Management Specialist



15

Post Office Box 2070
Chapel Hill, North Carolina 27515
919/942-5179



December 15, 1988

Mr. Julian M. Foscue, III
Western Area Supervisor
Solid & Hazardous Waste Management Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602

Subject: Variance to Solid Waste Permit No. 01-02-I,
issued November 30, 1986

Dear Mr. Foscue:

We are requesting a variance in permit conditions 4 and 5.

Permit condition 4: Storage of waste shall be confined to inside the secured building as shown on floor plan.

The variance would allow us, if necessary, to also store medical waste in a secure locked leakproof trailer within the security fence at our facility.

Permit condition 5: Storage time shall not exceed 48 hours.

The variance would extend our storage time from 48 to 96 hours.

Justification for these variances in our current permit:

1. It is often difficult to schedule the delivery times of TRS and transporter trucks so that they do not arrive late in the week. Since we normally do not operate our incinerators on Saturday and Sunday at the present time, some of this waste must be stored over the weekend.

2. As our waste volume increases due to our marketing efforts and the impact of regulatory pressure, we need as much flexibility as possible to maintain a constant flow of stored waste to our incinerators. Additional storage inside the building will be a high priority in any future expansions.

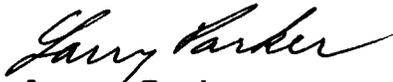
3. As far as we can determine from medical and toxicological studies, neither of these variances will increase the health risk to our employees or surrounding populations or impact on environmental quality.

4. We have never had an odor problem at our facility and do not anticipate such a problem if these variances are granted. Many medical care institutions currently store their wastes for a week or more at ambient temperature without objectionable conditions.

5. TRS has a standing policy of quality housekeeping. This will continue and be extended to a storage trailer if this variance is approved.

Obviously, we would expect the Branch to reinstate the original conditions of our permit if TRS does not meet the present level of environmental quality under the requested variances.

Sincerely,



Larry Parker
President

cc: Terry Waddell, Waste Management Specialist
J. Gordon Layton, Environmental Engineer

Operational Procedures

1. Transport and Entry to Facility

All trucks entering facility will pass through a security gate controlled by a dispatcher. The dispatcher will collect manifests before a truck is unloaded. All medical waste will be delivered in rigid, leak-proof containers.

Approximately ten (10) trucks of various capacities will deliver waste to the facility each day, seven days per week. TRS will utilize both client and its own trucks. No more than fifteen (15) trucks will be on the site at any one time.

All waste will be unloaded into a refrigerated storage area.

2. Waste Constituents

There is inadequate data to thoroughly characterize the changing constituents of medical waste. Waste streams at this facility are expected to have the following approximate content:

Type 0 Infectious Waste

Dry paper	35%
Wet paper	10%
Plastics	15%
Cardboard	7%
Glass	5%
Cans	3%
Food particles	3%
Moisture	1%
Contaminated waste	21%

- Sharps, including needles, tubing with needles attached, scalpel blades, glassware, and syringes that have been removed from their original sterile containers.
- Biological waste, including blood and blood products, excretions, exudates, secretions, suctionings, and other body fluids which may not be directly discarded into a municipal sewer system.
- Isolation waste, including all waste from the care or treatment of patients isolated to prevent the spread of communicable diseases except reverse (protective) isolation.

- Cultures and stocks of microorganisms and associated biologicals, including specimen cultures, waste from production of biologicals and serums, and discarded live or attenuated vaccines.
- Laboratory waste which has come in contact with pathogenic organisms, including culture dishes, transfer devices, paper, and cloth.
- Surgical waste, including all materials discarded from surgical procedures, disposable gowns, soiled dressings, sponges, casts, lavage tubes, drainage sets, underpads, and surgical gloves.
- Chemotherapeutic waste.

Type 4 Pathological Waste

Moisture	85%
Plastics	5%
Wet paper	3%
Cardboard	3%
Glass	6%

3. Storage of Waste

TRS policy is to move waste from trucks to incinerators as rapidly and efficiently as possible. All wastes, with few exceptions, will be stored in a cold (40° F) area until burned. The only perceived exception would be waste delivered during night-time hours and retained in the truck until off-loading the following day. No waste will be retained in delivery vehicles longer than twelve (12) hours.

The refrigerated storage area (121' x 50') will accommodate approximately 150,000 pounds of waste when waste is stored in standard 18"x18"x24" cartons to a height of six (6) feet. This represents 1.6 times the daily waste throughput when both incinerators are operating at capacity. No waste will be stored longer than ten (10) days in the refrigerated area.

4. Waste Preparation

Waste will be moved from refrigerated storage to incinerators by conveyor. Prior to loading into the incinerator hopper, the name of the generator and time will be recorded and each container will be weighed. Waste charges to the incinerator will be based on the weight of the waste.

TRS will scan all waste containers for radioactivity when TRS takes possession of the waste, either at the customers loading dock or at the TRS facility. Any container which exceeds the radioactivity allowed under regulation 10 NCAC 3G .2516; Waste Disposal, will not be accepted for incineration.

5. Waste Feed Procedures

The Joy Energy Systems 2500 TES incinerator is a continuous service unit. Waste containers will be loaded into the 50"x70"x30" hopper by automatic ram on one incinerator (side-loader) and manually on the other incinerator (top-loader). Each hopper will accept up to eight (8) standard 18"x18"x24" waste containers. The average loading pattern will be 190 pounds/load with a cycle time of 6 minutes (1900 lbs/hour)

If a flame is detected (ultraviolet scanner) in the ram feeder, an automatic water spray will activate.

6. Emissions Control

a. Scrubber

The stack height of each scrubber will be 45 feet above floor level (10 feet above the 35 foot roof). This height was determined by Mr. Kevin Eldridge, meteorologist, N.C. Air Quality Section, using a dispersion model. He has determined this to be the "GEP stack height" for this facility.

Each incinerator will be equipped with its own scrubber and scrubber stack. Emission gases (28,837 ACFM, 70 feet/sec, 1800° F) will be diverted from the incinerator stack by a hot damper through refractory lined breeching to the bottom of the Sly scrubber tower. The scrubbing liquid (50% NaOH) is introduced at the top of the tower and flows down over two plates. Gases move upward and pass through the holes in each plate. This promotes gas absorption by breaking up the gas phase into small bubbles. Sixty (60) gallons per minute of recirculated NaOH at free flow will be provided at the plate inlet. The pressure drop across the scrubber is 5.4" w.g. Gases will exit the scrubber at 12,931 ACFM at 171° F saturated. A fixed blade inertial mist eliminator will reduce emissions of liquid droplets from the scrubber.

NaOH feedstock solution will be stored in a 8,250 gallon fiberglass tank installed inside the incinerator building. Concrete containment, adequate to hold the capacity of the tank, will be provided under the tank. 5.2 gph of NaOH solution will be pumped to each scrubber tank to make up for evaporative losses.

Scrubber blowdown (435 lbs/hr of water and 48 lbs/hr of NaCl) will be discharged to the City of Graham Sanitary sewer. Blowdown liquid will pass through a heat exchanger to reduce the temperature of the liquid discharge (1.0 gpm from each scrubber) below 150°F.

11,593 lbs/hr of water will be evaporated from each scrubber into the gas stream exiting the scrubber stack.

b. Ash Residues

Two (2) internal ash transfer rams in each incinerator will move ash to an in-floor wet ash pit. Quenched ash is removed from the ash pit by an automatic ash hoe which dumps the ash into a metal ash receptacle under the hoe assembly. A forklift will be used to dump the ash from the receptacle into a 26 cubic yard roll-off/roll-on container rated for sludge service. These containers will be filled to about 20 cubic yards, the maximum weight allowed over the roads for these vehicles. These containers will have a sealable dump gate and a roll tarp cover.

At maximum operating capacity, approximately 48,160 pounds of ash (7.5% of waste burned) will be generated each week.

Ash stored in the roll-off containers will be drained (through closable drain cocks) for at least 12 hours before hauling to the Alamance County Landfill (approval letter, dated 5/18/89 shown in Appendix 1). Ash hauling will be by commercial vendor in covered roll-off containers. The vendor will select the route to the landfill. By the nearest route, the landfill is approximately 10 miles from the TRS facility.

Water, drained from the roll-off containers, will be piped by floor drain to one of the ash-hoe pits. This constitutes a closed-loop system for the ash quenching water.

c. Floor Cleanup and Wash Water

All floor drains in the incinerator building and refrigerated storage area will be connected to an underground storage tank outside the building. The collected liquids will be pumped into the lower chamber of one of the incinerators. This system constitutes a closed loop for all liquids which may have come in contact with any waste.

d. Domestic Sewage

All waste from the batrooms and shower facilities will be discharged to the City of Graham Sewerage System.

7. TRS Emergency Response Team and Vehicle

- Provide a permanently equipped and staged vehicle designed and equipped strictly for decontamination and abatement. Chemical sanitizers will be carried to provide a minimum of 3 minutes rinsing of contaminated areas with: hypochlorite solution (500 ppm available chlorine); phenolic solution (500 ppm active agent); iodoform solution (100 ppm available iodine); or quarternary ammonium solution (400 ppm active agent).
- Available 24 hours per day, 7 days per week to respond to any TRS medical waste spills or emergency cleanup situations which might occur.
- Available on 24 hour schedule to infectious waste generators, transporters and governmental agencies which need emergency service on a commercial basis.
- Backup trucks will be available for load transfer in case of a highway accident during transport.
- Provide continuous communication with experienced on duty personnel for advice and response to emergency situations.

Zoning

The land on which this facility is located is in an industrial park on Porter Avenue, Graham, NC. It is zoned I-1, Light Industrial District. Road access to this facility does not pass through any residentially zoned land. The facility is less than 1/4 mile from I-85. See Appendix 2 for zoning requirements (I-1).

Operational Procedures in a Worst Case Malfunction

The worst case malfunction would involve simultaneous loss of electrical power and water during a loading cycle with the fire door raised and the ram feeder extended into the lower chamber of the incinerator.

There are many design features built into the Joy incinerator to provide an orderly shutdown under power failure and water pressure loss conditions. These design features include:

Power Failure

If control power or main line voltage is lost to the programmable logic controller (PLC), the following will take place:

An alarm will sound

Operator spring on the hot damper in the incinerator stack will automatically move damper to fully open position in 5 seconds. This will dump all gas emissions up the incinerator stack

- The PLC will shut down
- All hydraulics will cease to function
- All burners will shut down
- The operator interface terminal (OIT) will shut down
- The emergency by-pass panels will shut down

The PLC will perform an "orderly shutdown" that includes the following:

- All input status tables are stored away (input status)
- All output status tables are stored away (output status)
- All timer values will be stored
- All counter values will be stored
- All latch statuses will be stored away

The main power disconnect switch will manually be turned to the off position. The feed ram will be manually retracted by:

- Depressing the solenoid activation pin located at each end of the solenoid directional control valve. The valves are located on the valve manifold on top of the hydraulic fluid reservoir. This will normally be a two man operation in that one man will have to exert constant pressure on the solenoid plunger while another man moves the device. Pressure on these pins vents the hydraulic fluid directly into reservoir
- The feed ram is withdrawn from the lower chamber of the incinerator by shifting its directional control valve and withdrawing ram with a come-along installed on the ram for this purpose

After the feed ram is completely out of the incinerator, the charging door can be lowered by:

- Shifting its directional control valve in the manner described above
- Gravity will lower the door

Water Supply Failure

Water supply will be lost to the scrubber, to the ram feeder hopper (fire protection), and to the ash hoe pit.

- Motor and blower on scrubber will automatically shut down
- Operator will be notified by an alarm
- The ram feeder will be locked out after the feeding cycle has been completed (assuming cycle is in progress)
- The ash hoe will be locked out
- The burners in the lower chamber will shut down

Estimated Emissions Under Upset Conditions

Assumes under worst case scenario that a fresh charge of waste (approximately 190 pounds) has just been loaded into the lower chamber.

- Temperature in the upper chamber is 1800°F and 1450°F in the lower chamber
- Smoke density will be 40% (Ringelman) for 3 to 4 minutes

- All volatiles in the waste will be burned in 10 minutes or less. Fixed carbon in the lower chamber will require 20 hours for burndown
- No infectious organisms will be released into the atmosphere
- Particulate emission rate will be 10.59+ lb/hr and HCl emission rate will be 30+ lb/hr depending on the waste constituents in the lower chamber and the temperature reduction in both chambers. Both particulate and HCl emissions will decrease over time as the fixed carbon is consumed
- There will be an increase in carbon monoxide and other products-of-incomplete-combustion (carbon, hydrocarbons, organic acids, polycyclic organic matter) during the burn down due to lack of oxygen to provide stoichiometric conditions

As required by 15 NCAC 2D .0535(f), the Regional Supervisor, Winston-Salem Region of the Division of Environmental Management will be notified as promptly as possible when particulate visible emissions exceed regulations.