HEALTH MANAGEMENT, INC.
OPERATIONS AND CONTINGENCY PLAN

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I. Facility Identification

A. Location and Owners

1. TN. Permit Identification No: _____
2. Name: Health Management, Inc. Facility
3. Mailing Address: 540 Rivergate Road
   Memphis, Tennessee 38109
4. Location:

   a) Street - 540 Rivergate Road
   b) City - Memphis
   c) County - Shelby
   d) State - Tennessee
   e) Zip Code - 38109
5. Telephone: (901) 948-1355
6. Owner/Operator: Browning-Ferris Industries of Tennessee, Inc.
7. Owner/Operator Address:

   Browning-Ferris Industries of
   Tennessee, Inc.
   540 Rivergate Drive
   Memphis, Tennessee 38109
   (901) 948-1355

8. Contact Persons:

   Gerd Hensen, District Manager
   E. J. McVoy, Operations Manager

B. History

BFI of Health Management, Inc. has operated medical waste collection operations in the Memphis area since 1987.

C. Description

This BFI facility is engaged in the collection, transportation, and treatment of infectious waste. Treatment is accomplished by incineration or steam sterilization (autoclaving).

1. The facility consists of the following:

   a) One 1350 lb. per hour (rated cap.) Simonds Manufacturing Model AF5B gas fired two stage incinerator with ram loader and ash removal system. Secondary stage temperature, 1800°F.
   b) One gas fired, low pressure electric pilot boiler.

c) Two WSF (96" O.D. x 20' ssl) horizontal autoclaves @ 9.5 cubic yard per hr. cap) with two (2) WSF Rapidoor on each autoclave. The design factors are 125 PSIG and 350°F.
d) One refrigerated storage area.
e) One 40 cubic yard compactor and bin dumper.
f) Employee change, sanitary, shower facilities.
g) Office areas.
h) Employee lunch and eating area.
i) Vehicle waste area.
j) Conveyor systems.
k) Waste bins.
l) Loading docks.
m) 6' Security fencing with gates around entire site.
n) Asphalt pavement for truck/trailer storage.
o) Employee parking area.

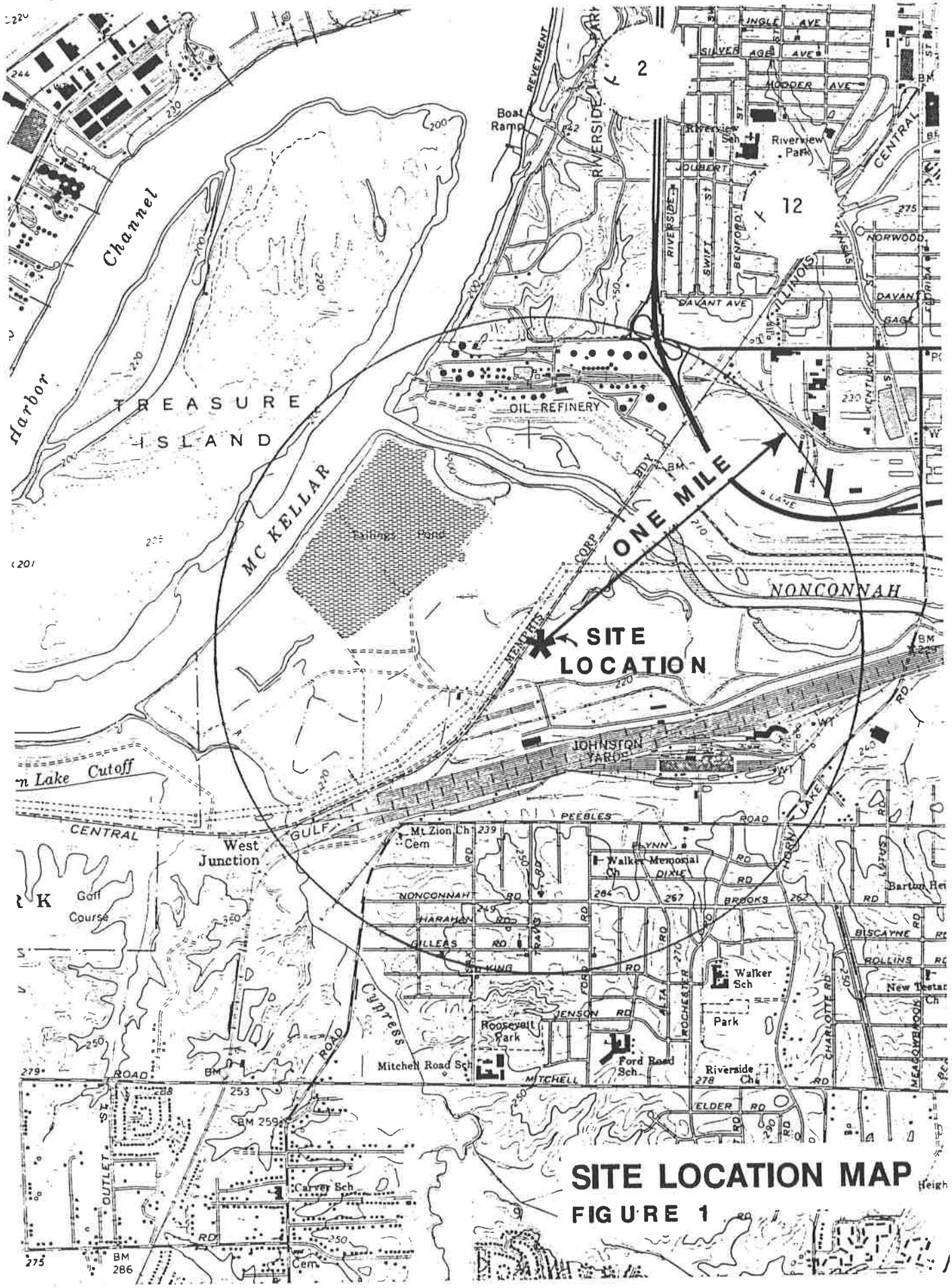
D. Hours of Operation

The Facility has been designed for continuous operation - 24 hours, 7 days per week. The actual operation of the Facility will depend on the volume of waste needing processing, and the Facility may only operate part time on occasion.

During periods when the plant is not operating, the Facility will be secured.

SECTION I ATTACHMENTS

1. Area Location Map
2. Site Layout
3. Building Layout
4. Permits (when issued)

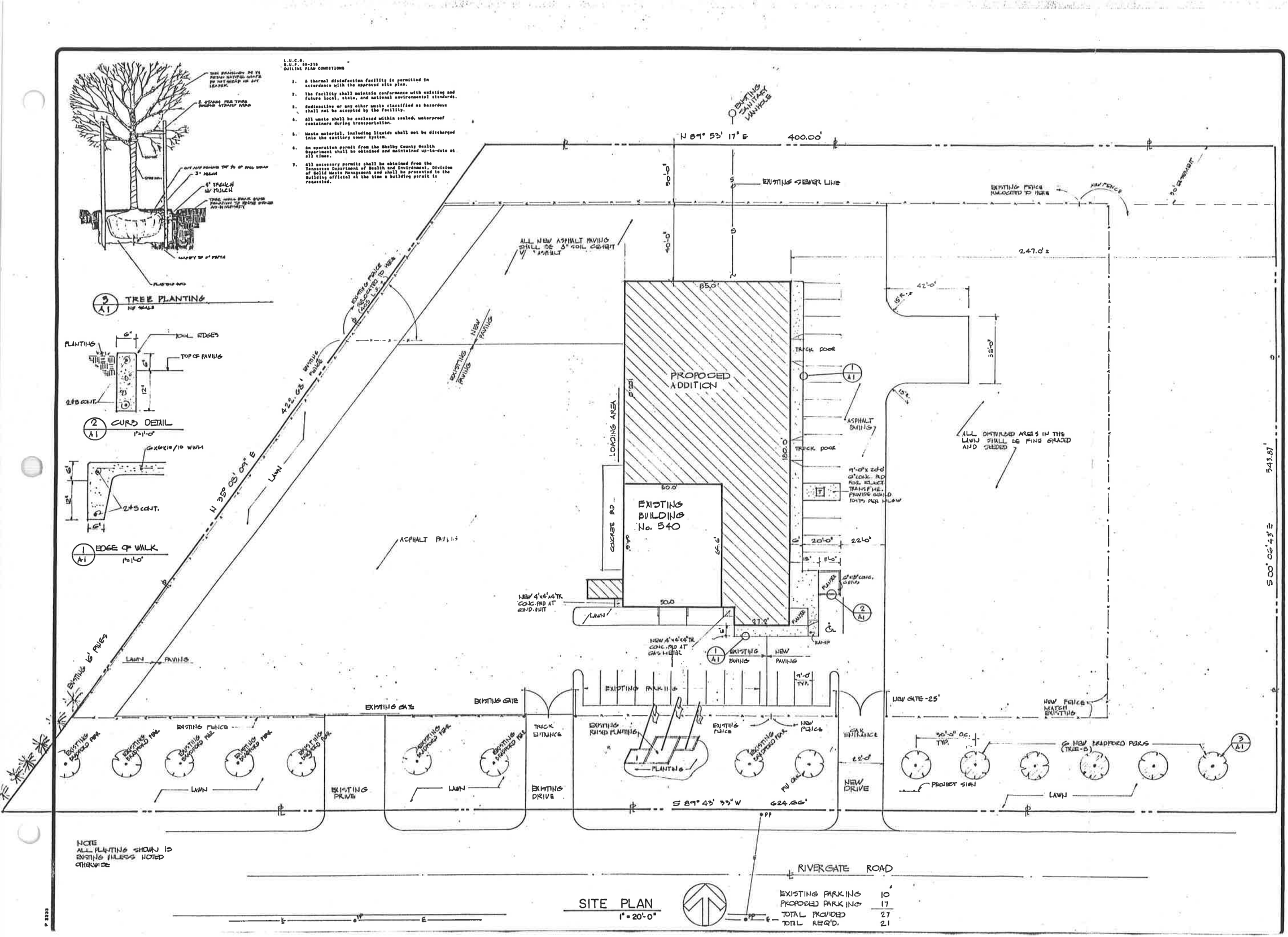


SITE LOCATION MAP

FIGURE 1

L.U.C.D.
S.U.P. 89-318
OUTLINE PLAN CONDITIONS

1. A thermal disinfection facility is permitted in accordance with the approved site plan.
2. The facility shall maintain conformance with existing and future local, state, and national environmental standards.
3. Radioactive or any other waste classified as hazardous shall not be accepted by the facility.
4. All waste shall be enclosed within a sealed, waterproof containers during transportation.
5. Waste material, including liquids shall not be discharged into the sanitary sewer system.
6. An operation permit from the Shelby County Health Department shall be obtained and maintained up-to-date at all times.
7. All necessary permits shall be obtained from the Tennessee Department of Health and Environment, Division of Solid Waste Management and shall be presented to the Building official at the time a building permit is requested.



NOTE
ALL PLANTING SHOWN IS EXISTING UNLESS NOTED OTHERWISE

SITE PLAN
1" = 20'-0"

EXISTING PARKING	10
PROPOSED PARKING	17
TOTAL PROVIDED	27
TOTAL REQ'D.	21

REVISIONS	BY

O. MARVIN JOHNSON
ARCHITECT
5583 MURRAY RD. SUITE 201
MEMPHIS, TN 38119
901-685-5503

B.F.I.
MEDICAL WASTE SYSTEMS
540 RIVERGATE RD. MEMPHIS, TN.

DRAWN	OMJ
CHECKED	
DATE	8-15-89
SCALE	1" = 20'-0"
JOB NO.	89-05
SHEET	A-1
OF	6 SHEETS

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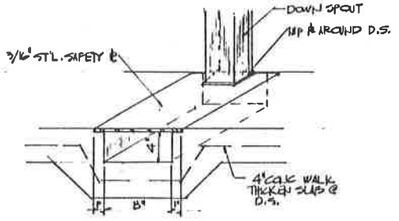
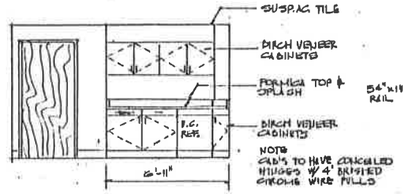
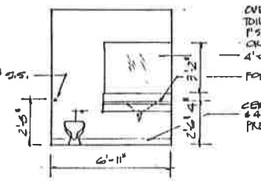


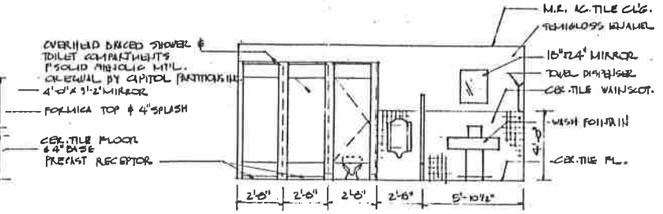
DRAIN AT DOWNSPOUT IN WALK
1½"=1'-0"



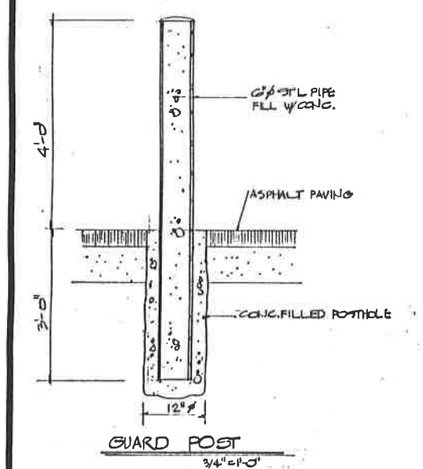
3/A2 EAST WALL - BREAK
½"=1'-0"



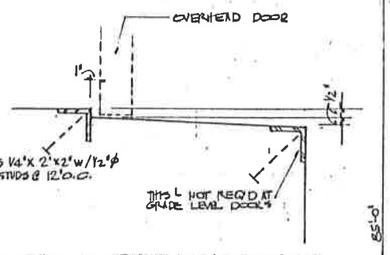
2/A2 WEST WALL - HANDICAP TOILET
½"=1'-0"



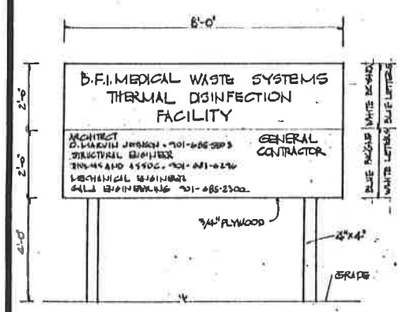
1/A2 NORTH WALL - MEN
½"=1'-0"



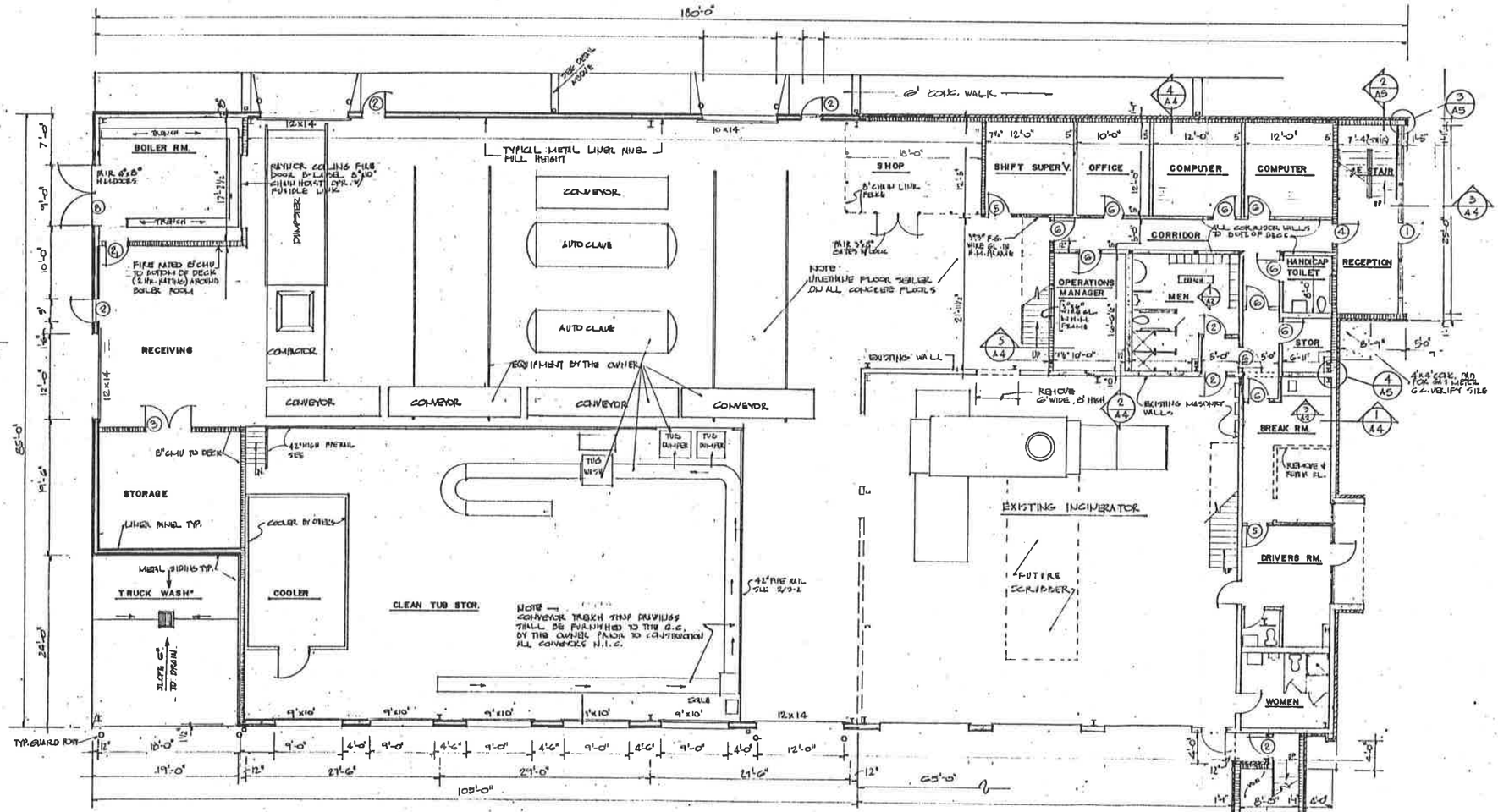
GUARD POST
3/4"=1'-0"



SILL AT UPWARD ACTING DOORS
3"=1'-0"



PROJECT SIGN
1/2"=1'-0"



GROUND FLOOR PLAN
1/8"=1'-0"

EXISTING BUILDING	3,925 SQ. FT.
PROPOSED ADDITION	12,416 SQ. FT.
TOTAL	16,341 SQ. FT.

REVISIONS	BY

O. MARVIN JOHNSON
ARCHITECT
5583 MURRAY RD. SUITE 201
MEMPHIS, TN 38119
901-685-5503

B.F.I.
MEDICAL WASTE SYSTEMS
540 RIVERGATE RD. MEMPHIS, TN.

DRAWN	OMJ
CHECKED	
DATE	8-15-89
SCALE	1/8"=1'-0"
JOB NO.	89-05
SHEET	A-2
OF 6 SHEETS	

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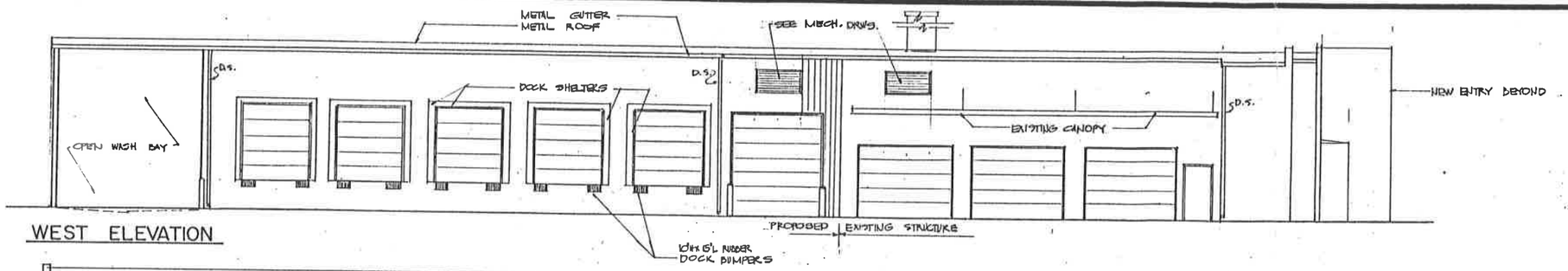
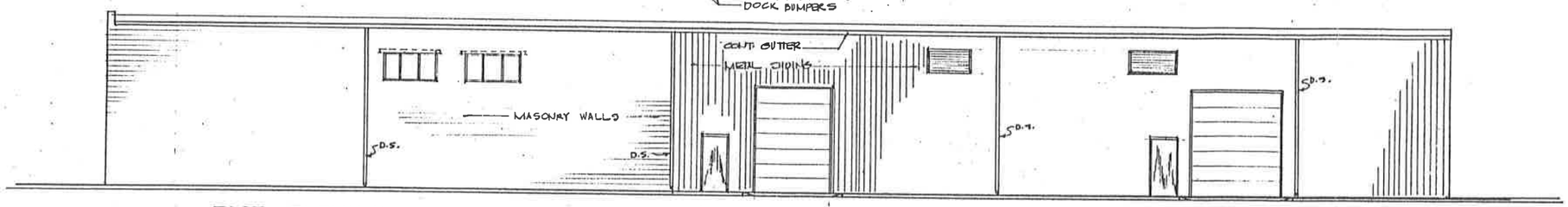
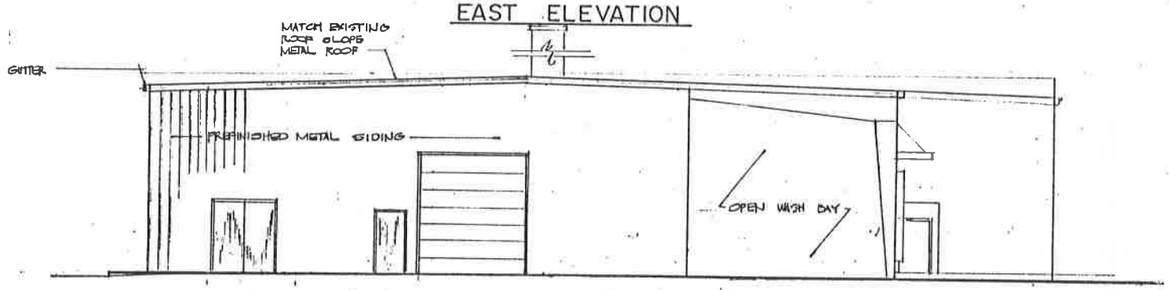


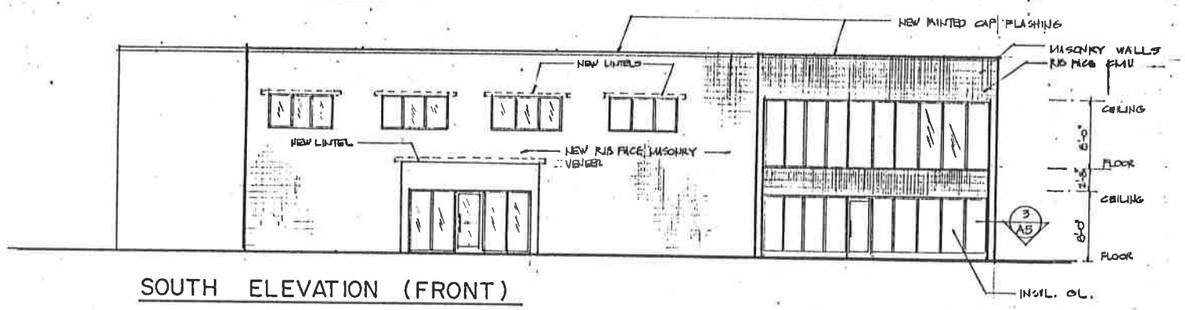
WEST ELEVATION



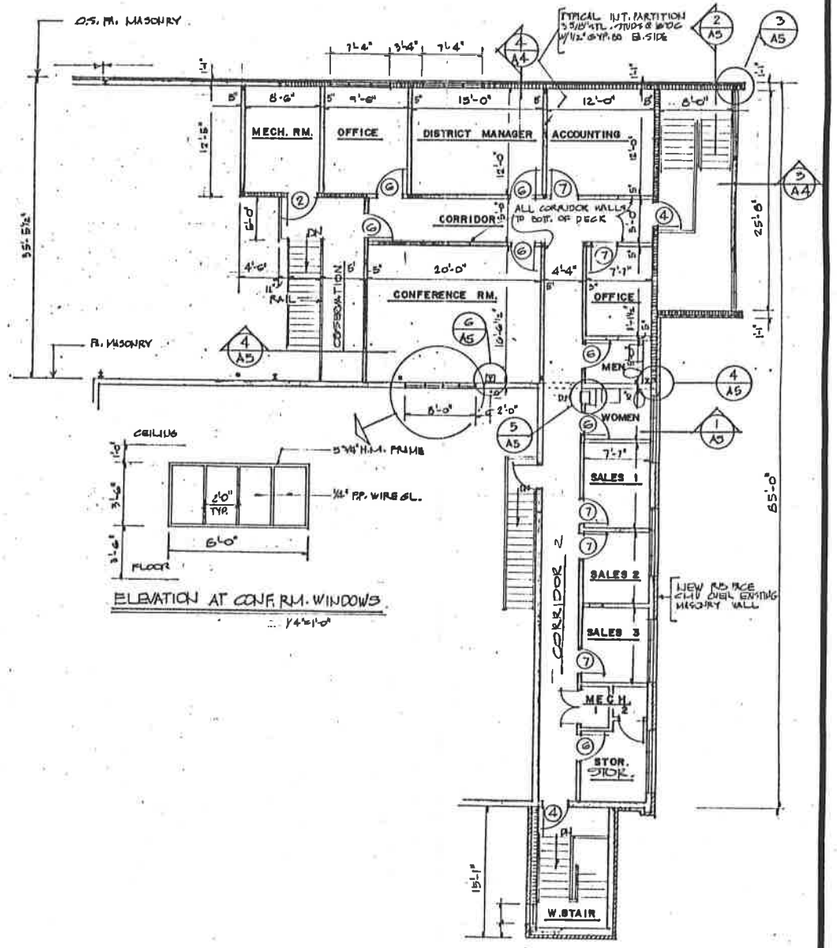
EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION (FRONT)



ELEVATION AT CONF. RM. WINDOWS

SECOND FLOOR PLAN

2231 SQ. FT.

REVISIONS	BY

O. MARVIN JOHNSON
ARCHITECT
5583 MURRAY RD. SUITE 201
MEMPHIS, TN 38119
901-685-5503

B.F.I.
MEDICAL WASTE SYSTEMS
340 RIVERSATE RD. MEMPHIS, TN.

DRAWN	OMJ
CHECKED	
DATE	8-15-89
SCALE	1/8"=1'-0"
JOB NO.	89-05
SHEET	A-3
OF 6	SHEETS

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Air Pollution Control

Memphis and Shelby County Health Department

OPERATING PERMIT

COMPANY NAME HEALTH MANAGEMENT, INC.

ADDRESS 540 Rivergate Road Memphis, TN 38109

DATE ISSUED 3-16-89 *EXPIRATION DATE* 3-16-90 *PERMIT NO.* 0627-01P

SOURCE DESCRIPTION INFECTIOUS WASTE INCINERATOR:

Fuel: Natural Gas;

Design Charging Rate: 1300-1600 pounds per hour;

Operating Rate: 7488 hours per year maximum;

The holder of this permit shall comply with the conditions contained in this permit as well as all applicable provisions of the Memphis and Shelby County Air Pollution Control Regulations. A permit condition may be appealed by filing a petition for reconsideration within thirty (30) days after the mailing date of the permit.

CONDITIONS:

1. This installation is to operate within the applicable visible emission limits as stated in Section 16-83, Reference 1200-3-5 of the Memphis City Code.

2. This source shall comply with all applicable regulations for incinerators as stated in Section 16-84 of the Memphis City Code.

3. This source shall comply with all applicable regulations pertaining to excess emissions due to malfunctions, startups and shutdowns as stated in Section 16-87, Reference 1200-3-20 of the Memphis City Code.

CONT'D ON PAGE 2-

MANAGER OF POLLUTION CONTROL

No authority is granted by this permit to operate, construct, or maintain any installation in violation of any law, statute, code, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.

NON TRANSFERABLE *POST OR FILE AT INSTALLATION ADDRESS*

EA.

Air Pollution Control

Memphis and Shelby County Health Department

OPERATING PERMIT

COMPANY NAME Health Management, Inc.

ADDRESS 540 Rivergate Road Memphis, TN 38109

DATE ISSUED 3-16-89 EXPIRATION DATE 3-16-90 PERMIT NO. 0627-01P

CONTINUATION SHEET -- PAGE NUMBER 2 OF 2 PAGES

4. This source shall be required to comply with the requirement of standards for infectious waste incinerators as stated in Chapter 1200-3-25 of the State of Tennessee Air Pollution Code, should the rule become enacted in the Memphis and Shelby County Air Pollution Codes.

5. Particulate emission from this source shall not exceed 0.2 grains per dry standard cubic foot of flue gas at standard conditions corrected to twelve percent (12%) carbon dioxide by volume excluding the contribution of auxiliary fuel.

6. The owner and/or operator of this source shall maintain records of the amount and type of the wastes fired in this unit.

7. Additional stack testing may be required should visible emissions exceed the applicable visible emissions limits as stated in Section 16-83, Reference 1200-3-5 of the Memphis City Code during periods of operations at or near the maximum capacity of 1600 pounds per hour.

8. The issuance of this permit does not exempt the permittee from any requirements of the Environmental Protection Agency pertaining to the emissions from the operation of this source.

9. This Department may require air compliance testing (EPA Method 5) to verify the compliance status of this incinerator.

10. Sixty (60) calendar days prior to the expiration of this permit, permittee shall apply for a permit renewal.

EA. K

Air Pollution Control

Memphis and Shelby County Health Department

CONSTRUCTION PERMIT

COMPANY NAME Health Management, Inc.

ADDRESS Lot 62, Rivergate Road, Memphis, TN 38109

DATE ISSUED 4-22-86 *EXPIRATION DATE* 10-22-86 *PERMIT NO.* 0627-011

SOURCE DESCRIPTION Infectious and Pathological Waste Incinerator.

Fuel: Natural gas

Design Charging Rate: 1310 lbs/hr.

Operating Rate: 7488 hrs/yr max

Deviation from approved application shall void this permit. This is not an Operating Permit. Tests and/or additional air pollution control equipment may be required prior to issuance of an Operating Permit. A permit condition may be appealed by filing a petition for reconsideration within thirty (30) days after the mailing date of the permit. The Air Programs Branch shall be notified within 30 days of initiation of operation.

CONDITIONS:

1) This installation is to operate within the applicable visible emissions limits as stated in Section 16-83, Reference 1200-3-5 of the Memphis City Code.

2) This source shall comply with all applicable regulations for incinerators as stated in Section 16-84 of the Memphis City Code.

3) Particulate matter from this source shall not exceed 1.80 lbs/hr.

4) This permit does not authorize any construction that does not conform to the conditions of this permit and the information contained in the approved application dated 4-3-86 on file with this Department.

Delyn Keith

MANAGER OF POLLUTION CONTROL

No authority is granted by this permit to operate, construct, or maintain any installation in violation of any law, statute, code, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.

DD *NON TRANSFERABLE* *POST OR FILE AT INSTALLATION ADDRESS*

Air Pollution Control

Memphis and Shelby County Health Department

CONSTRUCTION PERMIT

COMPANY NAME Health Management, Inc.

ADDRESS Lot 62, Rivergate Road, Memphis, TN 38109

DATE ISSUED 4-22-86 **EXPIRATION DATE** 10-22-86 **PERMIT NO.** 0627-011

SOURCE DESCRIPTION Continuation from Page One

Deviation from approved application shall void this permit. This is not an Operating Permit. Tests and/or additional air pollution control equipment may be required prior to issuance of an Operating Permit. A permit condition may be appealed by filing a petition for reconsideration within thirty (30) days after the mailing date of the permit. The Air Programs Branch shall be notified within 30 days of initiation of operation.

CONDITIONS:

5) This Department shall be notified in writing at least ten days prior to start-up of this source.

6) Within thirty days after initial start-up the owner/operator of this source shall apply for an operating permit from this Department.

7) The issuance of this permit does not exempt the permittee from any requirements of the Environmental Protection Agency pertaining to the emissions from the operation of this new source.

Delyn Keith

MANAGER OF POLLUTION CONTROL

No authority is granted by this permit to operate, construct, or maintain any installation in violation of any law, statute, code, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.

DD *NON TRANSFERABLE* *POST OR FILE AT INSTALLATION ADDRESS*

Permit No. B86240120

Certificate of Occupancy

THE PREMISE KNOWN AS

540 Rivergate

IS HEREBY APPROVED FOR USE AND OCCUPANCY AS

Health Management Inc.

AND IS GOVERNED BY THE REGULATIONS SET FORTH AND KNOWN AS THE MEMPHIS AND SHELBY COUNTY ZONING ORDINANCE-RESOLUTION AND MEMPHIS AND SHELBY COUNTY BUILDING CODES

ZONING I-H FIRE DISTRICT O USE GROUP F

MAXIMUM CAPACITY ----

MAXIMUM ALLOWABLE FLOOR LOAD ----

VARIATIONS GRANTED ----

OWNER Health Mangement, Inc.

CONTRACTOR The Wright Construction Company

ARCHITECT Charles Baxter McCord

MEMPHIS AND SHELBY COUNTY OFFICE OF CONSTRUCTION CODE ENFORCEMENT
SHELBY COUNTY ADMINISTRATION BUILDING
ROOM 750, 160 NO. MID-AMERICA MALL
MEMPHIS, TENNESSEE 38103-1674

Wayne Welch

ISSUED BY 12/11/86 S.W.

SALES AND USE TAX

CERTIFICATE OF REGISTRATION

THIS CERTIFICATE MUST BE PUBLICLY DISPLAYED

OWNERS:

HEALTH MANAGEMENT, INC.

EFFECTIVE DATE	TAXPAYER ACCOUNT NUMBER
03/22/87	2-621269916-001-1

PIA = 5996

HEALTH MANAGEMENT, INC.
540 RIVERGATE DR.
MEMPHIS TN 38109

COMMISSIONER OF REVENUE

TENNESSEE DEPARTMENT OF REVENUE, ANDREW JACKSON STATE OFFICE BUILDING, NASHVILLE, TENNESSEE 37242 - 1399

RV-1312 (REV. 1-87)

13-002-0104

MEMPHIS AND SHELBY COUNTY TENNESSEE
BUSINESS TAX LICENSE

License/Receipt: G 880527012 RL

Account Number: 860-03509-8

2F

MUST BE POSTED IN A CONSPICUOUS PLACE

THIS LICENSE EXPIRES 04/01/89

Shelby County Clerk
RICHARD E. "SONNY"
MASHBURN
160 N. MID AMERICA MALL,
MEMPHIS, TENNESSEE 38103

HEALTH MANAGEMENT INC
INCORPORATION

540 RIVERGATE
MEMPHIS TN 38109

Richard E. "Sonny" Mashburn, County Clerk

State of Tennessee
Department of Health and Environment
Division of Solid Waste Management

Solid Waste Management Program
4th Floor, 701 Broadway
Nashville, Tennessee 37219-5403
(615) 741-3424

REGISTRATION AUTHORIZING SOLID WASTE PROCESSING ACTIVITIES IN TENNESSEE

Registration Number: SWP 791060213

Date Issued: AUG 28 1986

Issued to Health Management, Inc., for a facility located in the Rivergate Industrial Port, Rivergate Road, Memphis, Shelby County Tennessee.

Activities Authorized: Solid Waste Processing by Incineration.

By my signature, this registration is issued in compliance with the provisions of the Tennessee Solid Waste Disposal Act (Tennessee Code Annotated, Section 68-31-101, et seq.), and applicable regulations developed pursuant to this law and in effect; and in accordance with the conditions and other terms set forth in this registration document and the attached Registration Conditions.

Tom Tiesler, Director
Division of Solid Waste Management

MEC/lag/SW-18-1 P/R #4

Solid Waste Processing Facility
Registration Conditions
Part I
GENERAL TERMS

The following conditions shall apply to all facilities except where Part II conditions are in conflict. In that case the Part II condition shall take precedence over the Part I condition.

1. This registration shall be valid for the expected operating life of the facility, barring revocation or suspension and unless otherwise provided in the Conditions.

2. This registration may be transfered only in accordance with the requirements of Rule 1200-1-7-.02(3) of the Rules Governing Solid Waste Processing and Disposal in Tennessee.

3. All applicable facility standards of the Rules Governing Solid Waste Processing and Disposal in Tennessee shall be considered to be condition of this registration which must be complied with, even if they are not included in Part II below.

4. This registration may be revoked or suspended upon any significant violation of the terms or conditions set forth herein or the applicable requirements of the Rules Governing Solid Waste Processing and Disposal in Tennessee.

5. This registration may be reviewed and reevaluated at any time.

6. This registration shall be modified if:

   a. Upon review, the Commissioner or Board determines that the registrant cannot adequately meet current terms;or

   b. The registrant seeks to expand or modify his facility's operation and provides the Commissioner or Board with all necessary documentation to justify the modification; or

   c. The regulatory standards and/or other requirements on which this registration is based change significantly.

7. The facility herewith registered is subject to investigation by Department staff at any reasonable time, and all facility operations may be subject to investigation. Such investigations may include inspection and copying of applicable records, inspection of equipment and operations, and the taking of samples and/or pictures.

8. Any violation of the conditions or other terms of this registration may subject the registrant to the penalties set forth in Tennessee Code Annotated Section 68-31-114 and 68-31-117.

9. No liquids, industrial special wastes or wastes requiring special handling shall be accepted at this facility unless prior written approval for each individual waste, is obtained from the Division of Solid Waste Management.

10. No hazardous waste, as regulated by the Tennessee Hazardous Waste Management Act (Tennessee Code Annotated, Section 68-46-101, et. seq.), and the Rules adopted pursuant to that Act, shall be accepted at this facility.

Part II
Conditions of Registration

1. Only those wastes, as specified in the approved Operations Manual dated May, 1986, shall be processed in the incinerator.

2. This registration is issued in conjunction with approval of operations from Air Pollution Control, Memphis and Shelby County Health Department. If the registrant violates any of the Air Pollution Control's regulations, then he shall also be in violation of this registration.

3. Health Management, Inc. shall conduct an initial hazardous waste determination on the ash from the incinerator and then subsequent follow-up determinations on a periodic basis. All ash shall be disposed of in a permitted landfill with authorization to handle that type waste. Approval shall be obtained, in writing, from the Division of Solid Waste Management prior to disposal in any facility.

4. Cleanup and wash-down of the facility shall be performed as needed.

5. The incinerator shall be operated by the facility attendant only.

6. An attendant shall be present at all times during the hours the facility is in operation.

MEC/lag/SW-18-3 P/R #4

II. Waste Types

The facility is designed to handle and process waste material emanating from medical type facilities. Infectious waste includes a wide range of materials and waste categories.

A. Definition of Waste Types

The United States Environmental Protection Agency defines infectious waste as ... "waste capable of producing an infectious disease". The State of Tennessee's definition of infectious waste is as follows:

"Infectious wastes" means solid wastes which contain or reasonably may contain pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease. For purposes of this Rule Chapter, the following wastes shall be considered to be infectious wastes:

1. Wastes generated by hospitalized patients who are isolated to protect others from communicable diseases (see the U.S. Centers for Disease Control Guidelines for Isolation Precautions in Hospitals, July, 1983, for definition of diseases requiring such isolation).

2. Cultures and stocks of infectious agents, including specimen cultures from medical and pathological laboratories, cultures and stocks of infectious agents from research and industrial laboratories, wastes from the production of biologicals, discarded live and attenuated vaccines, and culture dishes and devices used to transfer, inoculate, and mix cultures.

3. Waste human blood and blood products such as serum, plasma, and other blood components.

4. Pathological wastes (i.e., tissues, organs, body parts, and body fluids that are removed during surgery and autopsy.)

5. All discarded sharps (e.g. hypodermic needles, syringes, pasteur pipettes, broken glass, scalpel blades) used in patient care or which have come into contact with infectious agents during use in medical, research, or industrial laboratories.

6. Contaminated carcasses, body parts, and bedding of animals that were intentionally exposed to pathogens in research, in the production of biologicals, or in the in vivo testing of pharmaceuticals.

7. The following wastes (where the wastes) are from patients known to be infected with blood-borne disease or where the wastes have been determined to be infectious by a responsible authorized person at the facility:

   a) Contaminated wastes from surgery and autopsy (e.g., soiled dressings, sponges, drapes, lavage tubes, drainage sets, underpads, surgical gloves).

   b) Wastes from medical, pathological, pharmaceutical, or other research, commercial, or industrial laboratories that were in contact with infectious agents (e.g., specimen containers, slides and cover slips, disposal gloves, lab coats, aprons).

   c) Wastes that were in contact with the blood of patients undergoing hemodialysis, including contaminated disposal equipment and supplies such as tubing, filters, disposable sheets, towels, gloves, aprons, and lab coats.

   d) Discarded equipment and parts that were used in patient care, medical and industrial laboratories, research, and in the production and testing of certain pharmaceuticals and that may be contaminated with infectious agents.

B. Methods of Treatment

Local BFI operations policy specifies each of the waste types should be treated in the following manner:

1. Cultures and stocks of infectious agents - either autoclaving or incineration.
2. Infectious laboratory waste - either autoclaving or incineration.
3. Pathological waste - incineration only.
4. Isolation Waste - either autoclaving or incineration.
5. Human and Animal Blood and Blood Products - either autoclaving or incineration.
6. Contaminated carcasses, body parts, and bedding of infectious animals.

    a) Contaminated carcasses, and body parts - incineration only.
    b) Bedding of infectious animals - either autoclaving or incineration.

7. Needles and syringes, scalpel blades and other medical sharps - either autoclaving or incineration.
8. Chemotherapy Waste - incineration only.
9. Pharmaceutical Waste - incineration only.
10. Other waste materials - either autoclaving or incineration.

Operations' policy prohibits the treatment of those items classified as HAZARDOUS WASTE AND/OR RADIOACTIVE WASTE.

SECTION II - ATTACHMENTS

1. Tennessee Infectious Waste Regulations

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

DSWM TECHNICAL POLICY MEMORANDUM SW-88-1

TO: DSWM Staff and Other Interested Persons

FROM: Tom Tiesler, Director
Division of Solid Waste Management

SUBJECT: Special Waste Approval Policy: Disposal of Infectious Wastes in Sanitary Landfills - Revised

The purpose of this memorandum is to set forth restrictions and minimum requirements that must be met in order for this Division to approve the disposal of infectious wastes in sanitary landfills. Our approval is required pursuant to Rule 1200-1-7-.06(3) (a) 10 of the Rules Governing the Planning, Construction, Operation, and Maintenance of Solid Waste Processing and Disposal Systems in Tennessee. Unless otherwise authorized in writing by me, Division staff must ensure that at least these restrictions and minimum requirements are included in any special waste approval granted for disposal of infectious waste in a sanitary landfill. Additional or more stringent requirements may also be imposed if the Division Field Office Manager determines they are necessary because of special circumstances.

This revised policy is the result of the regulatory deliberations that this Division and this Department have engaged in over the last several months. It has been developed in conjunction with infectious waste rulemaking efforts of the Divisions of Health Care Facilities and Air Pollution Control. This Technical Policy Memorandum shall, upon my signature, replace DSWM Technical Policy Memoranda SW-86-1 and SW-86-2 which I established in July, 1986. It reflects a change in this Department's approach toward the regulation of infectious wastes as expressed in those previous Memoranda. It is our intent to incorporate the restrictions and requirements set forth in this Memorandum into our non-hazardous solid waste regulations as we re-write those regulations.

The following definition of infectious wastes is to be used in implementing this policy, and is also being used by the Division of Health Care Facilities and the Division of Air Pollution Control in their regulatory efforts:

> "Infectious wastes" means wastes which contain pathogens with sufficient virulence and quantity so that exposure to the waste by a susceptible host could result in an infectious disease. For purposes of this policy, the following wastes shall be considered to be infectious wastes:

(1) Isolation Wastes - Wastes contaminated by patients who are isolated due to communicable disease, as provided in the U.S. Centers for Disease Control Guidelines for Isolation Precautions in Hospitals, (July 1983).

(2) Cultures and Stocks of Infectious Agents and Associated Biologicals- Cultures and stocks of infectious agents, including specimen cultures from medical and pathological laboratories, cultures and stocks of infectious agents from research and industrial laboratories, wastes from the production of biologicals, discarded live and attenuated vaccines, and culture dishes and devices used to transfer, inoculate, and mix cultures.

(3) Human Blood and Blood Products - Waste human blood and blood products such as serum, plasma, and other blood components.

(4) Pathological Wastes - Pathological wastes, such as tissues, organs, body parts, and body fluids that are removed during surgery and autopsy.

(5) Contaminated Sharps - All discarded sharps (e.g., hypodermic needles, syringes, pasteur pipettes, broken glass, scalpel blades) used in patient care or which have come into contact with infectious agents during use in medical, research, or industrial laboratories.

(6) Contaminated Animal Carcasses, Body Parts, and Bedding - Contaminated carcasses, body parts (including fluids), and bedding of animals that were intentionally exposed to pathogens in research, in the production of biologicals, or in the in vivo testing of pharmaceuticals.

(7) Facility-Specified Infectious Wastes - Other wastes determined to be infectious by a written facility policy.

This Division recommends that all infectious wastes be incinerated, steam sterilized, or otherwise rendered non-infectious prior to disposal in sanitary landfills. However, this Division does believe that infectious wastes can be landfilled without identifiable risk to public health or the environment if certain precautions are taken. Therefore, it shall be the policy of this Division that the following limitations and requirements be included as a minimum in any special waste approval for the landfill disposal of untreated infectious wastes and that they be strictly enforced:

Waste Stream Limitations - As described below, certain categories of infectious wastes may not be disposed of in sanitary landfills or may be so disposed of only after they have been treated or packaged in certain ways:

(1) Sharps must be securely packaged in puncture-proof packaging prior to landfilling.

(2) Cultures and stocks of infectious agents and associated biologicals must not be landfilled unless and until they have been treated (e.g., autoclaved, incinerated) to render them non-infectious. Once they have been properly treated, most such wastes (including those from typical health care institutions) may be approved for landfilling as part of the facility's normal solid waste stream (i.e., without having to comply with the special management requirements established later in this policy memorandum).

(3) Human blood and blood products and other body fluids may not be landfilled. This restriction applies to bulk liquids or wastes containing substantive amounts of free liquids, but does not apply to simply blood - contaminated materials such as emptied blood bags, bandages, or "dirty" linens.

(4) Recognizable human organs and body parts may not be landfilled.

Operating Restrictions - Infectious wastes must be managed at the landfill in accordance with the following provisions.

(1) Infectious wastes must be transported to the landfill separately from other solid wastes and in securely-tied plastic bags or other leak-proof containers.

(2) The landfill operator must obtain advance notice prior to receiving a shipment of infectious waste, or a routine delivery schedule must be established, such that the operator will have time to prepare to receive the waste.

(3) The landfill operator must confine unloading and disposal operations to a specific area, separate from the normal working face, prepared by him to assure proper disposal with minimum complications.

(4) By the end of the operating day, the landfill operator shall have applied at least one foot of cover material over the waste and shall have compacted the emplaced cover material. There should be no compaction of uncovered infectious waste.

It should be noted that this policy does not obligate this Division to allow the disposal of any infectious waste in any landfill. The granting of Division approval for disposal of any special waste in a landfill is a case-by-case determination to be made at the Division Field Office level based on several factors. That approval should be denied or revoked if the Field Office Manager has reason to believe that the above requirements will not be or are not being met.

It should also be noted that this Division's approval does not obligate the landfill operator to accept an infectious waste for disposal. He may refuse to accept such waste or he may impose additional conditions on the infectious waste generator.

Tom Tiesler

4-29-88

Tom Tiesler, Director
Division of Solid Waste Management

Date

TT/F3078123

III. District Personnel

Browning-Ferris Industries considers its employees to be its most valuable asset.

It is through their efforts that the facility operates at maximum efficiency, satisfy customer needs, service the public, ensure that contractual obligations are fulfilled, and enables these commitments to be performed without disruption to the community. Since these personnel are the key to BFI's success, it is important to recognize each position and its responsibilities individually.

The facility is a part of the BFI of Tennessee, Health Management, Inc. District. An organizational chart included as Figure III-1 illustrates the management structure and lines of communication present for this facility.

The job titles and responsibilities of the district personnel involved in the operation of the Health Management, Inc. Facility are listed below:

A. Facility Manager

The efficient operation and production of the Memphis Facility is the over all responsibility of the plant manager, including solving internal problems, communicating with all levels of personnel and management, and disseminating information and instructions. Listed below are the positions regular duties.

1. Ensure that corporate, regional and district policies are followed.

2. Attend weekly staff meetings with District Manager.

3. Provide weekly staff meetings with facility personnel.

4. Conduct management meetings with the following district management personnel:

5. Assist and advise department managers with the responsibilities of their respective departments. (Refer to individual job description).

6. Conduct special projects for the district manager, and regional staff when required.

7. Ensure safety policies are updated and enforced.

8. Ensure plant operation and production is maintained.

9. Administer reprimands and/or disciplinary actions for violation of company policy.

B. Secretary/Clerical

Displays a cordial and professional manner to facility visitors and guests. The duties of the position are as follows:

1. Answer the phones for the facility and direct calls and messages to appropriate personnel.

2. Type all correspondence, reports, forms, etc.

3. Filing - establish new files, correspondence, accounts payable, etc.

4. Establish personnel files for new employees and obtain applications from prospective employees.

5. Initiate injury reports for workers compensation accidents and ensure all filings and reports are properly documented.

6. Order office supplies.

7. Various assigned tasks.

8. Responsible for computer manifest records.

C. Safety Manager

To ensure that a safe working environment is maintained for the HMI District and a Safety Manager is employed to enforce compliance with state and federal regulations and corporate policy concerning employees health and well being.

The requirements of this position are:

1. Ensure that all prospective and current employees are administered an annual physical examination and required inoculations. Also, coordinate with the clinic and/or corporate

office to ascertain the results of these examinations to assure employees are physically able to discharge their required duties.

2. Enforce federal, state and corporate safety policy, and if necessary, recommend disciplinary actions to district management to ensure compliance.

3. Ensure all industrial accidents are reported to the proper state agents, independent administrator, corporate and regional offices. Follow up on medical and indemnity to ensure payment.

4. Advise district management concerning accruals, billings and claims status of individual and cumulative claims in the district.

5. Conduct safety meetings and deliver specialized training to employees on a monthly basis.

6. Monitor the use of personal protective equipment by plant personnel to ensure its usage.

7. Conduct monthly facility inspections and ensure compliance with governmental requirements.

8. Insure OSHA and DOT records are properly maintained.

9. Maintain certificates of insurance from vendors.

10. Provide orientation to new employees concerning safety policies and training.

11. Inventory and reorder safety supplies when needed, (i.e. personal protective equipment, first aid supplies, spill kits, etc.)

12. Advise the district manager on matters of management, compliance, or cost associated with the Risk Management/Loss Control function.

D. Sales Representative

1. Primary Responsibilities

Under the direction of the District Sales Manager and/or the Facility Manager, the position includes the following functions:

a) Increase the revenues, profitability, and customer base in the medical community, within the assigned territory. This is accomplished by selling BFI services to new customers, increasing services to existing customer, and securing price increases.

b) Maintain a minimum revenue, customer base and ensure customer retention within the assigned territory by:

(1) Performing customer relations activities ensuring customers receive proper services for their current and future waste disposal needs.

(2) Identify potential problem areas and implement corrective actions to ensure customers' services are interrupted and their needs completely provided for.

(3) Seek customer referrals from current BFI customers, and other potential sources.

2. Specific Responsibilities

a) Increase the revenues, profitability, and customer base within the assigned territory, by attaining monthly goals for new business at prescribed levels of profitability.

b) Maintain daily sales calls, of the following categories: cold calls for new business, appointment calls for new business, call-backs for new business, and customer relations calls on existing customers. Also, conduct assigned calls for price increases on an as needed basis.

c) Conduct customer relations calls on existing customers within the assigned territory to:

(1) Determine the adequacy of present service and prescribe alterations if required.

(2) ensure customer satisfaction with BFI service and implement corrective action when necessary.

(3) Obtain referrals for prospective customers.

d) The following customer retention activities are required:

(1) Complete BFI service call records on all customer relations calls. These must be signed by the customer and will become documentation in the customer's file.

(2) Obtain a signed, standard service agreement or BFI approved purchase order, for all new customers; and a signed service agreement, as necessary, from existing customers;

(3) Answer information/complaint calls;

(4) Answer customer cancellation calls and minimize lost business;

(5) Enforce service agreements when customers attempt to cancel prematurely;

(6) Conduct follow-up calls on former customers, 60 days after their service has terminated and attempt to reinstate their service.

e) The following administrative duties are also required.

(1) Prepare daily planning schedules and daily call reports.

(2) Participate in special projects such as market surveys.

3. Standards of Performance

a) Evaluation is based on the individuals ability to meet specific sales, retention, and growth goals.

b) The sales force will conduct itself in a manner that reflects positively on BFI's position and image in the market place in the following manner: compliance with BFI corporate policy regarding antitrust laws; adherence to appropriate dress codes; compliance with safe driving procedures; treat customers with respect; promote BFI without ridiculing competitors; and maintain professional conduct.

E. District Accounting Manager

Will provide the district manager and district controller with financial and statistical information relating to district operations as required; maintain timely and accurate accounting records pertaining to operations within the district's responsibility; and perform other duties as may be assigned by the District Manager and Controller.

1. Approval of expenditures authorized by the District Manager or Controller.

2. General ledge

a) Bank reconciliation

b) Balance sheet accounts

c) General ledge clearing

3. Payroll

4. Medical administrator

F. Plant Manager

The Plant Manager of the facility will be responsible for all functions in the operations department. Discharging these responsibilities will require interaction with the following personnel:

Route Drivers

Roll-off Drivers

Route Supervisors

Production Supervisors

Plant Operators

Maintenance

Familiarization with the personnel and their job requirements is a necessity to identify and implement needed changes.

Continued contact with other management personnel (i.e. accounting, sales, and safety) is necessary to perform the duties of the position.

The specific responsibilities of this position are as follows:

1) Enforcement of all safety policies

2) Attend the weekly operations meeting

3) Hold weekly supervisor meetings

4) Require a monthly plant/safety employee meeting

5) Monitor weekly production and implement required changes to improve where necessary

6) Maintain acceptable plant appearance

7) Provide operations data to management as required

8) Review the drivers daily VCR's, and coordinate needed repairs.

9) Develop production schedule based on trailer inventory, and coordinate with the floor supervisor.

G. <u>Production Supervisor</u>

In the absence of the Plant Manager, the Production Supervisor assumes the overall responsibilities for managing the facility. These responsibilities

include the safety and well being of employees, plant production, and facility maintenance.

Specific responsibilities include:

1. Unsafe acts, or violations of corporate policy must be corrected immediately, and later reported to the Operations Manager and Safety manager.

2. Supervise and direct waste flow and substitute work stations that are vacated.

3. Exchange compactor boxes as needed.

4. Direct and locate trailers for unloading.

5. Exchange recorder charts for autoclaves and the incinerator daily.

6. Ensure trailers are logged in prior to unloading and logged out after unloading and cleaning is completed.

7. Document any trailer damage (using trailer damage checklist) at the arrival, and prior to, departure of the brokers trailers.

8. Calculate the total of all manual production sheets at the end of each shift, and submit to the dispatcher.

9. Notify the Operations Manager of any operational needs (i.e., supplies, maintenance, equipment, etc.).

10. Perform spore test of autoclaved materials.

11. Coordinate the training of all new employees.

12. Ensure only authorized personnel are permitted in the plant for tours, and all tours are accompanied by plant personnel.

13. Ensure the radiation detector is calibrated daily.

14. Ensure personnel are properly attired and utilize prescribed personal protective equipment.

15. Complete supervisor's accident investigation form concerning any accidents which occur, and submit to the receptionist.

16. All boxes detected with unacceptable radiation levels (above .075 m/r) are isolated and reported by the Operations manager for disposal by a low level radiation contractor.

H. Route Supervisor

The Route Supervisor is the liaison between the customer, plant, and/or driver, and therefore his mannerisms influence the customer's initial impression. The responsibilities of this position include:

1. Courteous telephone manners with an extended effort to identify and alleviate the customers problems.

2. Initiate daily, weekly and monthly plant production reports, driver route sheets, trucking log and customer list on lotus format.

3. Print bar codes year-to-date by district - total lbs. and total dollars on MWS format.

4. Tie out daily driver route sheets to process report and manifest for month-end billing.

5. Maintain files on all broker loads, and special waste manifest.

6. Review driver's daily VCR's and, initiate immediate repairs. Maintain VCR's in the vehicle maintenance files.

7. Maintain monthly inventory on containers, red bags and sharps containers - order when needed.

8. Coordinate all customer call-in requests with route driver and sales rep.

9. Develop daily and monthly tape backup on MWS.

10. Inventory empty and full trailers on lot in order for the manager to schedule, and project the work load.

I. Route Driver

The route driver is the most visible employee and is responsible for the corporate image developed. Persons in this position must display a professional and courteous image when servicing customers. Listed below are routine duties for this position.

1. Daily collection of medical waste from the customer's facility.

2. Delivery of boxes, sharps containers and supplies to customers.

3. Coordinate with dispatcher concerning route changes or late customer call-in's.

4. Complete the daily VCR, retain the yellow copy in truck - white copy goes to mechanic for needed repairs and mileage log - pink copy goes to Operations Manager for review and filing.

5. Service the route truck on a daily basis (i.e. fuel and oil) clean the vehicle on a weekly basis.

6. Ensure all deficiencies noted on the previous days VCR are repaired and sign off on the previous days VCR that repairs are completed.

7. Proper documentation, enter the requested customer information on the manifest, (i.e., name, address, etc.), to prepare for the scanning of bar codes.

8. When collecting the waste at the customer's facility, scan boxes for radioactive material - (.075 mr/hr acceptance level). Also attach and scan bar codes for entry into inventory, and load boxes on the vehicle.

9. Prepare the bar code scanner to upload inventory and create the customer manifest. Obtain the customer's signature, provide the customer with a copy of the manifest, and return a copy of all manifest to the dispatcher at the days end. If no boxes are collected, a manifest must be prepared and a signature obtained with a copy retained by the customer, and a copy given to the dispatcher. The arrival and departure time must be noted on each route sheet.

10. At the completion of the daily route, return to the facility and unload the truck, return the bar code scanner to the shift supervisor for uploading into the MWS, and return all manifests and route sheets to the dispatcher.

J. Roll-Off Driver

The primary responsibility of the roll-off driver is to ensure that treated waste is disposed of at the designated local state approved landfill. This position's specific responsibilities are:

1. Exchange compactor boxes, as needed, deliver the loaded boxes of treated waste to the specified landfill, and dispose of the waste.

2. Record all deliveries on the log, designating the landfill to tie out disposal manifest with landfill billing at the month end.

3. When not exchanging compactor boxes, collect residual materials (i.e. needles, ash, glass, etc.) for disposal.

4. Upon request, assist in spotting the brokers trailers at the dock for unloading.

5. Complete the daily VCR's - retain the yellow copy in the truck, white copy goes to the mechanic for needed repairs and mileage log - submit the pink copy to Operations Manager for review and filing by dispatcher.

6. Service the vehicle (i.e. fuel and oil) when required.

7. Contact the dispatcher daily for additional instructions.

K. Plant Operators

The plant operators under the direction of the shift supervisors are responsible for identifying and segregating waste for disposal, and ensure the waste is properly treated. Plant operators are also responsible for the loading and unloading of the autoclaves and incinerator and the proper operation of these units.

Listed below are the daily work duties:

General

1. When unloading waste from trailers utilize the conveyor systems, and wear the required PPE (gloves, face shields, aprons, safety shoes, and uniforms).

2. At the beginning of each shift, program the HMI system screen, at the dock, to receive main menu and prepare for the scanning of the bar codes.

3. Stack containers no more than 3 high, when they are unloaded from the vehicle.

4. The stacked containers are placed on the scale and weighed, the bar code is scanned, and the weight noted on the box.

5. The radiation detector at the scale, is precalibrated at the maximum acceptable radiation level, .075 mr/hr. If the audible alarm is emitted contact the shift supervisor immediately. The container must be scanned to determine the maximum radiation level, and the container isolated for proper disposal.

6. Container identified as "pathology" or "chemo" are segregated and designated for incineration. All other waste is to be autoclaved.

7. Broken or open containers will be repacked on the trailer, leaking boxes will be repacked or carried directly to the autoclave or incinerator for disposal, and the custodian required to clean the spill. Large spills must be disposed of by the spill response team.

Autoclave

The autoclave is designed to treat infectious bio-medical waste utilizing steam and pressure. Listed below are the responsibilities of this position:

1. The operator at the Entrance End is responsible for loading boxes of untreated waste into the empty bins. Proper PPE (i.e. gloves, shoes, face shields, and aprons) must be worn when loading the bins. The autoclave is designed to accommodate four bins, each

load of four bins can treat approximately 900 lbs. of infectious waste. To ensure maximum efficiency record the number of boxes and the weight on the manual production sheets.

2. When the autoclave's cycle is completed, and the treated waste removed, the bins of untreated waste are loaded into the autoclave, utilizing the electric shuttle cart.

3. After loading the vessel, the system is pressurized and the treatment cycle begins.

4. After treatment is completed, the operator at the Exit End will extract the bins from the autoclave and carry them to the compactor, where the bins are dumped, and the treated waste compacted. After they have been dumped, the empty bins are returned to the Entrance End to be reloaded.

Incinerator

The incinerator is utilized to incinerate chemotherapy, pathological, and pharmaceutical waste. The responsibilities of this position are:

1. Assist dock worker in unloading of trailers.

2. Pre-arrange container according to weight, in order to efficiently operate the unit on the prescribed 6-8 minute cycle or the permitted rating of 500 pounds an hour.

3. For maximum efficiency the unit must be loaded every 6-8 minutes. If excessive time is allowed to lapse energy is wasted and optimum use is not utilized.

4. Check primary and secondary temperatures at each cycle to ensure they are in accordance with set points - not too high or low.

5. Clean out air port holes on both sides of incinerator as required.

6. Check ash tank water level every hour.

7. Check incinerator for hydraulic leaks, bad wiring or any other problems daily. Inform supervisor if problems are noted.

L. Janitor

Utilize the job description/work schedule for daily duties. While this will give basic direction for the cleaning schedule, special projects may also be included.

1. Sweep, dust and clean offices by 8:00.
2. Polish office furniture.
3. Clean litter from front parking lot and entrance.
4. Wash windows on office exterior monthly.
5. Mop tile halls, lunch room, oper. & dispatch offices.
6. Clean locker rooms.
7. Wax all the tile floors- BOTH LEVELS WITH BUFFER
8. Clean litter from rear parking lot.
9. Mop floor of exit end of autoclaves, under packer continually.
10. Clean truck wash bay.
11. Mop exit end of autoclave conveyors & sissor lift continually.
12. Wash, when needed, interior windows.
13. Per the supervisors request, respond to spills, ASAP.

M	T	W	T	F	S	S

14. Mop dock, incinerator, entrance, and autoclave, floor area.

15. Clean the dock & storage, conveyor system.

16. Clean catwalk areas, & all handrails.

17. Wash the autoclave including pipes & valves

18. Clean incinerator, ash conveyor.

19. Clean boiler room floors, handrails, etc.

20. Wash M-20 collection vehicle.

21. Wash M-400 Roll-off vehicle.

22. Wash M-10 Ford pickup vehicle

23. Per the supervisors request, respond to spills ASAP.

M	T	W	T	F	S	S

M. Maintenance

Repairs and maintenance is essential for operation of the facility. The maintenance responsibilities are listed as follows:

1. When performing preventive maintenance or repairs of equipment, compliance with equipment operation and maintenance procedures, and safety procedures must be followed.

2. Perform daily, weekly, monthly and annual preventive maintenance on all equipment including boilers, autoclaves, incinerators, electric shuttle cart, etc. (See equipment operations and maintenance) (See Section VI Attachments).

3. A "work order" must be completed and filed in a respective maintenance file for all work on each piece of equipment. This is required for documentation purposes.

4. Maintain a parts and supply inventory for all equipment in the plant.

5. Become familiar with shutdown items that will require immediate repair, and repair these items immediately.

6. Perform any general building maintenance as needed (i.e. light bulbs, door hinges and latches, touchup painting, fixtures, etc.)

7. Because of potential emergency mechanical failure this position is on 24 hour call.

N. Disciplinary Policy

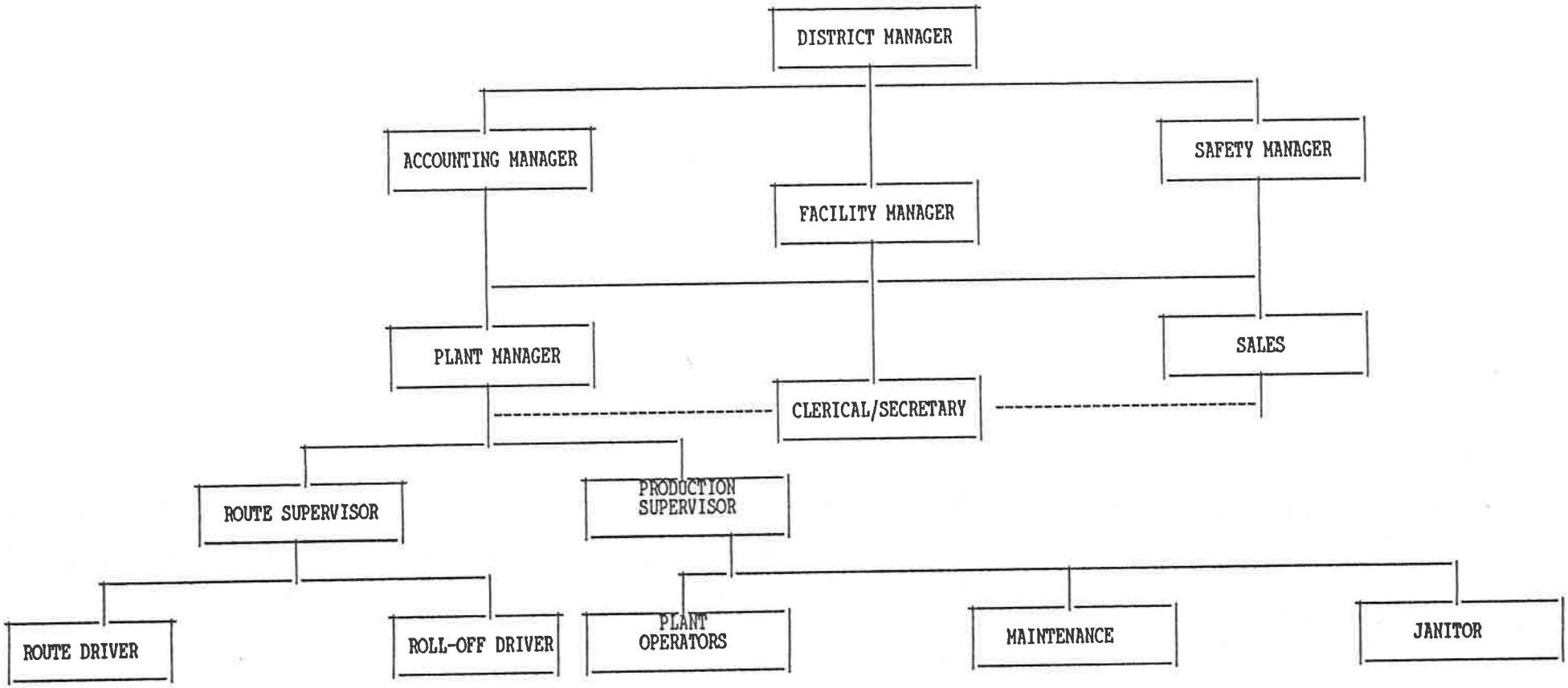
Adherence to duties, policies, and statutes are required of all employees for the safety and well being of the personnel, the public, the environment, and the facility. Therefore, the Facility has adopted a disciplinary policy which will be utilized and enforced by management to ensure compliance with these standards.

"Depending on the severity and preventability, a first infraction may result in a verbal reprimand. A second infraction may result in a written warning. A third infraction may result in a written warning, plus time off. A fourth infraction may result in termination. Depending on severity and preventability, any intermediate step or steps may be omitted, and any infraction could result in immediate termination."

SECTION III - ATTACHMENTS

1. Organizational Chart

MIDDLE TENNESSEE MEDICAL FACILITY - ORGANIZATIONAL CHART



IV. Employee Training and Safety Procedures

A. Employee Training

It is felt that the better informed and acquainted employees are with the industry, in which they are working, the more efficient and safe the operations will be.

All employees must participate in an initial one week training period (minimum) to acquaint them with the proper operation of the facility's equipment. Training of new employees consists of classroom instruction as well as an "on the job" introduction to the various facility processes. Other specialized operations (i.e. spotting, driving, pulling and replacing packer boxes, maintenance, etc.) require additional in-depth training.

1. Initial Training

The facility has implemented a detailed training program to ensure employees are well acquainted and versed in all aspects of the facility's operations. Each new employee is placed under the direct supervision of the shift supervisor for a one week training period. During this forty hours or more of training, the employee is taught to:

a) Off load trailers, using the conveyor system.

b) Weigh, scan and segregate waste as it is unloaded.

c) Properly load autoclave bins to ensure maximum efficiency and treatment of each cycle.

d) Load and unload the autoclaves to include proper pressurizing and depressurizing of the system.

e) Dumping and compacting of waste.

f) Loading and proper cycling of the incinerator.

2. Supplemental Training

All employees are required to attend monthly training sessions to acquaint them with new requirements, procedures and information.

Some of the topics presented are:

a) Spill clean-up

b) Radiation Detection

c) Identification of infectious waste types

d) Personal protective equipment

e) Types of radiation

f) Emergency evacuation procedures

g) Hazardous waste communication

These topics are developed and presented by district and/or regional personnel. Often video taped presentation are utilized for the training of new employees. On occasion authorities from outside of the company are brought in to make presentations in specialized fields,

In addition to the training offered by district and regional personnel, the facility also has access to the large variety of training materials maintained at BFI's corporate office in Houston, Texas.

It is this facility's goal to ensure its employees are informed concerning the field of infectious waste. This is a vital necessity to ensure a safer and more efficient operation.

As new and updated information is available, or new regulations effecting the medical waste industry is adopted, the facility will be responsive in immediately advising its employees to ensure that the work force is constantly updated to industry changes.

B. Physical Examination

All employees will receive, an annual Section II physical, which will include the following test:

1. Vision and hearing test.

2. Blood chemistry panel

3. Chest x-rays.
4. Pulmonary function test.

Personnel will also receive the appropriate immunizations, including tetanus toxoid and hepatitis B vaccination.

C. Injuries and Exposures

In injured, or exposed to infectious waste materials, the employee must report the incident immediately to the Safety Department. Medical treatment will be provided at a designated health care facility.

Exposure situations will require evaluation, testing, and proper preventative treatment. They will be reported immediately by the District Safety manager, to the Regional Office. Randy Holcomb will review all actions and initiate follow-up as necessary.

Company Policy requires all injuries and exposures to be reported immediately. Failure to comply will result in disciplinary action.

D. Hygiene and Personal Appearance

Facility personnel are regarded to possess special skills and qualities, and therefore are expected to project a professional image at all times.

To fulfill this expectation, proper appearance and conduct are essential, and thus the following requirements must be adhered to:

1. A clean uniform will be worn daily.

2. Clean work shoes must be worn while on duty.

3. Extreme hair styles or the wearing of jewelry is prohibited.

4. Mandatory showering is required at the end of each workday.

5. Work clothes and shoes must never leave the facility.

6. Courtesy will be extended to all clients, and any problems in this respect will be reported to the Operations Manager.

E. Personal Protective Equipment and Procedures

1. Uniforms:
Uniforms will be supplied and laundered by the district. A clean uniform must be worn each

day. Uniforms must never be worn or removed from the premises. Employees will arrive and leave work in street clothes.

2. Work Shoes or Boots:

A pair of work shoes or boots, with metal inner soles, and steel toes will be provided by the district.

These will be worn at work only and must remain in the employee's locker when not on duty. Work shoes must never be worn or removed from the premises. Street shoes will be worn to and from work, and remain in the employees locker during work.

3. Work Gloves:

Hand protection will be provided to personnel by the district and will be worn when handling infectious waste. Either thick "crinkled" rubber gloves or leather work gloves with a inner latex glove will be required to handle waste.

4. Weight Lifting Belts:

The district will make available, upon request from employees, weight lifting belts which may be worn. These are available to employees for their personal protection in helping prevent back injuries.

5. Eye Protection:

Employees working in the plant, (i.e. unloading trucks, loading autoclave carts or the incinerator) where spills and splashing might occur, must wear a face shield.

6. Respiratory Protection:

Double cartridge respirators equipped with 2 HEPA dust cartridges and two organic vapor cartridges will be utilized when cleaning large spills or entering equipment for the purpose of repairs or maintenance. Refer to the attached respirator program for fitting and cleaning requirements.

7. Aprons:

Aprons - midthigh in length, must be worn in the plant where spills and splashing might occur.

8. Personal Hygiene:

a) Gloves, face shields, and eye protection are to be worn for handling waste materials only and must be kept in the work area or employee's locker when not in use. Personal protective equipment should never be brought into offices, break areas, etc.

Drivers should store gloves and face shields in the back of the vehicle, or in the truck's tool box, when not in use. They must be utilized when handling waste but never worn when conversing with customers.

b) All employees are to wash their hands as frequently as possible. Hands must be washed before eating, drinking, smoking or using the rest room.

c) Employees must not each lunch in the work area. Smoking, eating, or drinking is prohibited while the employee is handling materials or servicing a customer.

9. First Aid:

a) A minimum of one employee in every ten, or one employee per shift, will be certified to administer First Aid. An Industrial First Aid Kit will be located in the facility and its contents inventoried and replenished at least once a month.

F. Spill Handling and Cleanup:

1. Spill Procedure

A spill of infectious waste can present problems for both the generator and the facility. These can range from such consequences as possible exposure to

infectious agents in the waste, to economic sanctions. Each employee must be able to identify and assess spills, and follow proper clean up procedures when spills are identified.

Because the type of material handled usually contains a certain amount of moisture, spills can occur at any time, primarily due to improper packaging or poor handling practices. The employee can minimize small spills by carefully inspecting all containers and following safe handling practices. Most spills will be small and can be handled by employees as they occur, following the procedure for small spills.

Larger spills may result for example, from a vehicular accident, where waste is scattered over a large area. In this case, the employee must contact the district office immediately for instructions and assistance. When necessary, the district office will contact the proper authorities. The employee will don personal protective equipment and secure the area to the best of his ability. he will clear the area of all non-essential personnel and contain the spill as much as possible. He should also inform the authority present, of the nature of the material involved (infectious waste). When district personnel arrive, the spill cleanup procedures will be followed. The area should not be washed down until spill cleanup is completed, unless there is danger of fire or explosion.

2. Spill Kits:

The facility and/or vehicles must be equipped with its own complete spill kit as described in the PPC plan. The spill kit contents and personal protective equipment are listed on the attachments.

3. Decontamination Procedures:

If there is a spill of infectious waste, proper decontamination procedures must be followed to prevent further contamination or exposure.

a) If contaminated, the employee must: first remove clothing and shower thoroughly with a germicidal soap (at least 10 minutes). If showering is not possible, the affected areas should be thoroughly cleansed with water and germicidal soap. Clean, uncontaminated clothing will be put on, and the contaminated clothing bagged for laundering. If contamination of the uniform is considered excessive, it will be treated as infectious waste.

b) For disinfecting and cleaning spills, the following procedure will be utilized.

(1) First assess the extent of the spill and contact the Plant Manager if sufficiently large.

(2) Isolate the spill to prevent spreading. In case of a large spill, barricade the area once it is contained.

(3) In the case of large spills personal protective equipment will be utilized. (i.e. gloves, disposable suit, face shield and respirator)

(4) Spray the contaminated are with disinfectant solution and wait for 10 minutes for the disinfectant to neutralize any infectious agents.

(5) Place absorbant on the spill areas and wait for the liquid to be absorbed (about 10 minutes).

(6) Shovel the absorbed waste and any other contaminated items into a container.

(7) Spray the area formerly covered by the spill with disinfectant solution. Also spray any tools (i.e. shovel) which may have come into contact with the spilled materials.

(8) Place all disposable items in red bag and place into waste container.

(9) If the spill occurs away from the facility, the spill must be isolated, barricaded and outside personnel prevented from entering the area or assisting in the spill clean up. ONLY DESIGNATED, TRAINED BFI PERSONNEL ARE PERMITTED TO CLEAN AND DECONTAMINATE SPILLS.

G. Emergency Evacuation Procedures

A facility emergency evacuation plan is in effect for the facility, and all employees are acquainted with the procedures if conditions should warrant them.

1. Employee Notification

Should an emergency arise requiring implementation of evacuation procedures, employees will be notified by one of the following methods:

a) Alarm - The facility is equipped with an alarm system which will be activated, warning employees of an emergency requiring evacuation.

b) Intercom - Should an emergency arise, an announcement will be made on the facility's intercom, advising employees of the problem and directing them to initiate evacuation procedures.

c) Supervisory Notification - The shift supervisor will verbally notify all employees to evacuate the facility if any emergency arises.

2. Operations

Should an emergency arise, the highest level manager on site, at the time of the emergency, must evaluate the conditions and dedicate whether circumstances are sever enough to interrupt the facility's operations. Depending on this evaluation one of the following actions must be initiated:

a) The condition does not warrant an evacuation, and operations will continue. Designated personnel will respond to the situation while the remainder of the employees will continue operating the facility.

b) Evacuation is required of plant personnel for a short period of time and equipment can continue operating on their respective time cycles without posing a greater or future danger to the facility.

c) Evacuation is required, but equipment operations can be gradually reduced utilizing normal "shut down" procedures.

d) The emergency is extreme and continued operations will cause imminent danger to the facility and personnel. In such an instance all equipment will be inactivated immediately utilizing the emergency shut-off switches (push to stop/pull to start buttons) and the main gas valve to the plant (located outside) will be shut-off. THIS PROCEDURES IS USED ONLY IN AN EXTREME EMERGENCY.

3. Response Teams

a) In the event of spills of infectious waste, a spill response team will be designated to initiate predetermined procedures (See Item F) and control the problem internally.

b) All other emergencies will require that respective outside emergency authorities will be contacted and professional assistance will be utilized to control the situation.

4. Facility Evacuation

Predesignated routes of evacuation have been established, and facility diagrams noting these avenues of escape are posted throughout the facility.

All personnel are trained and familiar with these avenues of escape. Though unlikely, should the need arise employees will utilize the avenue of egress designated for their respective work station and proceed to a predetermined assembly area where the ranking on site manager will account for all personnel to insure all are safely evacuated.

Once evacuated, no one will return to the facility until specifically authorized by both management and the responding emergency authorities.

SECTION IV - ATTACHMENTS

1. Medical Waste Training Outline
2. Radiation Safety Outline
3. Medical Waste OHSA Training Outline
4. Personal Protective Equipment
5. Respiratory Protection Program
6. Respirator Training Session Outline
7. Acknowledge of Training Certification

HOSPITAL WASTE TRAINING OUTLINE

I. Identification and Classification of Hospital Waste

- A. Biomedical Waste
- B. Chemotherapy Waste
- C. Hazardous Waste
- D. Radio Active Waste
- E. Other Waste

II. BFI Role in Waste Disposal

- A. Sales
- B. Waste Districts/Scheduling
- C. Manifesting
- D. Transportation
- E. Treatment
- F. Resource Personnel

III. Generators Responsibility for Hauling

- A. Identification of Infectious Waste
- B. Segregation of Waste
- C. Waste for Transportation
- D. Identification by Lot Number

IV. Manifesting

- A. Generator's Responsibility
- B. Driver's Responsibility

V. Medical and Hygiene Prevention

A. Physical Examination

B. Immunizations

1. Tetanus

2. Hepatitis B, Vaccination (test for positive immunization after final inoculation)

3. Gamma Globulin inoculation if puncture wound occurs

C. Washing Hands Frequently

D. Change Clothes at the end of the day

E. Shower at the end of the day

VI. Accident Reporting

A. Employee Injuries

1. Normal Injuries

a) Driver's responsibilities

b) District responsibilities

2. Special Injuries - sticks, cuts, splashes

a) Driver's responsibilities

b) Safety Manager's responsibilities

c) Storage and retention of waste media involved in incident

B. Vehicle Accidents

1. Normal Accident

a) Property damage only

b) Involving bodily injury or potential BI

2. Accident involving spills

VII. Personal Protective Equipment and Procedures

A. Shoes - Steel Innersoles

B. Gloves - Leather and Rubber

C. Chemical Goggles

D. Uniforms

E. Arm Gauntlets

F. Respirators and Cartridges

G. Weight Belts

H. Proper lifting techniques

VIII. Drivers Responsibilities

A. Pre-trip inspection

B. Check Supplies

C. Secure Vehicle

D. Wear proper Personal Protective Equipment

E. Scan Lot Number

F. Check with radiation detector - return hot items to generator

G. Inspect for proper packaging - (leaks, damage)

H. Loading

1. Use of mechanical devices

2. Weight belts

3. Proper lifting procedures

4. Stacking boxes

5. Secure boxes

I. Leave Personal Protective Equipment in truck

J. Manifesting

K. Off loading at disposal site

L. Post trip inspection

Region contacts for emergencies or questions: Janice Ulsch
Ken Hancock

RADIATION SAFETY OUTLINE

I. What is Radiation?

A. Types

1. Non-ionizing radiation
   Ex. Visible light, radar, microwaves, radio waves.

2. Ionizing radiation
   Ex. Gamma, x-ray, alpha, beta

B. Terms and concepts

1. Atom Model - Protons, neutrons, electrons

2. Isotopes - elements with different numbers of neutrons
   Radioisotopes or radionucleids - radioactive elements

3. Common medical radioisotopes

4. Half-life - time required for radioactive substance to lose 50% of its activity by decay.

5. Roentgen - unit of exposure / meters measure milli R per h.

6. RAD - unit of absorbed dose

7. REM - unit of biological effect/

8. milli (m) = 1/1000 R = 1000
   Ex. 10 R = 10,000 mR
9. Radiation symbol

   a. Some packages can measure 200 mR/hr. at surface or 10 mR/hr. at 1 meter and be shipped legally.
   b. Law requires symbol to be defaced if material is no longer radioactive.

C. Natural background radiation

1. Cosmic radiation
2. Terrestrial radiation
3. Radionucleids in body
4. Medical radiation
5. Radioactive material in consumer products
6. Calculate your radiation exposure

II. Types of Ionizing Radiation

A. Particulate radiation

1. Alpha - stopped by paper or skin

*2. Beta - stopped by aluminum

B. Energy waves

*1. Gamma - stopped by lead

* What you will measure with your instruments.

III. Health Effects

A. Internal hazard
Radioactive material ingested, inhaled or absorbed through skin.

B. External hazard
Ex. Gamma radiation

C. Some factors which can influence health effects

1. Dose
2. Time
3. Volume of tissue irradiated
4. Type of radiation and isotope
5. Age
6. Sex

D. Principal radiation hazards

1. Genetic effects to reproductive organs

2. Carcinogenic effects - may take 20 years or more to manifast.

3. Effects on fetus

4. Acute effects from high dose - rarely occurs
Ex. nausea, loss of hair, death, blistering, diarrhea

IV. Protection Standards - Regulations

A. Occupational exposure limit - Restricted area
5 Rem a year average

B. General public limit - Unrestricted area

1. 2 mRem in any hour or
100 mRem in any 7 consecutive days

2. 500 mRem a year

V. How do you protect yourself?

A. Use your meter

B. External hazard - gamma radiation

1. Distance
   Double your distance and exposure reduced by ¼.

2. Shielding

3. Time
   Ex. Meter reads in mR/hr. If meter reads 2 mR/hr., what is your DOSE if you are in that area for 30 min.? 2 hrs.?
   Answers: 1 mR
   4 mR

C. Internal hazard
   Protective equipment - gloves, respirator, suit.

D. Secure area - isolate waste

1. Move back to where meter reads 2 mR/hr. Rope off area.

2. Limit exposure to 100 mRem per week.

E. Contamination present?

1. Use meter to check for contamination on people and area.

2. Wash areas.

3. Use meter to verify decontamination.

VI. How do you survey for radiation?

A. G - M Survey Meter

1. Battery check.

2. Open window on probe measures beta and gamma radiation. Closed window measures gamma. Keep window open.

3. Meter reads in mR/hr.

4. What is background radiation? 0.02 mR/hr.?

5. Use check source.
   Ex. Coleman lantern mantle. Approximately 0.45 mR/hr.

6. Consider material radioactive if levels are more than twice background radiation.

B. Scintillation counter probe

1. Can measure low levels of radiation.

2. Measures gamma, not good for beta.

3. Measures in counts per minute (cpm).
   Ex. 25 00 cpm may be only 0.1 mR/hr.

C. Do's and Dont's

1. Do survey close to container if possible - 1 inch good distance.

2. Do remember meter can malfunction. Use check source to verify reading and watch needle on dial.

3. Don't open container to survey.

4. Don't touch probe to material that could contaminate probe.

VII. Scenarios

MEDICAL WASTE OCCUPATIONAL HEALTH AND SAFETY SEMINAR
TRAINING MATERIALS

January 1989

TOPIC	MATERIALS AVAILABLE
1. Wastestreams we handle - Biomedical - Pathological - Chemotherapy	VHS Occupational Health Issues in Medical Waste VHS Chemotherapy Waste (Module #5, Sales Training) available from Santa Ana
2. Personal Hygiene - handwashing/handwipes in vehicles - clean uniforms - showers - smoking/eating/ drinking	VHS Occupational Health Issues in Medical Waste
3. Personal protective equipment - gloves - safety shoes - face shield/splash masks - respirators	VHS Occupational Health Issues in Medical Waste VHS Acceptable Practice for Fitting Respirators Slide/tape Breathe Safe, Breathe Clean (incinerator operators) 16 mm Safety Meetings: Good Houskeeping, Personal Protection Equipment, Hand Protection Slide/tape Introduction to Personal Protective Equipment
4. Hazard Communication (Right to Know) - disinfectant solutions - formaldehyde/ chemotherapy	Slide/tape Hazard Communication Program

5.	Occupational Health Programs - physical examinations (pre-employment and annual) - hepatitis B, tetanus vaccinations - industrial hygiene monitoring	VHS Occupational Health Issues in Medical Waste
6.	First Aid/CPR	Local Red Cross
7.	Decontamination procedures	_____
8.	Radiation Safety	_____
9.	Emergency Response/Spill Kit	Hazardous Waste Transportation Emergencies Unit 3 Responding to the Incident Unit 4 Resolving the Incident (this slide/tape program is designed for hazardous waste)
10.	Personal Safety - Back	16 mm Lifting and Your Back Facts about Backs Danger Zone ... Your Back The Big Lift A New Way to Lift It Bend Your Knees If You Hear the Explosion the Danger Has Passed

- Eye	16 mm	Straight Talk on Eye Safety
		How Much are Your Eyes Worth?
		It's Up to You
		Don't Push Your Luck
		The Shield
		Eyes
- Feet	16 mm	Feet
- Hands	16 mm	On Every Hand
		Hands
11. Miscellaneous Topics	VHS AIDS videos (3)	
12. Driver Training		
- Medical waste procedures	- Medical waste driver training manual (workbook)	
- General driving safety	- Slide/tape AAA Driver - Improvement program	
	- 16 mm films (Approx. 15)	
- Defensive driving	- 16 mm films (Approx. 8)	
- DOT	- Slide/tape Federal Motor Carrier Safety Regulations (Eight Parts)	
13. Incinerator Operator Training	_____	
14. Autoclave Operator Training	_____	

PERSONAL PROTECTIVE EQUIPMENT
(BY FUNCTION)

FUNCTION	PPE REQUIRED
1. Off-loading full containers	Gloves Face shield Safety shoes Apron (1) Hearing protection
2. Handling containers	Gloves Faceshield Safety shoes Apron (1) Hearing protection
3. Visitor protection	
- On observation decks/areas	None
- In inactive areas	None
- In active areas (Tours)	Lab coats Safety glasses
- In active areas (Repair personnel)	Gloves Safety glasses or faceshield Safety shoes
4. Office personnel who move between plant and office	Lab coat Eye protection (1) Hearing protection
5. Clean-up employees (or other employees) who work in active areas but do not handle waste	Gloves Faceshield Safety shoes Apron (1) Hearing protection

(1) Hearing protection is required in high noise areas.
(2) NIOSH approved respirator may be reusable or disposable.

FUNCTION	PPE REQUIRED
6. Computer operator at dock or scale area	Gloves Safety shoes Faceshield Apron (1) Hearing protection
7. Tub wash operator	Gauntlet-length rubber gloves Knee-length rubber boots Knee-length splash resistant Apron Faceshield (1) Hearing protection
8. Autoclave facility workers	
- Working inside autoclave (maintenance)	Gloves Safety shoes Apron (2) Dust/mist HEPA filter respirator Faceshield (1) Hearing protection
- Working around autoclave while steam is let out (doors open)	Gloves Safety shoes Apron Faceshield (1) Hearing Protection
9. Incineration facility workers	
- Repairing incinerator (outside the chamber)	Gloves Safety shoes Apron Faceshield (1) Hearing protection

(1) Hearing protection is required in high noise areas.
(2) NIOSH approved respirator may be reusable or disposable.

FUNCTION	PPE REQUIRED
- Working at the control panel	Gloves Safety shoes Apron Faceshield (1) Hearing protection
- Working with unquenched ash (clean-up or removal, reprocessing waste)	Gloves Safety shoes Apron Faceshield or goggles (2) Dust/mist HEPA filter respirator (1) Hearing protection
- Working inside the incinerator (repairing refractory, removing material, etc.)	Gloves Safety shoes No apron Goggles (2) Dust/mist HEPA filter respirator Use confined space procedures - requires 2 employees
10. Spill clean-up at our facility (re-packing leaker, or other small spill)	Gloves Safety shoes Faceshield Apron
11. Spill clean-up on the road or elsewhere off BFI premises	Gloves Safety shoes Faceshield (2) Dust/mist HEPA filter respirator Apron

(1) Hearing protection is required in high noise areas.
(2) NIOSH approved respirator may be reusable or disposable.

FUNCTION	PPE REQUIRED
12. Cleaning/disinfecting trailers and storage areas	Gloves (rubber or latex) Safety shoes (2) Dust/mist HEPA filter respirator Faceshield Apron
13. Management employees performing special duties (i.e. emergency response, strike duty)	Management employees must wear protective equipment appropriate for the duty performed

(1) Hearing protection is required in high noise areas.
(2) NIOSH approved respirator may be reusable or disposable.

	GLOVES	SHOES*T/MIST FILTER	RUBBER GLOVES, BOOTS	HEARING
FACILITY WORKER	Leather & thin latex or heavy crinkled latex/ polyethylene	Metal & toes	—	Facility specific
SPECIAL DUTIES				
INCINERATOR CLEANOUT	Leather & thin latex or heavy crinkled latex/ polyethylene	Metal & toes	—	Facility specific
TUB WASH	—	—	Gauntlet length gloves, knee length boots	Facility specific
AUTOCLAVE MAINTENANCE	Leather & thin latex or heavy crinkled latex/ polyethylene	Metal and to		
DRIVER	Leather & thin latex or heavy crinkled latex/ polyethylene	Metal .1 kit) & toes	—	Function specific
SPILL RESPONSE	Leather & thin latex or heavy crinkled latex/ polyethylene	Metal .1 kit) & toes	—	Facility specific

RESPIRATORY PROTECTION PROGRAM

FOR

_____

INTRODUCTION

This written respiratory protection program for _____ District, Browning Ferris Industries of _____ Inc. has been established in accordance with the respiratory protection requirements of OSHA standard 29CFR1910.134 and ANSI Standard Z88.2 (1980). This program is specific to spray painting and welding activities that occur at this District but may be expanded to include other activities with appropriate modifications to this program.

Both OSHA and ANSI require implementation of feasible engineering controls and/or work practice controls as the primary means of maintaining exposures within permissible limits. BFI has adopted feasible engineering controls for spray painting and welding at its Districts to the extent that industrial hygiene monitoring has shown most exposures well below OSHA limits. In this context respiratory protection is not required by OSHA but this District has chosen to require the use of respiratory protection for the operations and activities stated herein as an added measure of employee protection. The following sections provide for the establishment of standard operating procedures for the selection and use of respiratory protection at this District.

PROGRAM ADMINISTRATION

The program administrator responsible for the implementation of this respiratory protection program at the _____ District is _____.

PHYSICAL EXAM

Only those individuals determined by a physician as medically able to wear respiratory protective equipment shall be issued one. The employee will receive pertinent tests and a physical examination as outlined in BFI's Physician Clinic Manual for this determination.

SELECTION AND USE OF RESPIRATORY PROTECTIVE EQUIPMENT

Respirators used shall be selected from those approved by the National Institute for Occupational Safety and Health (NIOSH). The selection process shall include among other considerations the following items.

(a) The nature of the hazardous operation or process;
(b) The type of respiratory hazard (i.e. contaminant identity, physical state, exposure level);
(c) The location of the hazardous area in relation to available fresh air;
(d) The period of time respiratory protection must be worn;
(e) The work activity (i.e. metabolic work rate) in the hazardous area;
(f) The physical characteristics, limitations, and capabilities of various types of respirators; and
(g) Respirator protection factors.

For the specific work activities and hazards encountered at this District the following table describes the respiratory protection that has been selected for each.

TABLE I. RESPIRATOR PROTECTION SELECTED FOR _____ DISTRICT OPERATIONS

Operation	Respirator Description
1. Spray painting containers and trucks using (describe equipment and ventilation within spray area)	(describe respirator, cartridges and prefilter)
2. Welding or carbon arc cutting within vehicle bodies or enclosed roll-off boxes	(describe respirator, cartridges and prefilter)
3. Hauling and disposal of bagged and wetted asbestos at a landfill.	(describe respirator, cartridges and prefilter)

TRAINING

Each employee designated to use a respirator at this District will be trained on the limitations, use, and maintenance of the respirators assigned to them. An outline of the training program is included in Appendix A of this written program. The training shall include an opportunity to wear and be fit-tested with the respirator(s) assigned to them. Upon satisfactory completion and understanding of this training, employees must read and sign the form of acknowledgement of training and respirator fit testing shown in Appendix B.

FIT TESTING

Each employee will be instructed and required to demonstrate understanding of the methods for conducting a negative pressure and positive pressure fit test for the respirator(s) assigned to them. A negative and/or positive pressure fit test is a requirement of the employee each time their respirator is donned for use. The specific method for fit testing shall follow the respirator's manufacturers recommendations.

At the time of initial assignment and at least annually thereafter, each employee shall receive a qualitative fit-test using a test atmosphere. This District shall use one of more of the following agents for qualitative fit testing.

Agent	Proper Use
Isoamyl Acetate (Norton #7002 Ampules) (Scott #802817 Ampules)	Can be used to test for proper fit of respirators equipped with cartridges, canisters or otherwise designed to filter out organic vapors.
Irritant Smoke (MSA #5645 Smoke Tubes)	Can be used to fit test respirators equipped with particulate filters or otherwise designed to filter out particles.

The suggested procedures for carrying out qualitative respirator fit testing are in Appendix C.

FACIAL HAIR POLICY

Testing and research has shown that excessive facial hair prevents a good seal from forming between the skin and respirator sealing surface. It is the policy of this District that employees required to use a respirator must be clean shaven and have no hair in the facial areas where a specific respirator must seal. A properly trimmed and groomed mustache is acceptable but beards, extended sideburns and gotees are unacceptable.

RESPIRATOR ISSUANCE

Where practical, respirators shall be assigned to workers for their exclusive use by the Program Administrator or his trained designee. The specific respirators selected for use at this District were previously listed under Table I. Any changes or additions to this Table shall be made by the Program Administrator or an individual with proper training in the selection and use of respiratory protective equipment.

RESPIRATOR INSPECTION AND MAINTENANCE

Each worker must inspect the respirator(s) assigned to them prior to each days use and during cleaning. The primary defects to look for in the inspection of the respirator and the corrective actions to take are itemized below:

1. Air purifying respirators (quarter-mask, half-mask, and full facepiece)

   a. Rubber facepiece - check for:
      - excessive dirt (clean all dirt from facepiece)
      - cracks, tears, or holes (obtain new facepiece)
      - distortion (allow facepiece to "sit"-free from any constraints and see if distortion disappears; if not, obtain new facepiece), and
      - cracked, scratched, or loose fitting lenses (contact respirator manufacturer to see if replacement is possible; otherwise obtain new facepiece).

   b. Headstraps - check for:
      - breaks or tears (replace headstraps)
      - loss of elasticity (replace headstraps)
      - broken or malfunctioning buckles or attachments (obtain new buckles), and
      - allow the facepiece to slip (replace headstrap)

   c. Inhalation valve, exhalation valve - check for:
      - detergent residue, dust particles, or dirt on valve or valve seat (clean residue with soap and water)
      - cracks, tears, or distortion in the valve material or valve seat (contact manufacturer for instructions), and
      - missing or defective valve cover (obtain valve cover from manufacturer).

   d. Filter element(s) - check for:
      - proper filter for the hazard
      - approval designation
      - missing or worn gaskets (contact manufacturer for replacement)
      - worn threads - both filter threads and facepiece threads (replace filter or facepiece, whichever is applicable)
      - cracks or dents in filter housing (replace filter), and
      - missing or loose hose clamps (obtain new clamps)

2. Atmosphere Supplying Respirators

   a. Check facepiece headstraps, valves, and breathing tube, as for air-purifying respirators.

   b. Hood helmet, blouse, or full suit, if applicable - check for:
      - headgear suspension (adjust properly for you)
      - cracks or breaks in faceshield (replace faceshield), and
      - protective screen to see that it is intact and fits correctly over the faceshield, abrasive blasting hoods, and blouses (obtain new screen)

   c. Air supply system - check for:
      - breathing air quality
      - breaks or kinks in air supply hoses and end fitting attachments (replace hose and/or fitting)
      - tightness of connections
      - proper setting of regulators and valves (consult manufacturer's recommendations), and
      - correct operation of air-purifying elements and carbon monoxide or high-temperature alarms

Respirators must be cleaned and disinfected regularly. As a minimum each worker should clean his or her own respirator after each days use. The cleaning procedure is described as follows:

1. Before leaving the work area, each user must "wipe-down" the respirator with a wet cloth to remove any contamination which may have settled on the equipment.

2. Respiratory equipment shall be washed with detergent in warm water using a brush. If possible, detergents containing a bactericide should be used. Organic solvents should not be used, as they deteriorate the rubber facepiece. If bactericide detergent is not available, the detergent wash should be followed with a disinfecting rinse. Two types of disinfectants may be made from readily available household solutions. A hypochlorite solution (50 ppm) can be made by adding two tablespoons of chlorine bleach to one gallon of water. An aqueous solution of iodine (50 ppm) can be made by adding one teaspoon tincture of iodine to one gallon of water. A two minute immersion of the respirator into either solution would be sufficient for disinfection.

3. Respiratory equipment shall be thoroughly rinsed in warm clean water (120°F maximum) to remove all traces of detergent, cleaner and sanitizer, and disinfectant.

4. Respiratory equipment shall be allowed to air dry on a clean surface or hung from a horizontal wire.

MONITORING

The use of respirators at this District shall be monitored by Supervisors and or the Program Administrator to assure that respirators are being used; that the respirator in use is appropriate for the work conditions; that respirators are being worn properly; and, that the respirators in use are in good working condition.

PROGRAM EVALUATION

This respirator program shall be evaluated at least annually to determine the overall effectiveness of the program in assuring the proper selection and use of respiratory protective equipment. This evaluation shall preferably be conducted by _____ Regional Safety Training Manager for the _____ Region or by a Program Administrator from another BFI District. Compliance with the aforementioned points of the program will be reviewed and where deficiencies are noted, appropriate action shall be taken to correct them. Special attention will be given to proper recordkeeping which includes training, fit testing, and medical records.

APPENDIX 11

SAMPLE RESPIRATOR TRAINING SESSION

(15-20 minutes w/o films/slides)

A. Introduction

1. Why wear respirator?
   a. Extra measure of protection
      1. BFI monitors exposures - ok
      2. Like seat belt extra protection wise
   b. Ventilation Problems
      1. Belts on fan
      2. Power failure
2. Why Train?
   a. Essential for you to obtain maximum protection.
   b. Understand respirator limitations.
   c. Understand proper care and maintenance.
   d. Know when to change cartridges.
   e. Importance of proper fit.

B. District Policy

1. Fourteen component program
2. Required in certain areas/operations
3. NIOSH approved respirators
4. Respirator selected for specific job.
5. NO FACIAL HAIR
6. Inspected & maintained Daily
7. Cartridge changes
8. Fit Test
9. Training
10. Monitoring

RESPIRATOR TRAINING (cont.)

C. Respirator Familiarization
   1. Description of brand/model
   2. Valves
   3. Clean daily
   4. Describe cartridges
   5. Assembly

D. Fitting Instructions
   1. Bottom strap below ears
   2. Top Strap above ears
   3. Tighten straps

E. Fit Test
   1. Negative Pressure
   2. Positive Pressure
   3. Test Atmosphere

APPENDIX B

Browning-Ferris Industries, Inc.

AND SUBSIDIARIES

ACKNOWLEDGMENT OF TRAINING RECEIVED

I, _____, am an employee of _____ (the "Company"). I have received instruction in the RESPIRATOR TRAINING & FIT TESTING training program presented by the Company on the following date(s): _____. I have had the opportunity to ask questions and receive answers on the contents of this training presented by the Company. I understand the training I have received and agree to abide by the standards presented therein.

_____
(Employee's signature)

_____

_____
(Address)

Dated: _____

V. Operating Procedures

A. Delivery

Waste arrives in refrigerated local collection vehicles or trailers (some of which are refrigerated). Local collection vehicles provide direct service pickup to customer locations, while trailers are utilized to transfer waste from remote locations to the treatment facility.

The facility is operated 24 hours, 7 days a week and waste is accepted accordingly. (The facility is not open, when no waste is available for treatment).

B. Receiving

Local collection vehicles are off loaded immediately, while trailers are stored temporarily in a designated parking area before being unloaded. As it is unloaded, the waste is visually inspected to insure the packaging is sound - if not the dock employees will don the prescribed personal protective equipment and properly repackage the waste. When unloaded the packaged waste is:

1. Bar code scanned for customer identification and billing.

2. Weighed - the weight is recorded for segregation and loading into the prescribed treating unit.

3. Scanned for radioactive material. (i.e, if radioactive materials are detected, the box is promptly segregated, and the customer contacted for return of the materials.

C. Storage

The facility is equipped with a modular cold room located in the building's receiving area for storing pathological and oher medical waste. All pathological waste is stored in the cold room at a temperature below 44°F if it is not going to be processed within 24 hours.

Additionally, the facility's operation utilizes refrigerated trailers to store medical waste prior to processing and it is the facility's policy to attempt to refrigerate all medical waste at 44°F or below. In the event, however, of emergency situations, some medical waste may not be refrigerated but only for a period of 96 hours or less.

D. Incineration

Boxes to be incinerated are segregated based upon customer labeling specifying incineration (i.e. pathological, chemotherapy, body parts, etc.).

Once segregated, boxes to be incinerated are placed in a designated area, separate from those for the autoclaves.

The incinerator is a Simonds Model AF5B which typically operates on a five to seven minute feed cycle, and is designed to burn 1350 lbs. of medical waste an hour.

E. Incinerator Scrubber System

The facility's incinerator has been equipped with a two stage venturi/absorper wet scrubber system to remove air emissions and comply with State and County air pollution standards. The scrubber consists of a quench section, venturi throat section, absorper tower, induced draft fan and caustic neutralization feed system. The scrubber is equipped with several alarms and monitors to insure proper operation.

F. Boiler

The autoclaves are connected to a 125 hp boiler which supplies the steam necessary to disinfect the waste. The natural gas fired boiler has been installed with a water treatment/softening system to prevent scaling in the boiler system. A waste heat boiler connected to the incinerator will be installed once a steam customer is located. The waste is charged into the incinerator by an automated ram. The waste is exposed to approximately 1400^{o}F in the primary chamber, and the secondary chamber maintains 1800^{o}F.

Ash is automatically removed from the incinerator by a conveyor system, and deposited into a container. The ash is hauled daily for final disposal at a state approved landfill.

G. Autoclaving

Each autoclave operates on a timed cycle, and is capable of processing four bins of waste per cycle.

The bins are loaded with waste and charged into the vessel for treatment. A minimum of 30 minutes is allowed for sterilization while the remainder of the cycle is allotted for warm up and cool down.

Note: A spore test is randomly conducted twice weekly to assure proper sterilization is achieved.

When sterilization is completed, the autoclaved waste is dumped in the compactor and disposed of at a landfill.

H. Special Provisions

Should the incinerator become inoperable all chemotherapy, pharmaceuticals and patholigical waste will be re-manifested and sent to another BFI incineration facility in St. Louis, Birmingham or Atlanta.

If the autoclaves become inoperable, the local waste will be sent to Nashville. Other districts using the facility will be redirected to alternate locations for disposal. Other available locations for disposal, are Cincinnati, OH; Atlanta, GA; New Orleans, LA; and St. Louis, MO.

I. Vehicle Decontamination

All trailers are cleaned and disinfected, before being released. Cleaning is accomplished with a spray cleaner and germicidal disinfectant.

SECTION V - ATTACHMENTS

1. Autoclave Operating Instructions
2. Boiler Operating Instructions
3. Incinerator Operating Instructions

WSF Industries, Inc.
P.O. Box 400 / Kenmore Branch / Buffalo, New York 14217-0400 / (716) 692-4930
Telex 91-6440 Fax 716-692-4135

November 3, 1989

BFI Medical Waste Systems
2221 Democrat Road
Memphis, TN 38132

Attention: Mr. Charles Cooley

Reference: WSF Proposal No. QI-7926-J
WSF Medical Waste Autoclave Systems

Dear Mr. Cooley:

Thank you for your continued interest in WSF equipment.

This will outline our proposal for your consideration.

WSF Industries agrees to furnish:

ONE (1) WSF HORIZONTAL AUTOCLAVE, 96" O.D. X 18'0" STRAIGHT LENGTH INCLUDING ONE (1) WSF RAPIDOOR AT EACH END.

Material:

Carbon Steel

Design Factors:

125 PSIG & F.V. at 370 Deg. F. with 1/16" Corrosion allowance.

Construction, Testing and Stamping:

ASME Code A88 Addenda, Section VIII, Division I. Latest Addendum

RAPIDOOR Assemblies:

a. Arranged for Side Swing operation.

b. Hydraulic cylinders for locking ring rotation and door positioning.

c. Preassembled and Motorized Hydraulic Package includes interconnecting hosing.

d. Patented Mechanical Pressure Indicating Device.

e. O-Ring type Service Gasket.

Autoclave Features:

a. Approximately Fifteen (15) process and/or sensing penetrations.

b. Saddle supports with drilled pads.

c. Internal tracks and conveyor supports. (See f. below)

d. Steam Header (External)

Welded 3" Carbon Steel pipe flanges at Autoclave ends, including Fisher steam control valve, strainer and manual shut-off valve with chain operator. Note: 1-4" flanged nozzle on autoclave top centerline for future cross over to adjoining autoclaves.

e. Drain/Vent Header (External)

Threaded, 3", Schedule 80, Carbon Steel pipe at autoclave ends with tees or crosses at intersections for ram cleaning. All fittings to be 300 lbs. with forged steel plugs. Isolation valves, automatic vent/drain valve and check valve included.

f. Conveyor Supports

Seven (7) cross channels to longitudinal tracks inside of each autoclave. Conveyor and installation of conveyor by others.

g. Insulation Supports

1/2" square nuts on 12" centers on each Rapidoor for insulation supports; insulation by others.

Control System

I. Nema XII Panel Containing:

1-Barber Coleman 570 Programmable Temperature Controller
1-Honeywell AR-25 Temperature Recorder
1-Motor Starter for Hydraulic Power Unit(Remote pushbutton stations (at doors)
1-Main Disconnect (460/60/3 Supply)
1-Control Transformer (460/3/60 to 115/1/60)

1-Light for Autoclave Pressure at or below 1.5 PSIG.
1-Light for Autoclave Pressure above 1.5 PSIG.
1-Light for Autoclave Over Temperature.
1-Light for Autoclave Over Pressure.
1-Light for Control Power on with on/off selector switch.
1-Emergency Stop Pushbutton.
1-Bell for Cycle End.

II. Hardware

2-Honeywell Pressuretrol Pressure Switches
(1-Low Pressure to lock out hydraulic power unit, 1-set at 80 PSIG to interrupt control signal and indicate high autoclave pressure.)
2-Thermometers (1 each end thru shell near door controls).
2-Pressure gauges (1 each end thru shell near door controls).
1-Safety relief valve.
2-Door control stations (1 each end start/stop for hydraulic power unit and manual control valves for lock ring open/close and door positioning) wired and piped (hose).
2-Manual Pressure Indicating Devices.
4-Limit Switches indicating doors closed and doors locked.

III. Typical Cycle

1. Load Autoclave
2. Lock Doors
3. Engage Manual Pressure Indicating Devices
4. Select desired time and temperature on Barber Coleman 570 controller.
5. Depress cycle start
6. Steam valve opens, vent valve closes
(Thermostatic air vent automatically removes trapped air).
7. Time-temperature program complete
8. Steam valve closes, vent valve opens
9. Cycle ends (0 PSIG). Autoclave at or below 1.5 PSIG light illuminates
10. Disengage Mechanical Pressure Indicating Device
11. Open Door(s)
12. Remove Load

WSF
Industries, Inc.

Charles Cooley
BFI Medical Waste Systems

PRICE: $114,437.00 each

$111,003.00 based on two (2) autoclaves, two (2) hydraulic pumps and controls for both units in one (1) common control panel.

Prices do not include any Sales, Use or similar taxes and is firm for 45 days.

F.O.B.: Our plant, Tonawanda, NY

TERMS: 1/2% 10, Net 30 Days with approved credit

SHIPMENT: 18 weeks.

We appreciate the opportunity to present this proposal and hope to serve you. Please call or write if additional information is required.

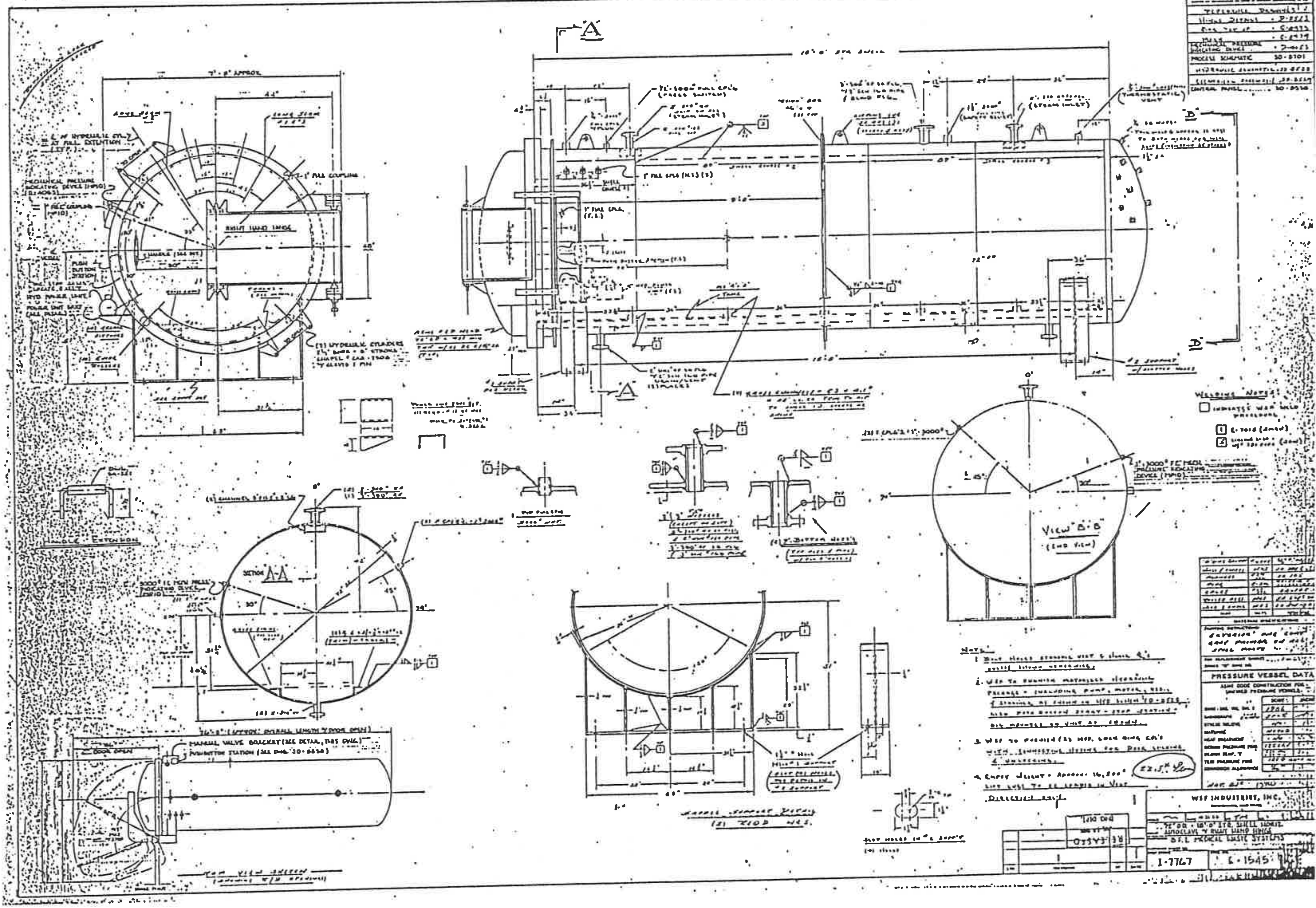
Sincerely,

WSF INDUSTRIES, INC.

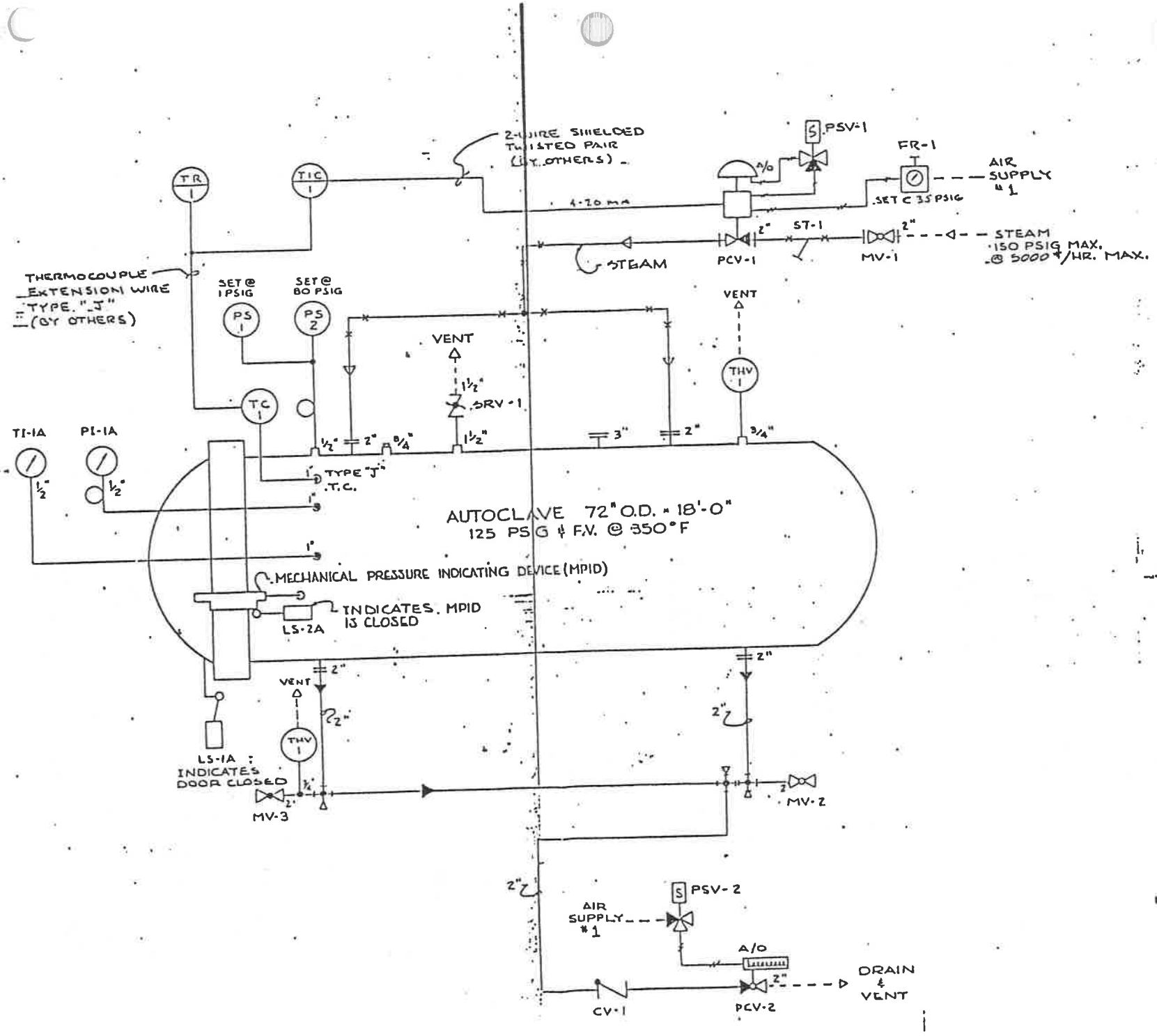
James A. Ruffing (CJ)

James A. Ruffing
Sales Manager-Special Products

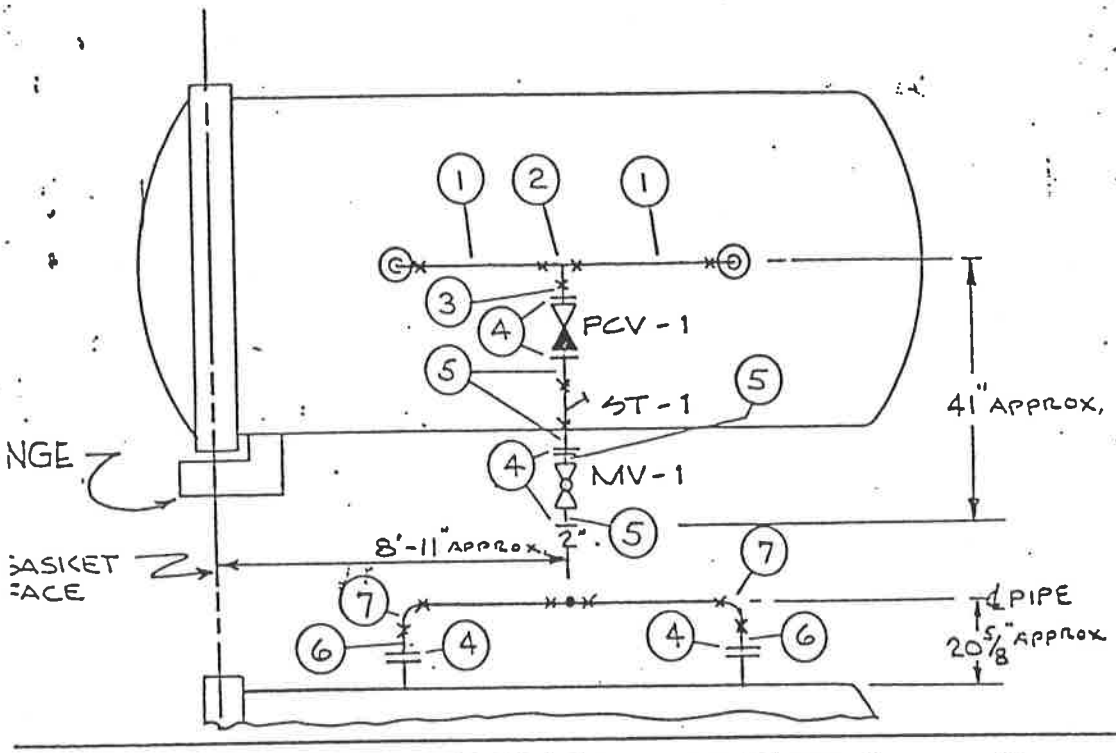
JAR/caj



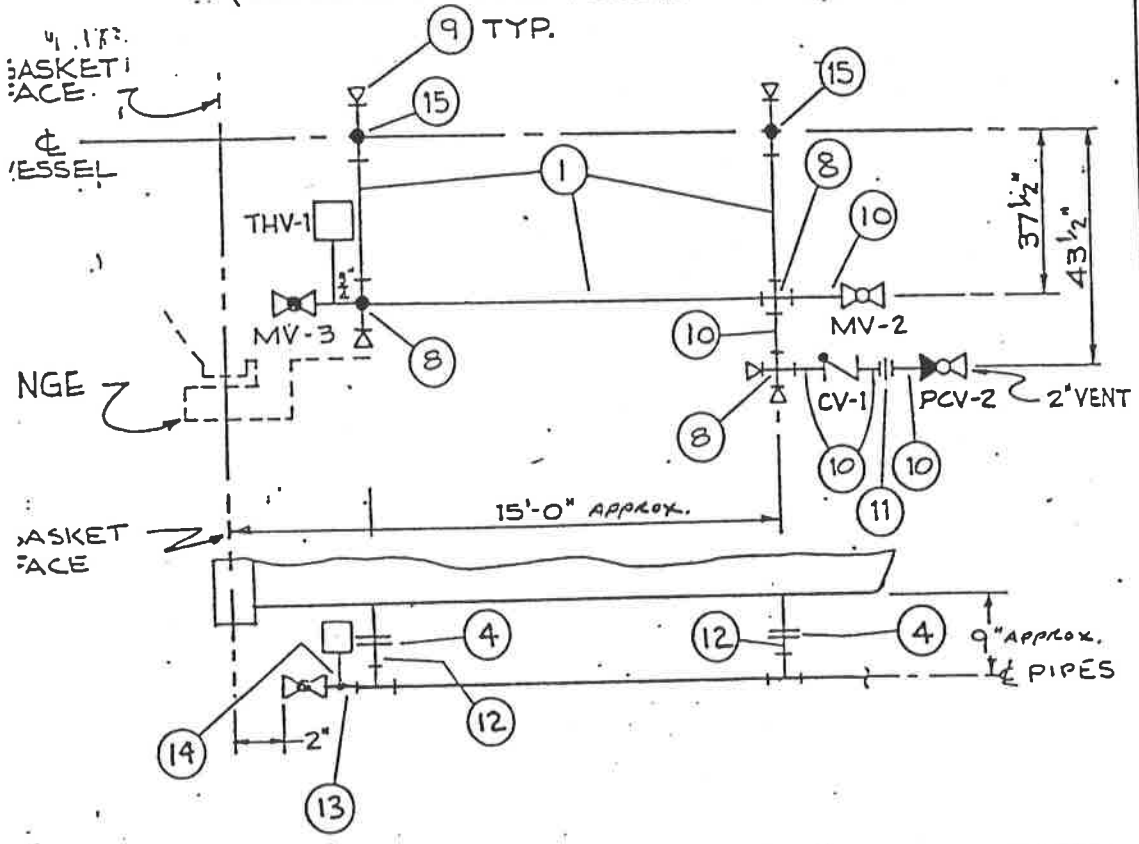
VIEW "D-D"
(END VIEW)
SECTION A-A
MANUAL VALVE BRACKET (SEE DETAIL, THIS DWG.)
PUSHBUTTON STATION (SEE DWG. 30-8630)
HANDLE EXTENSION
RIGHT HAND HINGE
PROCESS SCHEMATIC
CONTROL PANEL
NOTES:
PRESSURE VESSEL DATA
ASME CODE CONSTRUCTION FOR UNFIRED PRESSURE VESSELS
WSF INDUSTRIES, INC.
AUTOCLAVE W/ RIGHT HAND HINGE
I-7767
E-1545


2-WIRE SHIELDED TWISTED PAIR (BY OTHERS)
TR
TIC
4-20 MA
PSV-1
FR-1
AIR SUPPLY #1
SET @ 35 PSIG
A/O
2"
ST-1
2"
STEAM
150 PSIG MAX. @ 5000 #/HR. MAX.
STEAM
PCV-1
MV-1
THERMOCOUPLE EXTENSION WIRE TYPE "J" (BY OTHERS)
SET @ 1 PSIG
SET @ 80 PSIG
PS 1
PS 2
VENT
VENT
THV 1
1½"
SRV-1
TC 1
TI-1A
PI-1A
½"
½"
½"
2"
¾"
1½"
3"
2"
¾"
1" TYPE "J" T.C.
1"
1"
AUTOCLAVE 72" O.D. x 18'-0"
125 PSIG & F.V. @ 350°F
MECHANICAL PRESSURE INDICATING DEVICE (MPID)
INDICATES MPID IS CLOSED
LS-2A
2"
VENT
2"
THV 1
LS-1A : INDICATES DOOR CLOSED
¼"
2"
MV-3
2"
2"
2"
MV-2
2"
PSV-2
AIR SUPPLY #1
A/O
2"
DRAIN & VENT
CV-1
PCV-2

PIPING ON TOP OF TANK



PIPING ON BOTTOM OF TANK
(LOOKING DOWN THROUGH TANK)



AUTOCLAVE OPERATING PROCEDURES

A. Pressurizing

1) Close both doors to the respective autoclave, utilizing the hydraulic motor. The lever on the side of the autoclave will lock the vessel (closing the door) when pushed and unlock the vessel (opening the door) when pulled.

2) The door will close automatically and the hydraulic motor is turned off when the door is locked into place.

3) Valve No. 3 is completely closed.

4) The reset button is pushed to initiate the 30 minute cycle, and Push the Start button.

5) Close valve No. 1 and No. 4 in approximately 15 seconds, or when steam appears.

6) When gauges indicate 350 ^{o}F and 80 PSI pressure, the unit is pressurized.

7) After 30 minutes of treatment the buzzer will sound and the unit will begin to depressurize.

B. Depressurizing

1) Open valve No. 3 completely and allow the vessel's pressure to drop to 12 to 15 PSI.

2) Open valves No. 1 and No. 4, halfway, and allow pressure to decrease to between 5 to 0 PSI. Then open valves No. 1 and No. 4, completely.

3) Push the "ON" button to the hydraulic motor and open the "Clear End" door first. Push the lever on the side to unlock the door.

4) After the steam has escaped through the suction fans, the door on the "dirty end" is opened.

5) Remove the treated waste first, load untreated waste and begin pressurizing.

AUTOCLAVE START UP PROCEDURES

1) Remove the individual conducting the entry and all tools utilized during the entry from the autoclave.

2) Remove the mechanical ventilation (fan) from the vessel's entry.

3) Remove the lock and chain from the door on the "clean end".

4) Remove the lock from the main breaker, but the breaker should remain in the "off" position.

5) Remove the lock and chain from the main steam feed valve and open main valve.

6) Remove the tag from the "pull on/push stop" switch (located on the chart panel) and pull the switch to the "on" position.

7) Turn the main circuit breaker to the "on" position.

8) Return the autoclave to service.

AUTOCLAVE SHUT DOWN PROCEDURES

1) The attached shut-down and start up procedures will be utilized when a vessel entry is conducted.

2) Close and lock-out manual steam feed valve (manual valve located on the feed side of the automatic feed valve). Utilize chain and padlock to lock-out.

3) Shut "off" main circuit breaker (located on wall beside the respective autoclave) and lock the circuit breaker in the "off" position.

4) Deactivate system by pushing in the "push to stop/pull to start" button located on the chart record panel. Tag the button in the "off" position using the designated tag.

5) Open both doors at either end of the autoclave and lock the door on the "clean end" in the open position.

6) Mechanical ventilation (purging) will be established for a minimum of one-half hour (30 minutes) before the entry is initiated. The mechanical ventilation will be posted at the clean end, the entrance at which the door is locked open.

7) Mechanical ventilation will continue throughout the entry.

8) Throughout the entry, a "look-out" will be designated, and assigned no responsibilities other than maintaining constant visual and verbal contact with the employee conducting the entrance. The look-out will be posted at the entrance where the door is locked open (the clean end) and the mechanical ventilation is blowing to his back (i.e., ventilation is carried from the look-out's breathing zone).

9) Persons conducting the entry will utilize the following personal protective equipment:

   a) Hooded and booted Tyvek suit.
   b) Double cartridge respirator with:
      2 HEPA dust cartridges
      2 organic vapor cartridges
   c) Safety goggles
   d) Gloves
   e) Safety shoes

10) Utilize the attached hazardous work permit when conducting the vessel entry.

BOILER START UP PROCEDURES

1. Replace the following:

   a. rear fire box entry.
   b. back access door.
   c. water column head (insure new gasket is installed).
   d. replace water plugs on the water piping (insure new gaskets are installed).
   e. replace steam and water hand hole plates (insure new gaskets are installed).

2. Check all bolts to access doors, plugs, and water column to insure they are tightened.

3. Unlock feed water pump breaker and feed water valve. Open the feed water valve, place breaker in the "ON" position. Start the feed waste pump and fill the boiler (Note: if water emits from any plugs or openings tighten until properly sealed).

4. Leave Trycock valves open until water runs out of lower valve, then close the valve.

5. Allow water to rise to the proper level in the glass gauge on the water column, and close the two upper Trycock valves

6. Remove lock and turn on main boiler breaker, also remove tag and turn on main panel breaker.

7. Remove lock on main gas valve and open (red valve on 6" line). Remove tags and open the two secondary gas valves (on 1" line).

8. The Potentiometer switch must remain in the "automatic" position and place Potentiometer on low fire position.

9. Turn power switch to "ON" position and allow 60 second pre purge. Reset the gas low pressure switch and the auxillary low water cutoff.

10. Turn Burner Switch to "ON" position after the 40 sec. prepurge is completed.

11. Electric ignition will attempt to light the burner. The burner will show "Flame Failure" if ignition does not occur, after which, allow it to complete the "post purge" cycle and attempt to relight. If ignition does not occur after second attempt, turn burner switch to "OFF" position and check the following items:

    a. insure all gas valves are open;
    b. insure there is proper air pressure (i.e., insure dampers and blowers are free of dirt and the linkage rod allows the air shutter to cycle properly)
    c. insure the ultra-violet scanner is properly inserted and the cable is tightly connected to the rear of the scanner.
    d. insure the low gas pressure switch and the auxillary low water control have been reset.

    Allow for a three minute cool down, turn the burner switch "ON".

12. Push Manual Reset and restart ignition cycle.

13. After the boiler is on, the Potentiometer (on low fire at start up) will be gradually increased in four 15 minute increments until it is set on the "High Fire" position.

14. The Potentiometer will remain on "high fire" and "automatic", thus allowing the boiler to go through the "full modulation" cycle (1 million BTU's to 4 million BTU's) as needed, and allowing for maximum operating efficiency. Note: If there is a flame failure after ignition occurs, the manual reset button and low water reset switch must be pushed and the ignition cycle repeated.

15. Allow boiler pressure to build until it equalizes with other boiler(s) on line.

16. After pressures have equalized, remove the lock and open the main steam valve and return the system to full service.

BOILER SHUT DOWN PROCEDURES

1. Turn the burner switch to the "OFF" position.

2. Allow the blower to cycle for a minimum of 60 seconds, post purge, and turn the control switch to the "OFF" position.

3. Shut off the main gas valve (red valve on the 6" line) and lock out the valve in the closed position.

4. Shut off the two manual secondary gas valves (on the 1" line" and tag the valves out.

5. Shut off and lock-out the boiler's main electrical breaker in the "OFF" position. The main breaker is located on the wall behind the boiler. Tag out breaker on main panel in "OFF" position.

6. The Potentiometer switch should remain in the "automatic mode" during the boiler shut down.

7. Allow a minimum of 12 hours for the boiler to cool down or until the pressure gauge reads 0 PSI (Note: consult the manufacturer to see if a partial blowdown is required to remove sediment).

8. When the pressure gauge indicates 0 PSI, open the Trycocks on the water column.

9. When the boiler pressure gauge indicates the pressure of the boiler is 0 PSI, the Trycocks on the water column must be opened to insure there is no residual steam in the boiler. The top and middle Trycocks should be opened to insure the boiler is free of steam.

10. Close and lock-out feed water valve(s) to the respective boiler(s).

11. Shut off respective feed water pump(s) and lock-out main breaker(s) in the off position.

12. Close main steam discharge valve (on the discharge side of the condensate valve) and lock-out the valve in the closed position.

13. When assured that there is no steam remaining the boiler, open the blow down valves and allow the boiler to drain.

14. If the surface temperatures allow, open the front entrance hatch and allow to remain open for a minimum of six hours to expedite the cooling of the boilers interior.

15. After the boiler has cooled to 100^{o}F, the following access doors will be opened:

    a. back access door to the fire box (rear exhaust box).
    b. rear fire box entry.

16. The following plugs must be removed (clean plugs and outlets):

    a. the five plugs to the water piping.
    b. the nine water and steam hand hole plates.

17. Remove the head to the water column.

18. Maintenance and repairs may begin when the above procedures are completed. (Note: Always install new gaskets to the water plugs, water and steam hand hole plates, and water column head each time they are removed.)

19. The water side of the boiler should be thoroughly flushed with water from a hose nozzle under pressure. Flushing must continue until the water discharged is clear.

20. After flushing is completed, the interior must be inspected to determine if rust, scale, corrosion, or mineral deposits have accumulated. Before inspecting the interior, a fan or blower will be allowed to purge the interior for one hour prior to inspection.

21. Safety goggles must be worn by the employee conducting the inspection. Also, the purge will continue throughout the inspection and an additional employee will be present, maintaining constant visual and audible contact with the inspector.

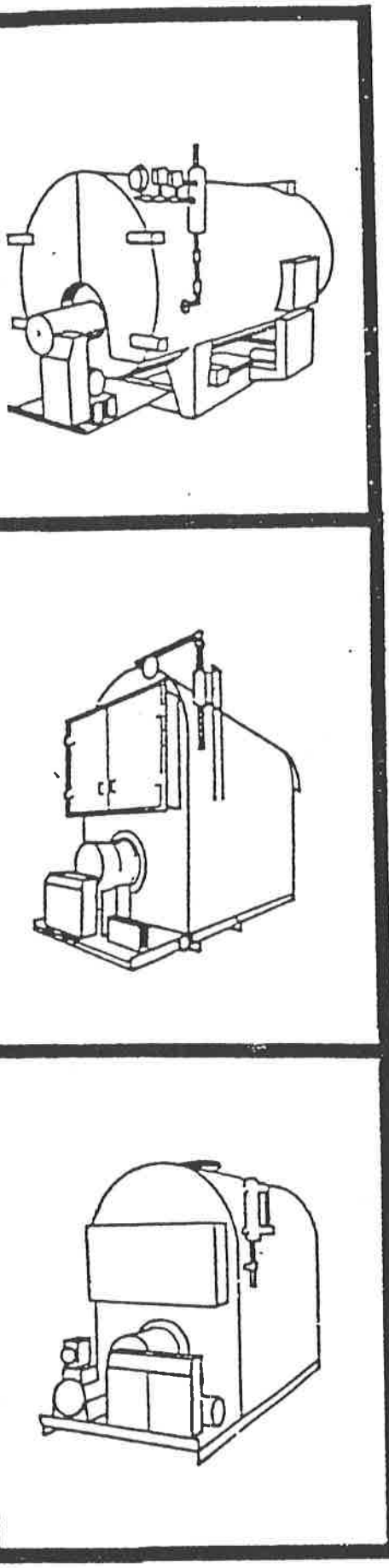
22. Hand scrapers will be used to remove mud, scale, and rust from the boiler's interior. Cleaning should begin at the top and work down. The precautions listed in item 21 will continue during the cleaning

23. After the deposits have been removed, the boiler must again be flushed to remove the residue incurred from the cleaning.

24. All fire tubes must be inspected to insure they are intact. Columns of deposits, foam, etc. are indications of cracks or holes in the tubes. If there is indication of tube leakage, contact the local service representative immediately.

25. If tubes are determined to be intact, they will then be cleaned of carbon and residue. This will be accomplished by utilizing a brush and pole to "ram" out each individual tube until deposits are removed.

26. Inspect the refactory for cracks or breaks. Note: Refer to Boiler Maintenance Schedule.



KEWANEE
BOILER
COMPANY, INC.

CARE AND OPERATION

FORM KBM 507

INDEX

RULES TO REMEMBER

1. Whenever fresh water is put into a boiler, it should be heated until boiling occurs, to drive off oxygen and prevent corrosion.

2. When starting up for first time, fire at a low rate to dry out refractory lining, and prevent shocking of Tubes/Tube Sheet.

3. Boil out the boiler with caustic solution to remove oil and grease before placing the boiler in service. See Page 7. for details.

4. Avoid sudden heating or cooling. Do not add large quantities of cold feedwater to a hot boiler.

5. Check water level daily.

6. Blow down water level controls frequently in a steam boiler.

7. Keep boiler clean on inside. Wash out at regular intervals. See Page 7. for details.

8. Inspect both fire side and water side surfaces for corrosion and pitting at least once a year.

9. Give boiler immediate attention when taken out of service to prevent deterioration. See Pages 11 and 12. for details.

10. Keep boiler room clean, orderly and well lighted.

11. Consult a boiler water specialist for correct water treatment.

12. Maintain opening to outdoors for combustion air.

13. Boiler openings should be used for service intended. See Page 7. for details.

HOW TO IDENTIFY YOUR BOILER

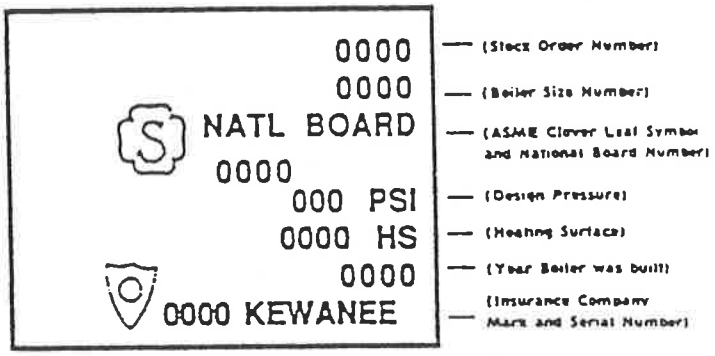
DATA PLATE

Each Kewanee Boiler has a data plate on the front fluedoor or on the right hand side of the boiler near the front which shows the catalog or model number, ratings and working pressure.

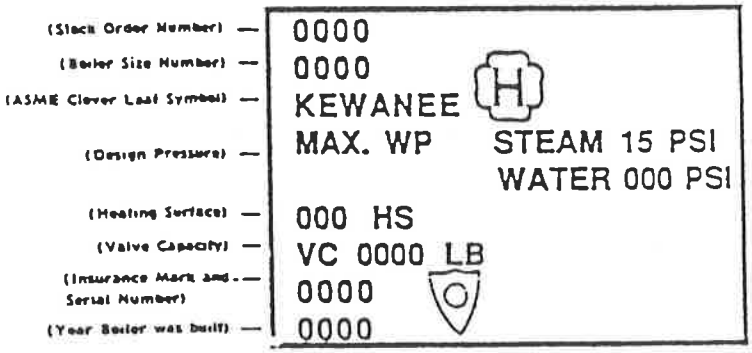
BOILER STAMPING

Each Kewanee Boiler has identifying marks stamped in the shell plate. These stampings should be uncovered and visible. A removable cover plate is provided in jackets installed or furnished by Kewanee to permit access to this stamping. For location of these stampings, see pages 3-6.

HIGH PRESSURE STAMPING



LOW PRESSURE STAMPING

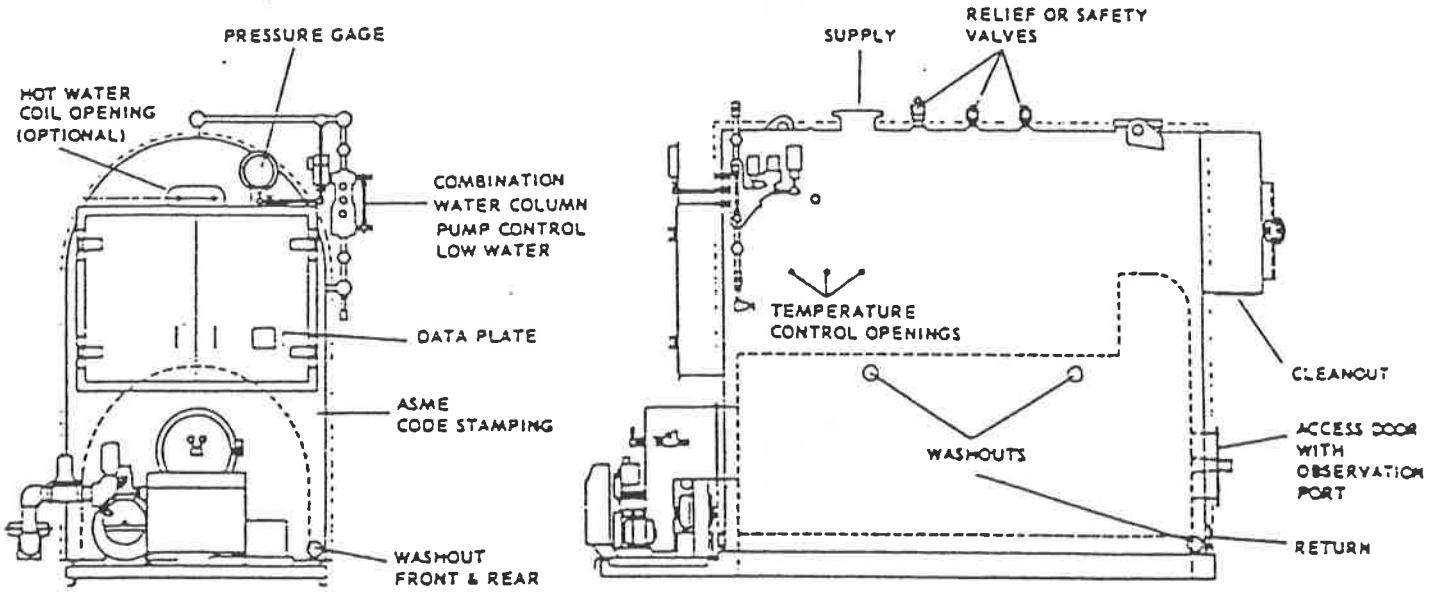


MANUFACTURER'S DATA REPORT

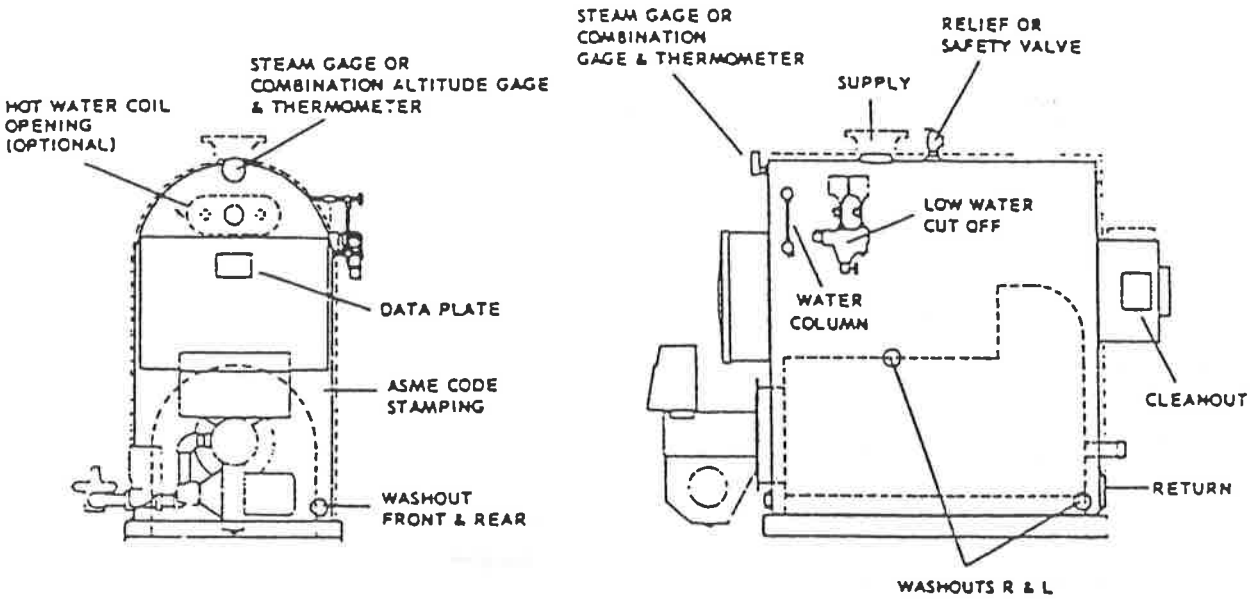
The manufacturer's data report showing the construction specifications for all boilers stamped with a National Board number is on file with the National Board of Boiler and Pressure Vessel Inspectors, 1155 North High St., Columbus, Ohio 43201. The insurance inspection company mark is recorded by the boiler insurance company whose representative approved construction of the boiler. Manufacturer's data reports are available on request from Kewanee for boilers stamped with the Insurance Company serial number only.

KEWANEE
TYPE "C" BOILERS

IDENTIFICATION AND LOCATION OF TAPPING AND TRIM



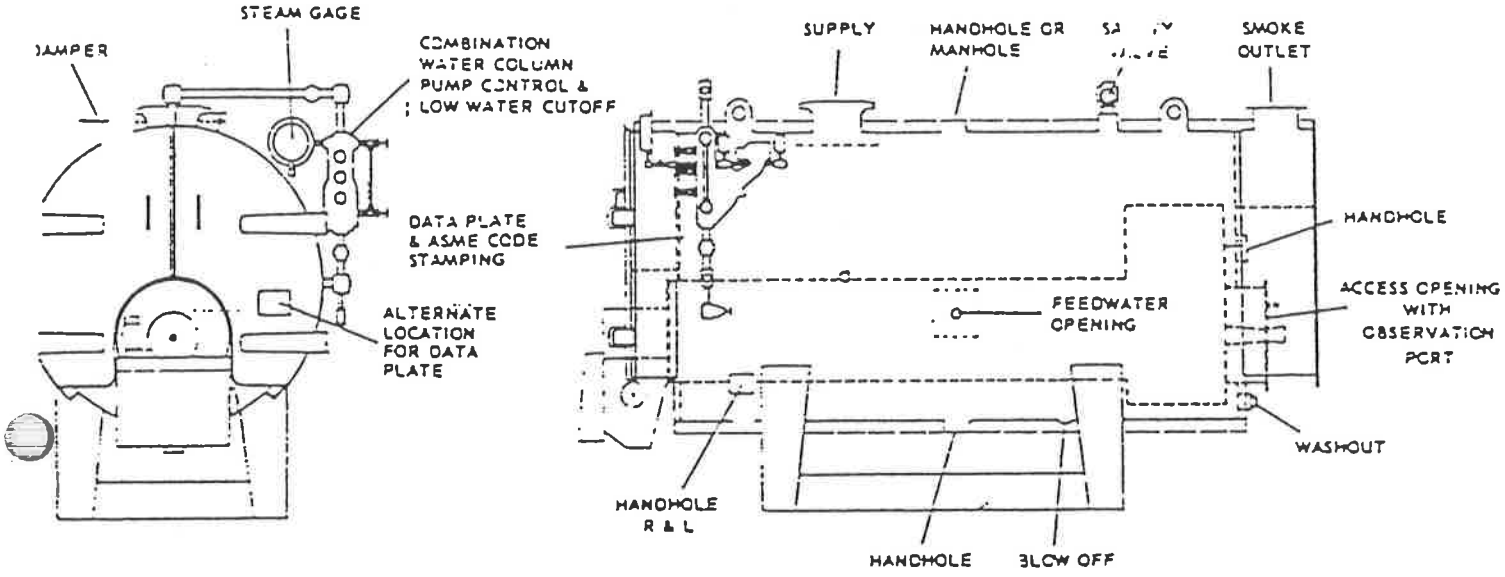
TYPE "M" PACKAGE



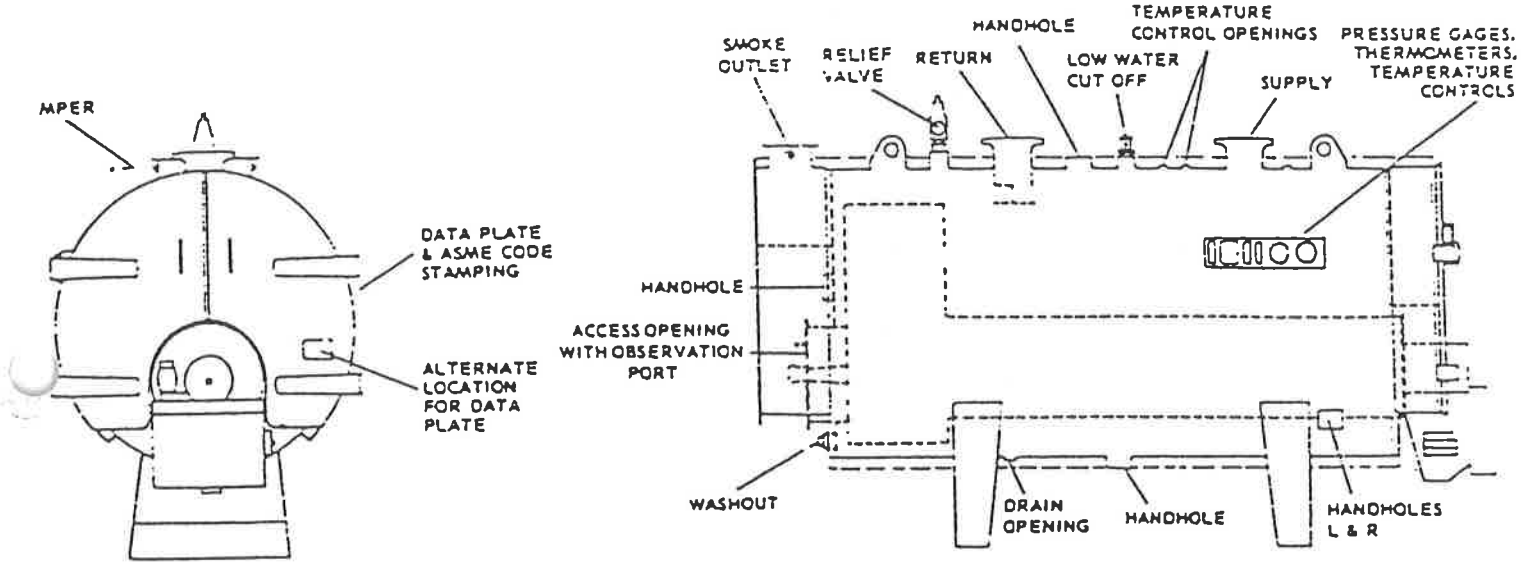
KEWANEE
CLASSIC III BOILERS

IDENTIFICATION AND LOCATION OF TAPPING AND TRIM

STEAM

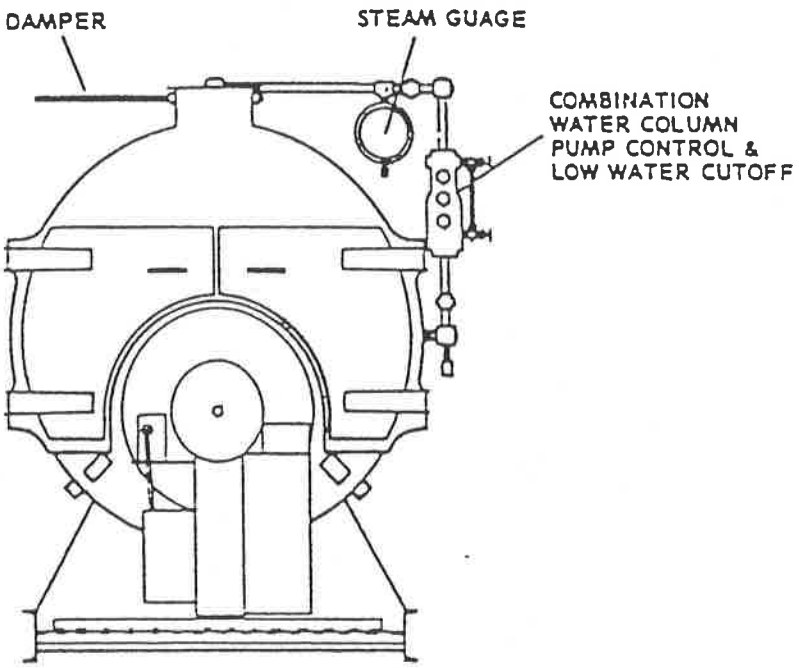


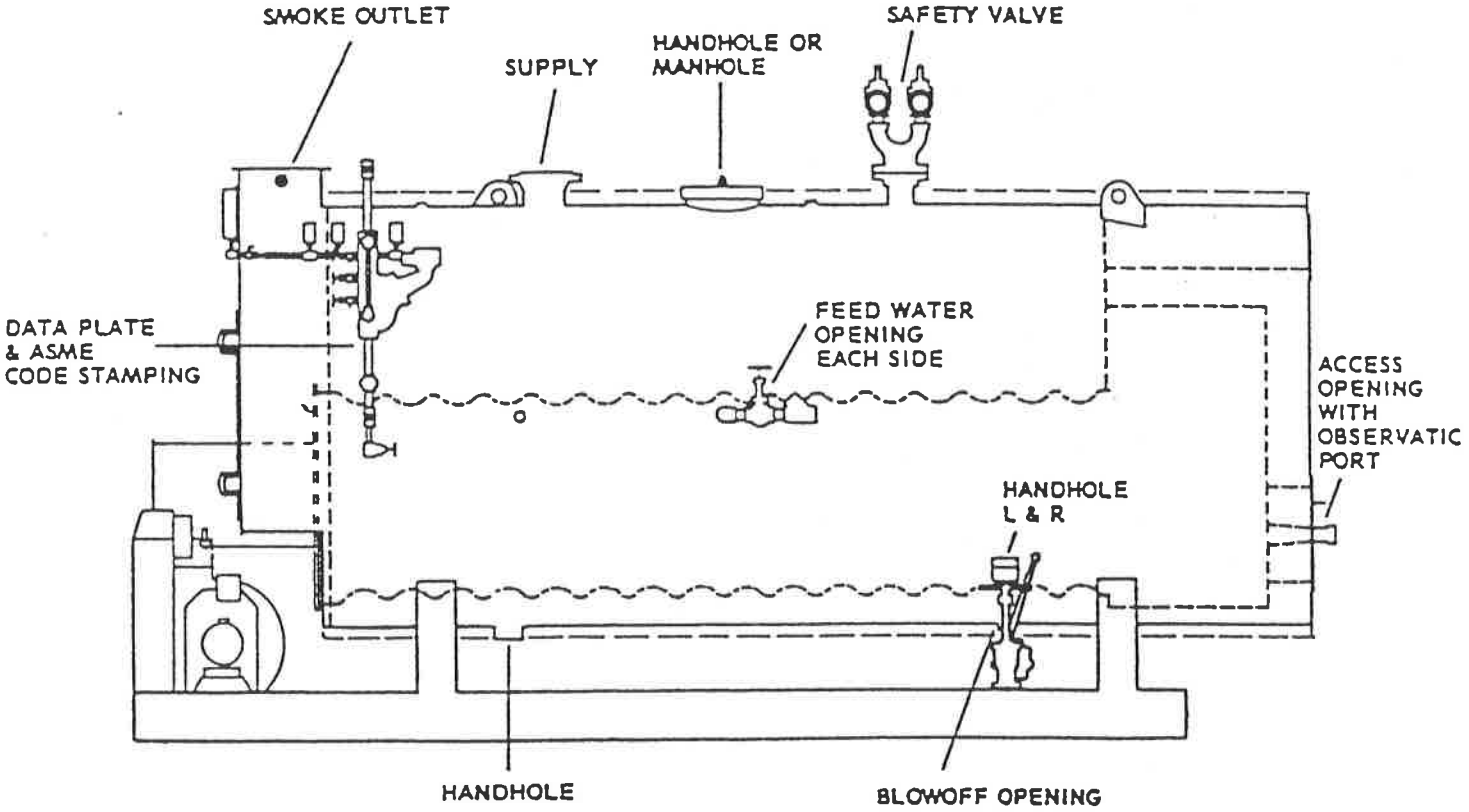
WATER



KEWANEE CLASSIC II
High and Low Pressure Boilers

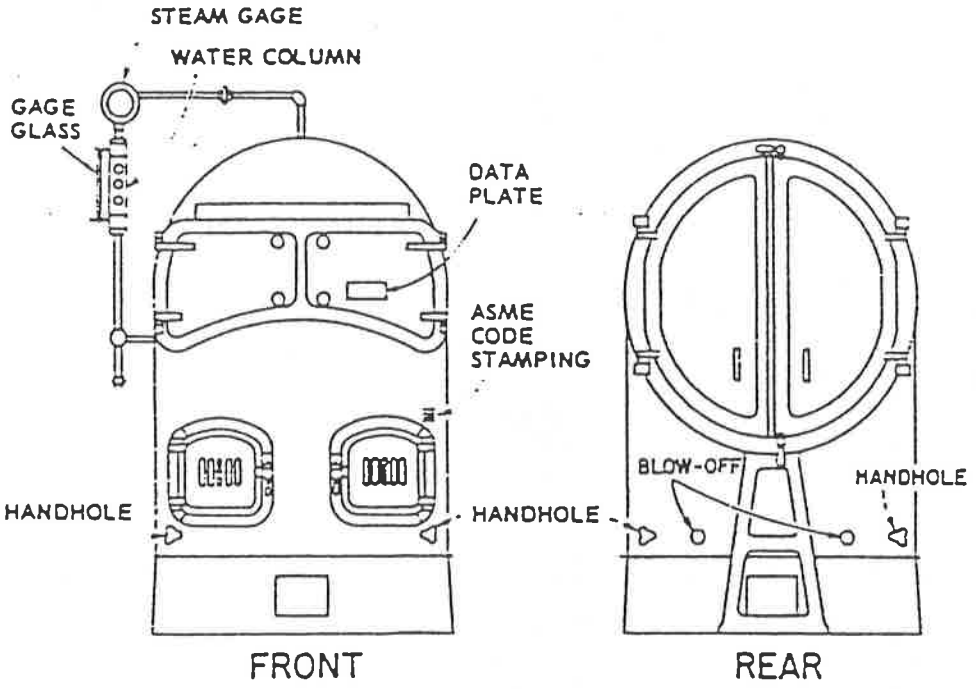
IDENTIFICATION AND LOCATION OF TAPPING AND TRIM

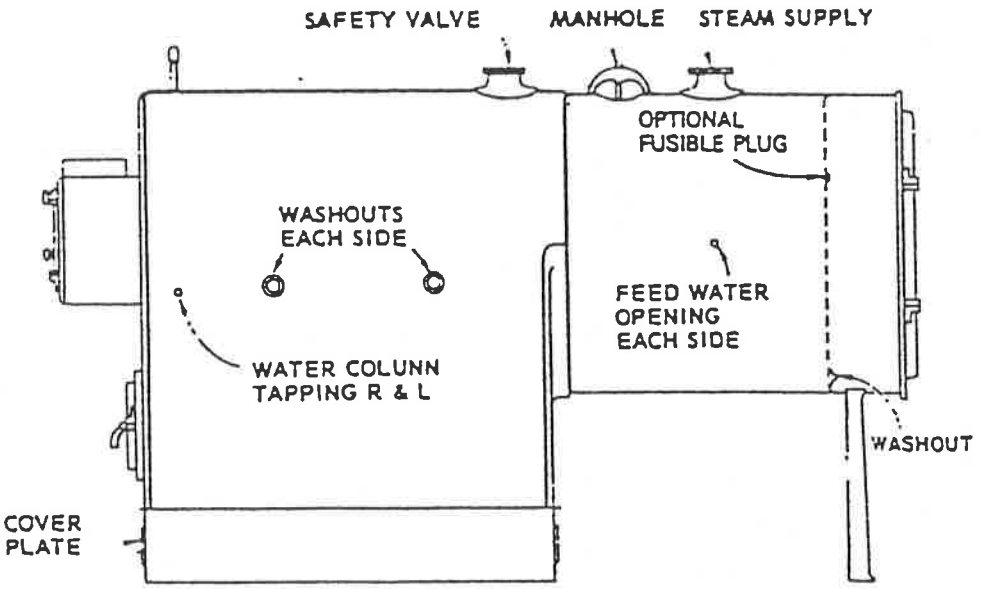




KEWANEE
500 AND HF SERIES BOILERS

IDENTIFICATION AND LOCATION OF TAPPING AND TRIM

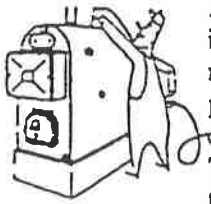




RIGHT SIDE

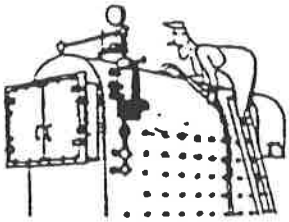
PREPARING THE BOILER FOR SERVICE

WASHING THE NEW BOILER



Before operating the new boiler, it should be washed out to remove oil and grease, pipe joint paste, etc., accumulated during construction and installation. This is usually taken care of by the heating contractor. Washing the boiler must not be neglected because impurities may damage the boiler, or cause an unsatisfactory operation condition.

STEPS FOR WASHING



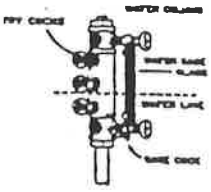
1. Remove any foreign materials which may be left in the boiler.
2. Check out burner equipment up to, but not including the actual firing.
3. Remove any controls or accessories that may be damaged by the chemicals used.
4. Remove a plug from a tapping on the highest part of the boiler. (If no other opening is available, remove the safety valve carefully to avoid damaging it.)
5. Measure out one pound of trisodium phosphate for each 50 gallons of water to be put into the steam boiler or the hot water boiler system. Mix the chemical with sufficient water to make a concentrated solution for pouring into the boiler. (Caution - Use care in handling the chemicals. Chemicals are harmful to skin, clothing and eyes. Do not permit the dry chemical or concentrated solution to come into contact with skin or clothing.)
6. Fill the boiler half full of water and then pour in the concentrated cleaning solution.
7. Replace the plug or safety valves, and close up other openings that may have been opened.
8. Steam boilers may then be filled with additional water up to the proper water line.
9. Water boilers and the entire system may be filled with additional water up to the expansion tank. To assure a full system, open all air vents until water is emitted.
10. Start the firing equipment and check the operating limit and safety controls.

    Operate the boiler as though in conventional service, reaching normal operating temperatures for water or normal pressures for steam.
12. Steam boilers should be operated for a few days to bring oil and dirt from the system back to the boiler. If desired, the condensate return may be discarded to the drain, and operation continued until the condensate runs clear.
13. Water boilers should be operated for one day with pumped circulation throughout the entire water system.
14. Stop the firing equipment.
15. Drain the boiler and water system in a manner and to a location that can safely handle hot water.
16. Use a high pressure water stream to hose down the water side of the boiler.
17. Refill the boiler system with fresh water; steam boiler to proper water level; water boiler to expansion tank, venting air as it is filled.
18. Bring water temperature up to at least 200° F, to expel air and avoid corrosion.
19. Add boiler water treatment chemicals if desired.
20. Tighten handhole, manhole covers and plugs while boiler is hot.
21. The boiler is now ready to put into service or on standby.
22. In stubborn cases, another boil-out may be necessary.

WATER LEVEL

STEAM BOILERS

The water column must be located in accordance with the ASME Code. For low pressure boilers, the lower water gage nut (lowest visible water line) shall be located one inch above the top of the highest firetubes or combustion chamber. For high pressure boilers, the lower water gage nut (lowest visible water line) shall be located three inches above the top of the highest firetube or combustion chamber.



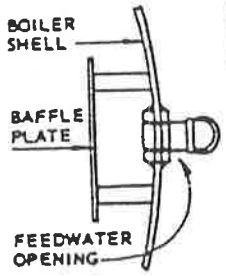
The water level in the boiler will be maintained by a water level controller if the boiler is equipped with this type of control. The valves at the top and bottom of the water gage glass must be kept open so that a true boiler water level will be shown in the glass.

If the boiler is manually fed, open the try cocks, feed water to the boiler slowly. When the water runs out of the lower try cock, close try cock and add water until it reaches 2" in the glass (middle of the glass for 3R and M Series boilers).

OPERATING THE BOILER

FEED WATER CONNECTION

It is important that all water entering the boiler be fed through one of the openings at either side of the shell. These openings are provided with baffle plates for distributing the feed water more evenly in the boiler. The openings are labeled "Feed Water Opening" on diagrams, pages 4, 5 and 6. Do not feed water through the blow-off opening at bottom of shell.



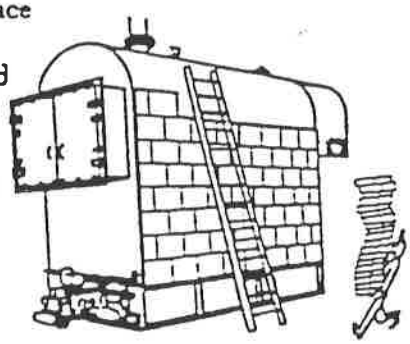
HOT WATER BOILERS

With a hot water heating system the boiler and entire system must be full of water for satisfactory operation. The red or fixed hand on the combination altitude gage and thermometer, when used, is normally set to indicate the amount of pressure required to fill the system with cold water. Water should be added to the system until the black hand registers the same or more than the red hand. To insure that the system is full, water should come out of all of the air vents when opened.

As soon as the boiler has been filled with water it should be fired and heated to steaming or operating temperature in order to drive off air bubbles. Do not allow boiler to stand full of water unless it has first been heated. (CAUTION: During this period the burner should be held in the low fire position.)

BOILER INSULATION

The outside surface of the boiler should be covered with insulation to prevent needless heat loss from the shell. By reducing the heat loss from the boiler, excessive boiler room temperatures are avoided and better economy is obtained. Packaged boilers are jacketed by the manufacturer. The covering, if done on the job, is usually not applied until after the boiler has been operated a week and ten days in order to test all joints and connections for tightness. Do not cover identification stampings on boiler.



DRYING OUT SETTING

The boiler must be fired at a low rate for at least one day to dry out the refractory linings. Adjust the burner for a low firing rate and operate intermittently to keep the combustion chamber warm. The drying procedure may be carried out together with the washing process.

MECHANICAL FIRING INSTRUCTIONS

If boiler is fired with either an oil, gas, combination oil and gas burner, or stoker, complete with controls and safety devices, operate the burner in accordance with the burner manufacturer's directions. These are obtainable either from the heating contractor who made the installation or directly from the burner manufacturer.

Your Kewanee boiler is a quality product, engineered to extract practically all usable heat from the fuel burned and will continue to do so as long as the burner is adjusted properly, heating surfaces are kept clean and sufficient air for combustion is provided. Your Heating Contractor or Utility Company should be consulted for adjustment of the fuel burning equipment and controls.

Safety and economy are prime objectives in the operation of every boiler plant. The operator should, therefore, be familiar with his equipment and give it diligent attention. He should acquaint himself with all rules pertaining to the care and maintenance of the boiler as set forth by the Insurance Inspector, State Boiler Inspector and local regulations.

PRESSURE AND TEMPERATURE CONTROLS

The pressure on the steam boiler should be carried no higher than necessary to carry the load. The water temperature in the hot water boiler should be no more than required to heat the building. The pressure or temperature controls should therefore be adjusted accordingly. Excessive pressures are wasteful and should be avoided. It is important to operate this boiler as steady as practicable to avoid sudden heating or cooling.

FLUE CLEANING

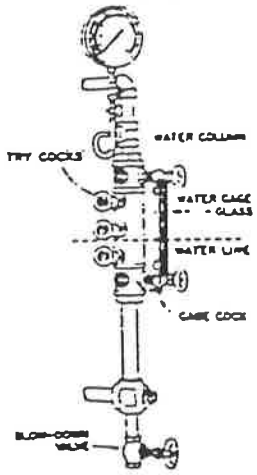
The frequency of flue cleaning will depend on the fuel burned and on burner adjustments. If combustion is complete, the flues will not require frequent cleaning. The flues should be examined at least once each week, and if coated with carbon or soot, should be scraped clean. A good criteria for cleaning flues is whenever the stack thermometer reads 100^0 F higher than it did when the boiler was new and firing at the same rated output.

COMBUSTION AIR

Provision must be made for the entrance of combustion air to the boiler room. When the boiler is starved for air, it will smoke and soot up. If the boiler room is tightly constructed with close fitting doors and windows, it is then necessary to have a clear opening, preferably to the outdoors, with an area in square feet determined by dividing the boiler horsepower rating by 23.

WATER LEVEL CONTROLS

Always note the water level in the glass and the steam pressure on the gage when entering the boiler room. Observe the reading of the steam gage in relation with the setting of the pressure control.



Blow out the low water cut-off and water level control as recommended by the manufacturer. Test the control by turning off the water supply and then observing whether or not the burner cuts out with low water in the glass. Blow out the low water cut-off and water level control as recommended by the manufacturer. The control should be tested by causing the float to lower so that the burner will be cut off. This should occur while there is still water showing in the water gage glass.

BLOW OFF

LOW PRESSURE BOILERS

The use of the blow-off or drain valve in the low pressure heating boiler is for the purpose of discharging rust colored water and sediment which may settle to the bottom of the boiler. The withdrawal of a pail of water about once each month is generally staisfactory. The loss of clear water from the boiler is wasteful and should be avoided. The blow-off valve must be used sparingly.

HIGH PRESSURE BOILERS

The use of the blow-off in high pressure boilers is to remove heavy concentration of dissolved chemicals to prevent foaming and undesirable water carryover in the steam. The amount and frequency of blowing down depends upon the number of hours a day the boiler is in service, the rate at which it operates, and the amount of make-up water used. Except where the amount and frequency of blowing down are determined by chemical analysis, blow down at least one full opening and closing of the blow-off valve every 24 hours. Do not allow valve to remain open, but start closing as soon as it has been fully opened. This amount of blow down will also remove rust and sediment which has settled to the bottom of the boiler.

Blow down only at times of light loads.

When boiler is equipped with a blow-off valve and a quick-opening valve in the same blow-off connection, always open the quick-opening valve first and the blow-off valve second.

In closing always close the blow-off valve first and the quick-opening valve second. See that the valve shuts tight and remains tight. Repair all leaky blow-off valves as soon as practicable.

If the discharge end of the blow-off line is visible, watch it for the purposes of detecting leaky blow-off valves.

WATER TREATMENT

Boiler water should be treated with good conditioning compound in accordance with the manufacturer's instructions.

Water treatment in the low pressure heating boiler is mainly for protection from corrosion or pitting. There is usually no lime or scale problem because practically the same boiler water is used over and over. Treatment for corrosion is designed to maintain the water alkalinity and to destroy oxygen. The water should be treated and heated to steaming temperatures as soon as the boiler has been filled. Do not allow water to stand in the boiler unless it has first been steamed.

Initial treatment of the boiler water at the beginning of the heating season is generally satisfactory for the entire year as long as the same water is used.

An unusual operating condition where there is a problem such as foaming, priming, boiler scale, corrosion or pitting should be referred to a concern specializing in boiler water chemistry. Do not experiment with "homemade" treatments or compounds.

FOAMING AND PRIMING

Foaming or priming in the steam boiler will cause large quantities of water to be carried over into the steam main. It will be detected by violent fluctuations of the water in the glass or by sudden dropping of the water level from the glass. Impurities will show as tiny specks or flakes floating in the boiler water. The following reasons may be the cause of the trouble:

1. Dirt or oil in boiler water.
2. Over-dose of water treatment.
3. Carrying too high a water level in boiler.
4. High overload on boiler.

In case of serious trouble, stop the burner and decrease the load on the boiler until the true water level can be determined. Then alternately blow down and feed fresh water several times. If the trouble continues, it will be necessary to wash out the boiler and refill with fresh water. Test safety valve and connections of pressure gage, water column, and water glass to make sure that they are clear and unobstructed by the impurities which are responsible for priming.

A practical check to determine if impurities are causing foam is to place a sample of boiler water in a beaker and bring it to a boil. If contaminants exist, it will foam and froth. A similar test in a second beaker filled with tap water will determine how bad the boiler water is.

CORROSION AND PITTING

Corrosion of the boiler on either the water side or the fire side can be of very serious consequence and should be guarded against.

Water Side Corrosion is generally caused by an unfavorable water condition or oxygen which attacks the metal and forms pit marks or holes in the tubes. Control of the boiler water alkalinity and deaeration is considered the best means of preventing water side corrosion. The proper alkalinity for boiler operation is recommended as a minimum pH value of 10½. The boiler should be examined regularly for corrosion. Every time the boiler is cleaned, the interior surfaces should be carefully examined for water corrosion. Water side corrosion in its earliest stages will be detected by small "mounds" of black iron oxide in powdered form along the top and sides of the firetubes. Concentrated pitting will occur under these "mounds."

Corrosion can be controlled by proper water treatment and the problem should be referred to a water chemist.

Fire Side Corrosion occurs mostly during stand by or when the boiler is not in use. In some cases it develops during normal firing periods. It will be detected either by a concentrated pitting action, particularly along the bottom of the fire tubes or by a general thinning of the metal at the entrance of the direct tubes.

Fire side corrosion is generally caused by the action of moisture on the carbon or soot coated surfaces. Moisture from the flue gases condensing on the cooler boiler surfaces combines with sulphur in the soot to form sulphuric acid which is highly corrosive to the metal. This condition can be very severe with coal fired boilers because of the high sulphur content of the fuel. It is usually more active along the bottom of the fire tubes where moisture collects.

Fire side corrosion can be prevented by keeping the fire surfaces clean and dry. PROTECT THE COAL FIRED BOILER FROM FIRE SIDE CORROSION AT END OF EVERY HEATING SEASON.

SCALE IN BOILER

Lime or hard scale does not normally occur in the low pressure heating boiler since practically the same water is used over and over. It is essential, however, to maintain all air valves and vents in good condition, to keep the system leak-proof, and to use the blow-off sparingly. In addition, water treatment should be applied for corrosion. When so maintained there will be no scale, mud or sediment in the boiler and the water will remain clear.

In the operation of a steam boiler it is desirable to return as much of the condensate as possible to the boiler in order to reduce the amount of raw make-up water to an absolute minimum. Some industrial processes require live steam which cannot be returned to the boiler, and all steam consumed in this manner must be replaced with make-up water.

Natural waters invariably contain minerals or salts in solution, and when the water is heated, these substances are precipitated or separated from the solution as solids. The precipitate is either carried in suspension or it settles out in the form of soft scale (mud) or hard scale.

In a steam boiler the water is distilled and discharged through the steam outlet while the solids remain. There is, therefore, a gradual accumulation of solids inside the boiler when raw feedwater is used. Salts which are carried in

suspension cause foaming and priming. Mud and scale inside the boiler cause overheating and damage. Every gallon of raw water fed to the boiler increases the mineral concentration, and unless corrective measures are taken, there will be unsatisfactory operation and injury to the boiler.

Soft scale and salts in suspension may be reduced by blowing down and washing out. Where the water supply is hard, the make-up water should be treated to prevent scale. Since the type of treatment or compound will depend upon the mineral analysis of the water supply, it must be determined by an experienced boiler water chemist.

INTERNAL CLEANING

The importance of internal cleaning should be emphasized because the boiler must be kept clean on the water side. Do not allow mud or scale to accumulate. The boiler should be washed out at regular intervals and at the same time examined internally to make sure that correct water treatment is being used.

After draining the boiler, when still warm, all manhole and handhole covers should be removed in order to gain full access to the interior surfaces. Wash with water from hose nozzle under pressure and use hand scrapers for mud and scale. Start at top and work down. Flush liberally until water coming from boiler is clear.

REPAIRS

Repair all minor leaks promptly. If serious leaks occur, shut down boiler immediately and cool gradually. Have repair made by a reputable boiler mechanic before re-firing.

MAINTAIN DRIP TIGHT CONNECTIONS

All piping connections to the boiler and all accessories should be maintained leakproof because even a minor leak, if neglected, may soon become serious. This applies especially to water column, water glass, water level control piping and manhole and handhole gaskets. Pipe nipples should be tightened or replaced if there is evidence of leakage. Leaky plugs in boiler shell should be replaced with nipples and caps.

REPLACING WATER GLASS

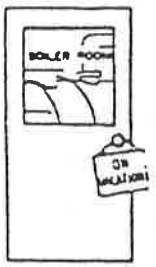
The water glass should be removed and cleaned whenever necessary. When a water glass has been broken, remove the broken pieces and slowly open the valves to blow out any remaining particles. Before inserting the new glass, see that the drain is open and that the glass is of the exact length required and that connections are in line. Insert glass with rubber gaskets, brass rings and stuffingbox nuts, taking care not to set the nuts too tight; then warm the glass by opening the top valve slightly and let a small current of steam flow through the glass. Close drain cock after the glass is sufficiently warmed, open bottom valve slightly and when water level in the glass has become stable, open the bottom valve wide and then open the top valve wide.

APPLYING MANHOLE AND HANDHOLE COVER AND PLUGS

Always use new gaskets. Clean the metal surfaces where the cover plate bears against the shell plate. Apply graphite paste or grease to asbestos gaskets to prevent sticking and to secure tightness. Use care in centering the cover plate and gasket in shell opening before drawing up bolts. Draw bolts up firmly, and if necessary, tighten them repeatedly when raising steam pressure to make them leakproof. Grease washout plug threads and use new gaskets.

Buna N rubber gaskets, sometimes used, shall not be graphited. Never tighten this type more than necessary. Excessive tightening may shorten life of gasket.

OUT OF SERVICE CARE



Steam boilers, and hot water boilers and systems may be left filled with water during minor shut downs providing the boiler room is dry. However, condensation and rust is less likely to occur if the boiler is drained and kept dry.

If idle boilers must be left with water in them in excess of one week, the water should first be boiled with the boiler vented to drive off any dissolved gases. The boiler water should then be made alkaline in excess of 50 grains (850 ppm) per gallon with caustic soda. Use 1.5 oz. of caustic soda per 100 pounds of water contained within the boiler and or system.

When the boiler is to be out of service for an extended period, it is recommended that the boiler be drained and kept dry. Use the following procedure to prevent corrosion and deterioration:

WASHING BOILER

Remove manhole and handhole covers. Hose the inside of boiler with water under high pressure and use hand scrapers to remove any mud, scale, etc. Start at top of boiler and work down.

DRYING BOILER

Dry the boiler by means of hot air stoves or by building a small fire of newspapers in the firebox. Do not let the boiler get hot enough to be uncomfortable to the hand. Leave all openings uncovered during drying process. In damp boiler rooms it is advisable to place an amount of quicklime on boards inside the boiler in excess of 2 lb. for each 1000 gal. of boiler capacity. All openings should then be closed.

CLEANING FIRESIDE SURFACES

Thoroughly scrape all carbon and soot from fire surfaces. After the fire tubes have been cleaned, apply a thin coating of oil or grease if boiler is to remain out of service for an extended period of time. Remove any rust or deposits from other fireside surfaces and after cleaning thoroughly, protect the surface with coating of oil, grease or red lead. Make sure no water or steam can enter boiler.

START UP

When starting up boiler after a long shut-down, fill boiler with water, wash out, refill, add water treatment compound and heat the boiler to drive off air bubbles.

Check all accessories at this time. Clean and make sure they are in good repair. If they are in need of repair, order replacement parts immediately.

FALL ATTENTION

It is good practice to have your heating system gone over by your Heating Contractor to make sure it is in good operating condition before the heating season starts. In general, all moving parts such as motors, draft regulators, pulleys, hinges, etc., need oiling or greasing at regular intervals. Burners on automatically fired boilers may require adjustments or worn parts may need replacing.

LOCAL LAWS AND ORDINANCES

It is recommended that the boiler operator be familiar with any local laws relating to the duties of engineer and fireman, or to the safety requirements of his work.

Inspection: All boilers installed in States where periodical inspection is the law will be inspected by the State or Municipal Inspector having jurisdiction. It is recommended that these inspections be supplemented with inspections by the person responsible for the plant.

No special cleaning is necessary for the exterior of the boiler other than giving the inspector convenient access to the boiler shell and tubes shall be washed down thoroughly to remove mud, loose scale and mineral deposits. Disconnect the blow-off line and run the water to a drain.

INCINERATOR START-UP PROCEDURES

1. Insure both entrance doors (primary and secondary) are securely closed.

2. Check the ash Dragon to insure the water is on and filled within 2 in. of the top.

3. Inspect all hoses for hydraulic leaks.

4. Remove the padlock from the main breaker and turn it to the "ON" position.

5. Turn the system key to "ON".

6. Turn the loader control switch to the manual position and close the ram lid and guillotine door.

7. Remove the lock from the main incinerator gas valve (on the 6 inch line) and turn the valve on.

8. Remove the tags and turn on the secondary gas valves for the burners on both the primary and secondary chamber.

9. Start the incinerator through its programmed start cycle. (Step #5)

   a. Blowers will come on and purge the system for three minutes.

   b. After the three minute purge is complete the burners are ignited.

   c. The burners preheat the system until the secondary reaches 1800°F. Throughout the preheat, the blowers remain off.

10. Place the loader switch in the "auto" position.

11. Wait for "preheat complete" light to illuminate indicating the system has preheated and is ready to load.

12. Push "lid open" button; open the loader lid.

13. Determine type of waste and the amount to be loaded for each cycle.

14. Load waste into hopper and close lid and push the "push to load" button to run the loader through its cycle.

15. Place the next load in the hopper and close the lid, press the "Charge ready" button.

16. The system will continue the cycle every six minutes after each load is put into the system, the hopper can be reloaded, and the system will charge it automatically.

17. The system can be charged at any item during the burn-down cycle and the cycle will start again.

18. Continue the cycle by loading the hopper every seven minutes.

INCINERATOR SHUTDOWN PROCEDURES

The system should never be manually shut off except in extreme emergency.

Except in emergency situations, the system must be allowed to proceed through its burn-down sequence.

1. After the final load of waste has been placed in the primary chamber, press the incinerator shutdown push button. The primary burner continues to burn for three hours at which time the primary time cycle expires and the following occurs:

   a. The primary burners extinguish and primary burner light goes out.

   b. The secondary chamber's after burn time cycle begins.

2. The secondary burn-down time will last four hours at which time the following occurs:

   a. "Secondary burner" light is extinguished.

   b. Cool-down cycle begins.

   c. Blowers will continue to purge.

3. When the "Secondary burner" light is extinguished, the main 6 inch gas valve to the incinerator must be closed.

4. Secondary gas valves to the primary and secondary burners will be closed and tagged with the predesignated tags.

5. The cool-down cycle will continue for four hours. At the conclusion of the cycle, the following will occur:

   a. All blowers, secondary and primary, will shut off.

6. When the cool-down cycle is completed, the doors to the incinerator should be opened to expedite the cool-down for entrance as follows:

   a. Place the ram lid and guillotine door switch on manual and open both doors.

   b. Open the main entrance door and lock in the open position using a chain and padlock.

7. When all doors are open:

   a. When the doors and lid are open and the ram is retracted, the loader control switch will be placed in the "OFF" position.

b. The system key will be turned off and tagged in the "OFF" position using the predesignated tag.

c. The systems main circuit breaker will be turned (pushed) to the "OFF" position and a pad lock used to lock the circuit breaker in the "OFF" position.

8. Prior to conducting the entry mechanical ventilation (i.e., fans to purge the system for a minimum of one hour before entry is initiated.

9. Air temperature must reach a maximum of 200°F before the entry is initiated.

10. Employees conducting the entry must utilize the following personal protective equipment:

    a. Hooded and booted Tyvek suit.

    b. Safety shoes with metal innersoles.

    c. Safety goggles.

    d. Double cartridge respirator with two HEPA filters and two organic vapor cartridges.

    e. Gloves.

11. While conducting the entry (if required), a designated lookout will be appointed to maintain constant verbal and visual communications with the person conducting the entry.

SEQUENCE OF OPERATION
Normal Cycle

1. Check operating settings of temperature controllers and rest, if necessary.

   A. Primary Temp. Controller 1400 - 1600 degrees F.
   B. Secondary Temp. Controller 2050 degrees F.
   C. Preheat complete 1800 degrees F.
   D. Feeder lock out 2100 degrees F.

2. Check that all the following gas cocks are in the "ON" position:

   A. Main Gas Valve from Gas Supply
   B. Incinerator Main Gas Valve
   C. Primary Burner Gas Valves
   D. Primary Burner Pilot Valves
   E. Secondary Burner Gas Valves
   F. Secondary Burner Pilot Valves

3. Turn the lever on the main disconnect up to the "ON" position.

4. Turn system key operated switch to "ON" position to energize the control circuit. "System Power On" light illuminates.

5. Start the incinerator through its programmed cycle by pulling the incinerator "push to stop/pull to start" pushbutton.

6. Primary and Secondary Auxiliary Blower motors start. (Purge Cycle)

7. When Purging is complete:

   A. Auxiliary air blowers stop.
   B. Preheat starts.
   C. Secondary burner pilot fires.
   D. Main motorized gas valve opens after:

      1. Secondary burner flames is proved.
      2. Low and high gas pressure switches are made

   E. Secondary burner lights illuminate.
   F. Secondary burners main flames fire.
   G. Primary burner fires.
   H. Primary burner light illuminates.

8. When Preheat is complete:

   A. "Preheat complete" light illuminates.
   B. "Ready to Load" light is illuminated.

9. Place loader "man/off/auto" switch in "Auto" position.

10. Using Lid open pushbuttons, open loader lid.

11. Incinerator can now be loaded:

    A. Press lid "OPEN" pushbutton and open hopper lid.
    B. Load waste into loader hopper.
    C. Press lid "close" pushbutton and hold until lid is fully closed.
    D. Push loader cycle "Charge Ready" pushbutton.
    E. Loader Door raises

        1. Primary Burners are extinguished.
        2. Primary auxiliary air and flameport air blower shut off and their dampers close.
        3. Burn timing cycles reset.

    F. Ram pushes refuse to be burned into incinerator.
    G. Ram retracts to "Pause" position.
    H. Loader Door Closes.

        1. Primary burner refires.
        2. Primary air and flameport blowers turn on and dampers open.

    I. Water spray system activates.
    J. Ram proceeds to extreme rear position.

        1. Green "Ram" light illuminates.
        2. Loader motor stops.

OPERATING INSTRUCTIONS

NOTE: Before starting the incineration system, clean and service according to the attached instructions.

1. Check that all following gas cocks are in "on" position:

   A. Main gas valve from gas supply
   B. Incinerator main gas valve
   C. Primary Burner gas valves
   D. Primary burner pilot valves
   E. Secondary Burner Valves
   F. Secondary Burner Pilot Valves

2. Check to make sure that the ash Dragon water is turned on and that the conveyor is filled to within 2 inches of the top.

3. Turn the lever on main circuit breaker on the panel to the "on" position.

4. Turn the lever on main disconnect switch on the motor control panel.

5. Turn system key to "on" position to energize the control circuit.

6. Check to see that all burners have fired after 3 minutes.

7. Place loader "man/off/auto" switch in "Auto" position.

8. Wait for "Preheat Complete" light. (1800 degrees F.)

9. Using "Lid Open" pushbutton, open loader lid.

10. Loader will then be ready to load.

11. Check with supervisor as to how much weight of a certain type of waste should be loaded for each cycle.

12. Load waste into loader hopper and close lid, push loader "Charge Ready" button to run loader through its cycle.

13. Load next load into hopper and close lid, and press loader "Charge Ready" button. If the green light is illuminated, the loader will go through the next load cycle. Repeat as required to load all the waste.

14. After the last load, allow the unit to run through its burn-down sequence.

WARNING: Do not manually shut system off except in extreme emergency.

ADJUSTING SETTINGS
OF CONTROLS, BLOWERS, AND BURNERS

A. GENERAL

The incinerator provides control for gas burners, air to primary chamber and air to secondary chamber.

Manufacturer's manuals give instructions for adjusting gas to burners. After burners are adjusted, flow can be checked with a gas meter.

The primary chamber has under fire air ports at 3 levels. Primary air is controlled by butterfly rotation dampers. The flameport air is controlled by an automatic proportional damper. Secondary air is controlled by butterfly rotation dampers and an automatic damper.

The temperature controller for the secondary is set according to the waste being destroyed. This proportionally controls the secondary burner input at + 1800°F.

The temperature controller for flameport air is set a small increment 50 to 75 degrees F. above the secondary burner control to add combustion air as required to hold the chamber temperature down. It must be set above the secondary burner set point or it will add air and drive up the fuel consumption rate.

A temperature controller in the primary is set at 1400 °F. which turns the primary burner off and on.

A temperature controller for the secondary chamber indicates that preheat is complete and allows the system to switch to burning mode. Temperature controller sensing the secondary chamber temperature shuts the secondary burners and primary burners off for high limit protection.

TROUBLE-SHOOTING INCINERATOR PROBLEMS

1. SECONDARY BURNER WILL NOT LIGHT OR BURN WITH MAIN FLAME

   A. Power Off

   B. Fuses blown

   C. Gas off or Pressure too low or too high

   D. System on burn-down cycle.

   E. One of the following safeties is not making contact: primary auxiliary air pressure switch, Secondary auxiliary air pressure switch, or gas high pressure, or gas low pressure switch, or burn air pressure switch.

   F. Faulty ignition transformer, ignitor, flame rod, flame rod coated with carbon, pilot valve, or motorized gas valve.

   G. A Burner flame out occurred and the burner must be manually reset by pushing the reset button mounted on the burner flame safeguard relay for a duration of three seconds.

   H. Secondary temperature too high.

   I. Purge not complete.

   J. Access Door open.

   K. Carbon on ignitor rods in burner.

2. PRIMARY BURNERS WILL NOT LIGHT OR BURN WITH MAIN FLAME

   A. Power off

   B. Fuses Blown

   C. Gas off or pressure too low or too high

   D. System on burn-down cycle.

   E. A burner flame out occurred and the burner must be manually reset by pushing the reset button mounted on the burner flame safeguard relay for a duration of three seconds.

   F. Secondary burner not firing.

   G. Purge not complete.

   H. Temperature too high in secondary.

   I. Faulty ignition transformer, spark electrodes, flamerod coated with carbon, pilot valve, main gas valve, or -

J. Temperature too high in primary.

K. Loader cycle not complete.

L. Access door open.

M. Burner air pressure switch not making contact.

3. FLAMEPORT AIR BLOWER WILL NOT RUN

A. Power off.

B. Fuses Blown.

C. Motor starter overload tripped.

D. Preheat not complete.

4. INDICATING LIGHTS DO NOT ILLUMINATE

A. Power off to light.

B. Bulb burned out.

TROUBLE SHOOTING - LOADER PROBLEMS

Refer to the electrical schematic and the hydraulic schematic for important design information required in order to troubleshoot hydraulic or electrical problem.

MOTOR WILL NOT START

A. Line power off

B. Disconnect off

C. Fuses blown

D. Starter overloads tripped

E. Motor burned out

F. Loader temperature lock-out

MOTOR STARTS BUT LID, DOOR OR RAM WILL NOT MOVE

A. Motor rotation incorrect (new installation)

B. Directional control valve stuck

C. Directional control valve coil burned out

D. No pump pressure

1. Oil level too low
2. Relief valve stuck open
3. Motor coupling loose
   (motor shaft or pump shaft broken)
4. Oil too viscous
5. Pump not priming (air leak in intake line)
6. Intake line blocked

E. Cylinder failure

LOADER DOES NOT OPERATE IN AUTO MODE

A. One of the incinerator safeties is tripped.

B. Preheat not complete.

C. Temperature too high in the primary chamber.

D. Purge not complete.

E. Hopper lid closure switch not actuated.

F. Motor starter overload tripped.

G. Fuse blown.

H. Hydraulic fluid level too low.

I. Load time not complete from last load.

LOADER DOES NOT OPERATE IN MANUAL MODE

A. Power off.

B. Fuse blown.

C. Motor starter overload tripped.

D. Hydraulic fluid level too low.

DOOR OR RAM DOES NOT MOVE AFTER A SUCCESSFUL AUTO START

A. Limit switch inoperative

B. Limit switch arm on limit switch needs to be adjusted

C. Directional control valve stuck

D. No pressure

E. Directional control valve coil burned out

F. Cylinder failure

G. Door or ram jammed

GUILLOTINE DOOR CREEP

A. Cylinder seals worn and leaking

B. Oil leaking around directional control valve spool

C. Directional control valve spool stuck open

D. Door check valve stuck open or worn

LOAD CYCLE DOES NOT COMPLETE

A. Ram rear limit switch out of adjustment.

B. Waste jammed behind ram so it can not travel to the full rear position.

C. Waste jammed under guillotine door.

D. Cable on cable reel overlapping unevenly.

TROUBLE SHOOTING FOR FAULTY COMBUSTION

WHITE SMOKE

White smoke appearing at the incinerator stack is usually caused by excess air entering the incinerator. The following steps, in sequence have been found to eliminate white smoke.

1. Check damper adjustment.

2. Ignite the secondary chamber burner, or check to see that it is still burning.

3. Reduce the secondary air.

4. If all the secondary burner capacity is not being used, gradually increase the operating rate of the burner until the smoke stops. (Set secondary temperature set point higher)

5. If all of these operations fail to stop the issuance of white smoke examine the material being charged. Possibly the white smoke is the result of finely divided mineral material present in the charge and being carried out the stack. Paper sacks that contain pigments or other metallic oxides, and minerals such as calcium cloride, cause white smoke.

BLACK SMOKE

Black smoke is usually caused by insufficient amounts of air for combustion or a burning rate greatly in excess of the capacity of the incinerator. The following steps, in sequence, have been found to eliminate black smoke.

1. Check damper adjustment.

2. Shut off the primary burner/burners if in operation.

3. Increase the secondary air.

4. Either ignite the secondary chamber burner or check to see that it is still burning.

5. Should these steps fail to elimate the black smoke, examine the material remaining to be charged. Highly combustible materials (i.e., rubber, plactic, etc.) that are charged in too great a quantity results in too rapid a combustion rate for the incinerator to handle. These materials may be charged in smaller quantities and in relatively small pieces along with general refuse. If such materials must be burned frequently, experimentation as to the quantity that may be charged along with other materials may be necessary.

CLEANING INSTRUCTIONS

After each cool-down (at least once a week)

1. Incinerator should be cleaned thoroughly before every start-up.

2. Allow the unit to cool before cleaning. Doors should be kept closed after incineration, at least until refractory lining has cooled down to 250 degrees F. Do not quick cool the incinerator with water or refractory damage will result.

3. Open the access door and observe the condition of the primary chamber. Turn the ash Dragon on manual and make sure it is operating. Using manual controls open the guillotine door and run the ram full forward and back. Then move the ash plows forward 6" at a time until the lower hearth is clear.

CAUTION: Do not move the ash into the ash drop too quickly. Allow the ash Dragon to move the ash out at uniform rate.

4. Turn key selector switch off and remove key. Shut off power to system using main disconnect and lock in "off" position to prevent unauthorized start-up while cleaning.

5. Inspect the primary chamber making sure all air inlets and smoke passages are free from debris. Clean out all underfire air holes. Do not permit ash to build up and block any of the primary air ports. Ashes should be brushed from the floor.

CAUTION: <u>DO NOT</u> DIRECTLY STRIKE THE REFRACTORY WITH CLEANING TOOLS.

6. Any slagging and glass build-up along sidewalls and on the hearth areas should be chopped off to restore the original operating levels. Failure to remove slag on a regular basis can result in the binding of ash plows or loader ram and cause damage to the system.

7. No ash should be left to accumulate in front of burners.

8. At least once a month the accumulated ash should be swept or vacuumed out of the secondary chamber.

9. Place a container under the ash plow hopper and empty any accumulated ash.

10. At least once a month open all primary and secondary air plenums and clean out all ash and obstruction.

INSPECTION AND MAINTENANCE SCHEDULE

GENERAL NOTES

A. When maintaining burner, blower and accessories, refer to the appropriate manufacturer's manuals.

B. When checking the control circuit for safe and proper operation, use electrical drawings.

C. When checking hydraulic systems refer to drawings.

DAILY

A. Check for fuel leaks and repair.

B. Thoroughly clean ashes from primary chamber daily or an required for particular incinerator application.

C. After start-up, visually inspect flue gases emitted from the stack for smoke and/or fly ash. Adjust unit if necessary or contact manufacturer's representative.

D. Close loader lid and incinerator access doors when unit is not in use.

E. Check the sump pump inlet screen for any debris and clear as required.

F. Inspect the hydraulic system fittings for existence of leakage.

G. Check hydraulic fluid level.

WEEKLY

A. Grease all bearings in loader and ash Dragon.

B. Grease the guillotine door guide.

C. Inspect all thermocouples and replace as required.

D. While the loader is operating, inspect the hoses, piping, and swivels for leakage and wear. Tighten or replace as required.

E. Clean dust and dirt from motors, air inlets, cooling fins, and vents.

F. Check all drive belts for tightness and alignment.

G. Clean the loader and surrounding area. Keep debris from accumulating behind the ram.

MONTHLY

A. Check the incinerator auxiliary air blower, burners, temperature controller, pyrometers and control circuit for safe and proper operation.

B. Check all fasteners for tightness. Loose fasteners should be tightened and missing ones replaces.

C. Check the primary and secondary for tightness. Worn gaskets should be replaced.

D. Test burners and accessories for correct operation before charging primary chamber.

E. Inspect ash drop chute for tightness and cracks. Repair as required.

F. Inspect ash Dragon for stress cracks. Repair as required.

G. Check oil levels on hydraulic systems.

H. Inspect all blower wheels, dampers, and air passages. Clean as required.

I. Check relief valve pressure setting.

J. If the hydraulic fluid shows signs of contaminates or if the viscosity has changed, clean and flush out the tank and replace the fluids with new hydraulic fluid.

K. All fasteners should be checked for tightness. Loose fasteners should be tightened and missing ones replaced.

L. Check the ram cylinder hoses for wear.

QUARTERLY

A. Lubricate all motors according to the manufacturer's instruction.

B. Under dirty, wet or corrosive conditions, add one quarter once of grease per electric motor bearing.

C. Check motor coupling for wear.

D. Check sample of hydraulic fluid.

YEARLY

A. Lubricate all motors.

B. Replace the hydraulic fluid filter element.

C. Clean the strainer.

D. Inspect ram wear shoes and replace if necessary.

E. Replace the hydraulic fluid (clean tank).

LOADER INSPECTION AND MAINTENANCE SCHEDULE

DAILY

1. Inspect the hydraulic system fittings for existence of leakage.
2. Check hydraulic fluid level.

WEEKLY

1. Clean the loader and surrounding area.

MONTHLY

1. Check relief valve pressure setting.
2. If the hydraulic fluid shows signs of contaminates or if the viscosity has changes, clean and flush out the tank and replace the fluids with new hydraulic fluid.
3. All fasteners should be checked for tightness. Loose fasteners should be tightened and missing ones replaced.
4. Check the ram cylinder hoses for wear.

QUARTERLY

1. Under dirty, wet or corrosive conditions, add one quarter once of grease per electric motor bearing.
2. Check motor coupling for wear.
3. Check sample of hydraulic fluid.

YEARLY

1. Replace the hydraulic fluid filter element.
2. Clean the strainer.
3. Inspect ram wear shoes and replace if necessary.
4. Replace the hydraulic fluid (clean tank).

RAM AND ASH PLOW STROKE ADJUSTMENT

RAM STROKE ADJUSTMENT PROCEDURE

The ram travel should be set at a minimum of 18" past the inside refractory wall of the primary chamber.

If the ram remains inside the incinerator chamber with a fire burning for an excessive amount of time the ram could warp. Warpage could occur to the extent that the ram will remain jammed in the incinerator.

NOTE:

To set the ram travel, run it cold while making adjustments. Place a wooden block on the hearth so the ram pushes it to the load stroke position and you can measure back to the wall.

1. Run a normal load cycle and measure the ram penetration past the inside wall. If it needs adjustment change ram cycle timer to correct setting using loader monitor.

ASH PLOW STROKE ADJUSTMENT PROCEDURE

1. All adjustments for stroke are made on the loader monitor mounted on the door. Change appropriate ash pusher cycle timer for correct travel.

RELIEF VALVE PRESSURE SETTINGS PROCEDURE FOR HYDRAULIC SYSTEM

1. Install a 0-5000 PSI gauge in the manifold block (p) port opposite the pressure line that starts at the pump.

2. Loosen the locknut on relief valve, item 11. See Hydraulic Schematic.

3. With the ram fully retracted depress the ram reverse push-button and pressure will build up. Use manual mode only.

4. To increase the pressure turn the relief valve stem clockwise.

5. To decrease the pressure turn the relief valve stem counter-clockwise.

6. When the desired pressure is reached, lock the relief valve locknut. Then retest the pressure to insure that one did not accidentally move the pressure setting.

NOTE: The relief valve should be set at 1100 PSI.

PROPOSAL FOR
A VENTURI SCRUBBER SYSTEM
WITH AUXILIARY EQUIPMENT TO
CONTROL PARTICULATE AND
ACID GAS EMISSIONS
FROM A HOSPITAL WASTE INCINERATION SYSTEM
IN MEMPHIS, TENNESSEE

TO
BFI MEDICAL WASTE SYSTEMS
SOUTH CENTRAL REGION
2221 DEMOCRAT RD.
MEMPHIS, TN 38132
ATTENTION: MR. CHARLES COOLEY
REGIONAL MANAGER

BY
ANDERSEN 2000 INC.
306 DIVIDEND DRIVE
PEACHTREE CITY, GEORGIA 30269
(404) 997-2000
TELEX: 54-2858
FAX: (404) 487-5066

PROPOSAL #APCE-5520-S NOVEMBER 14, 1989

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269
(A CROWN ANDERSEN COMPANY)

TELEPHONE: (404) 997-2000
(800) 241-5424
TELEX: 54-2858 ANDERSEN PECH
TELEFAX: (404) 487-5066

I. EQUIPMENT AND/OR SERVICES QUOTATION

- Proposal and Quotation No.: APCE-5520-S
- For ("Buyer"): BFI MEDICAL WASTE SYSTEMS
  SOUTH CENTRAL REGION
  2221 DEMOCRAT RD.
  MEMPHIS, TN 38132
  ATTENTION: MR. CHARLES COOLEY, REGIONAL MANAGER
- Quotation is: [x] Firm [ ] Preliminary [ ] Subject to the Price Escalation Policy on page ___ hereof.
- Date Submitted: NOVEMBER 14, 1989
- Quotation Firm Until: JANUARY 15, 1990
- Delivery Time(s):
  EQUIPMENT SHIPMENT - 14 WKS AFTER RECEIPT OF ORDER

(NOTE: As major equipment items are completed, partial shipments may be made. Partial shipments will result in partial invoicing in the proportion that the shipment bears to the entire order.)

- F.O.B. (Place of Delivery & Special Shipping Instructions, if any):
  PEACHTREE CITY, GA
- Terms:

  20% NET 30 DAYS AFTER SUBMITTAL OF CERTIFIED DRAWINGS
  75% NET 30 DAYS AFTER SHIPMENT OF EQUIPMENT
  5% NET 30 DAYS AFTER SUCCESSFUL PERFORMANCE TEST, BUT NOT LATER THAN 90 DAYS AFTER EQUIPMENT ARRIVAL AT JOB SITE

All amounts which are outstanding and unpaid for more than 30 days will be subject to a late charge at the rate of one and one-half percent (1.5%) per month (or at the highest amount or rate which under applicable law Buyer may contract to pay in order to induce prompt payment, whichever is less.)

- Performance Testing: [x] Required to satisfy the Performance Levels Guaranty when tested for acceptance in accordance with the Acceptance Tests specified on page(s) 11-13 hereof.

- Send all correspondence to Andersen 2000 Inc. at its home office address indicated above with copies to the following:

  MR. DOUG STINSON
  AS-TECH ENGINEERING CO.
  P.O. BOX 921269
  NORCROSS, GA 30092-1269
  (404) 448-2341

THIS QUOTATION IS SUBJECT TO OUR [x] STANDARD CONDITIONS OF SALE
[ ] TURNKEY CONTRACT TERMS AND CONDITIONS
(SEE PAGE(S) 9&10 HEREOF).

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

EQUIPMENT AND/OR SERVICES QUOTATION — Continued

Item No.	Quantity	Description
1	1	Andersen 2000 Inc. Model WAV-110 Wetted Approach, Automatically Variable Throat Venturi Scrubber With Wetted Elbow and Model VES-110 Cyclonic Separator With Sloped Bottom, Integral Liquid Recirculation Tank. Venturi and wetted elbow are constructed of Hastelloy Alloy C-276 and the cyclonic separator is constructed of fiberglass reinforced vinylester using a high temperature chemically oxidation resistant vinylester resin with 3% antimony oxide fire retardant and with exterior U.V. inhibitor. The scrubbing system is shown in Drawing P5520-2. The system is sized for a maximum inlet gas flow rate of 20,250#/hr at 1800°F and 14.624 psia (-2" W.G. static pressure). Refer to Drawing P5520-1 for process flowsheet and material balance. The venturi scrubber has been designed for a maximum differential pressure capability of up to 30" W.G. Design differential pressure, however, is 24" W.G. total. Based on the assumed particle size distribution shown in Figure 1, the particulate removal efficiency is expected to be 80% as shown in Figure 2. The venturi scrubber is fed with 115 gpm of scrubbing solution at a pressure of 30 psig. The separator section is sized for a saturated gas flow rate of 9919 acfm at 173°F and -26" W.G. static pressure. An Inconel mesh-type mist eliminator is included in the cyclonic separator. The nonmetallic components of the scrubbing system have an operating temperature limitation of 220°F. An emergency water quench system is provided which is actuated through solenoid valves and temperature switches provided with this scrubbing system.
2	1	Recirculation Pump For Item #1 Above. Ingersoll-Rand GRP, DURCO, or equal nonmetallic pump powered by a 7 1/2 HP, 460V/3Ø/60 Hz, TEFC drive motor. Pump is sized to deliver up to 140 gpm of scrubbing solution at 35 psig.
3	1	Connecting Duct From Scrubber Discharge To Fan Inlet. Constructed of 1/4" thick fiberglass reinforced vinylester, as in Item #1.
4	LOT	Chemical Feed System With Caustic Feed Pump And Recirculation Heater For Caustic soda. Pump is powered by a 1-1/2 HP, TEFC, 460V/3Ø/60 Hz drive motor.
5	1	Structural Support For Venturi As Shown In Drawing P5520-2. Constructed of carbon steel with a coat of epoxy paint.
6	LOT	All necessary recirculation and control piping (CPVC) to connect from tank to recirculation pump and from recirculation pump to venturi liquid distributor. System is prepiped, water tested, and dismantled prior to shipment. Make-up water header (galvanized steel) with liquid level control, pump seal flush, and emergency quench water is provided. Caustic piping (304 S.S.) from feed pump to recirculation tank is not provided. Piping is shown schematically in Drawing P5520-3. Customer must provide connections for make-up water, caustic, and bleed stream to disposal.

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

EQUIPMENT AND/OR SERVICES QUOTATION — Continued

Item No.	Quantity	Description
7	LOT	Instrumentation And Control Panel. Includes the differential pressure gauges and indicators in Drawing P5520-3. Includes a pH electrode and transmitter to be mounted in the discharge stream from the recirculation pump, a pH controller to control caustic flow into the scrubbing system, automatic liquid level control, temperature switches and solenoid valves to act as the emergency quench spray to prevent damage to the fiberglass reinforced vinylester vessel in the event of scrubbing liquid failure, and a pressure controller to maintain constant pressure at the venturi inlet or incinerator primary chamber. Components indicated as "panel mounted" are mounted in a NEMA 4 panel. All other instrument components are shipped loose for mounting by the customer. Also including Allen-Bradley or equal motor starters in panel for recirculation pump, caustic pump, and fan.
8	1	Andersen 2000 Inc. Model M-IV-22 Radial Blade Centrifugal Fan. Fan is sized for inlet gas flow rate of 9919 acfm and inlet gas density as shown in Figure 3. Fan is equipped with a 75 HP, TEFC, 460V/3Ø/60 Hz, 1800 rpm drive motor. Fan is driven in Arrangement #9 at 2300 rpm. Fan includes a Hastelloy Alloy C-276 fan wheel and a rubber-lined mild steel housing. Fan includes drain at bottom of scroll, teflon shaft seal, access door, flanged inlet & outlet, and guards. Fan is fully assembled before shipment. Refer to Figure 3 for fan performance curve and Table 1 for estimated sound data. SHIPPING WEIGHT ITEMS 1-8 = 18,000# PRICE ITEMS 1-8 = $190,500
9	1	Caustic Storage Tank. Model 1000V high density, cross-linked polyethylene construction with 1000 gallon capacity. Vertical cylindrical tank with 16" top opening with cover. Tank includes sight glass level indicator. Tank will contain enough caustic for 200 operating hours. Secondary containment tank is also included. PRICE = $2,280
10	1	Exhasut Stack. Stack is fiberglass reinforced vinylester, 24"Ø, and is designed to be mounted at grade and extends to 50'-0" above grade. Includes two 3"Ø sampling ports. Stack is designed to be guy wired from foundation by others. PRICE = $22,200

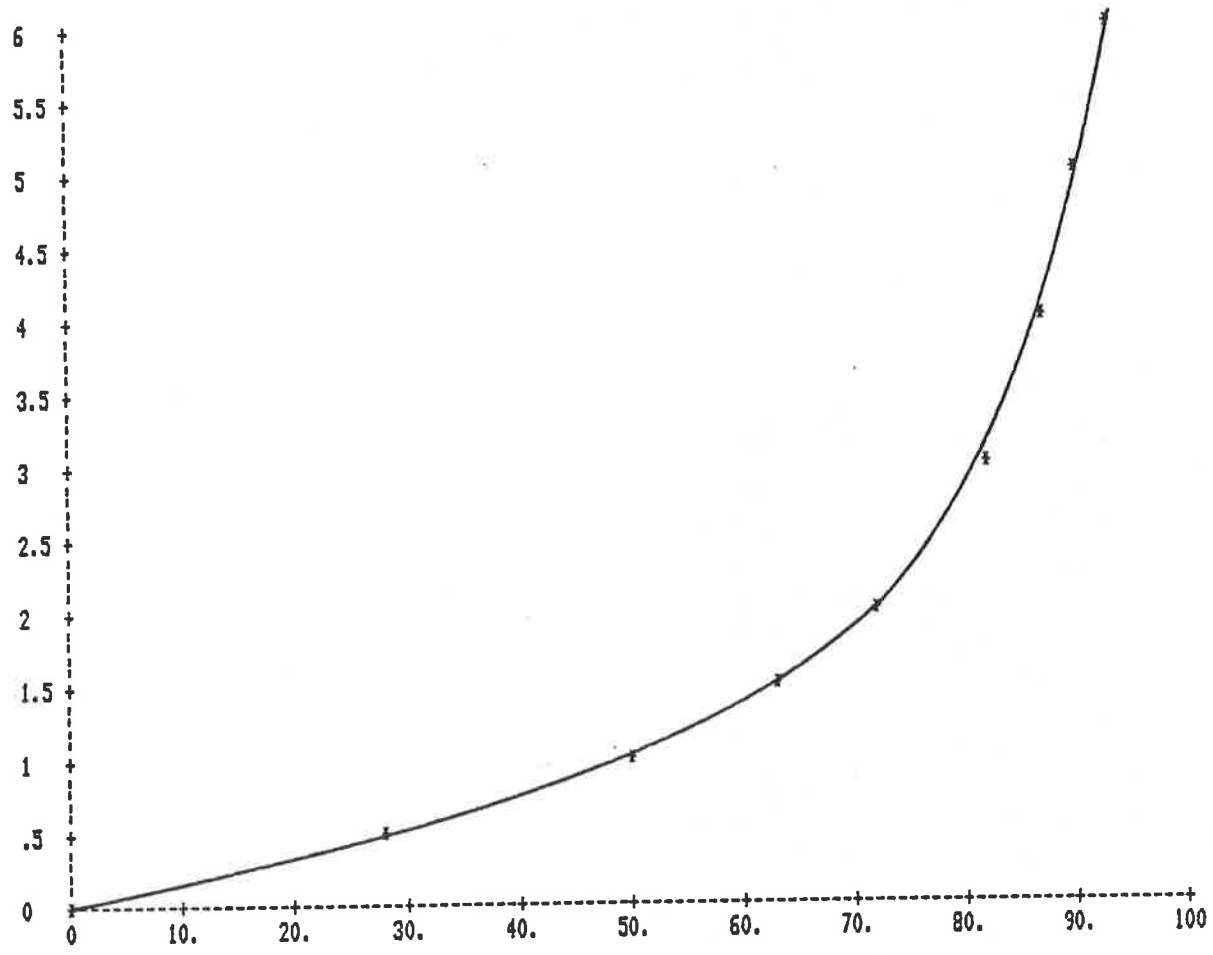
ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

EQUIPMENT AND/OR SERVICES QUOTATION — Continued

Item No.	Quantity	Description
11	5 MAN DAYS	Startup Services. (Stack sampling by others.) Includes all travel, car rental, lodging, and per diem for Andersen's engineer at the job site. (Additional days available at $500/day plus expenses.) PRICE = $4,700
12	LOT	Skid Mounting Of Items 1-8 Above On Mild Steel, Epoxy Paint Support Skid. Equipment will be prepiped and prewired to a junction box or the control panel located on the skid. PRICE = $10,800

FIGURE 1

AERODYNAMIC
PARTICLE SIZE
DISTRIBUTION

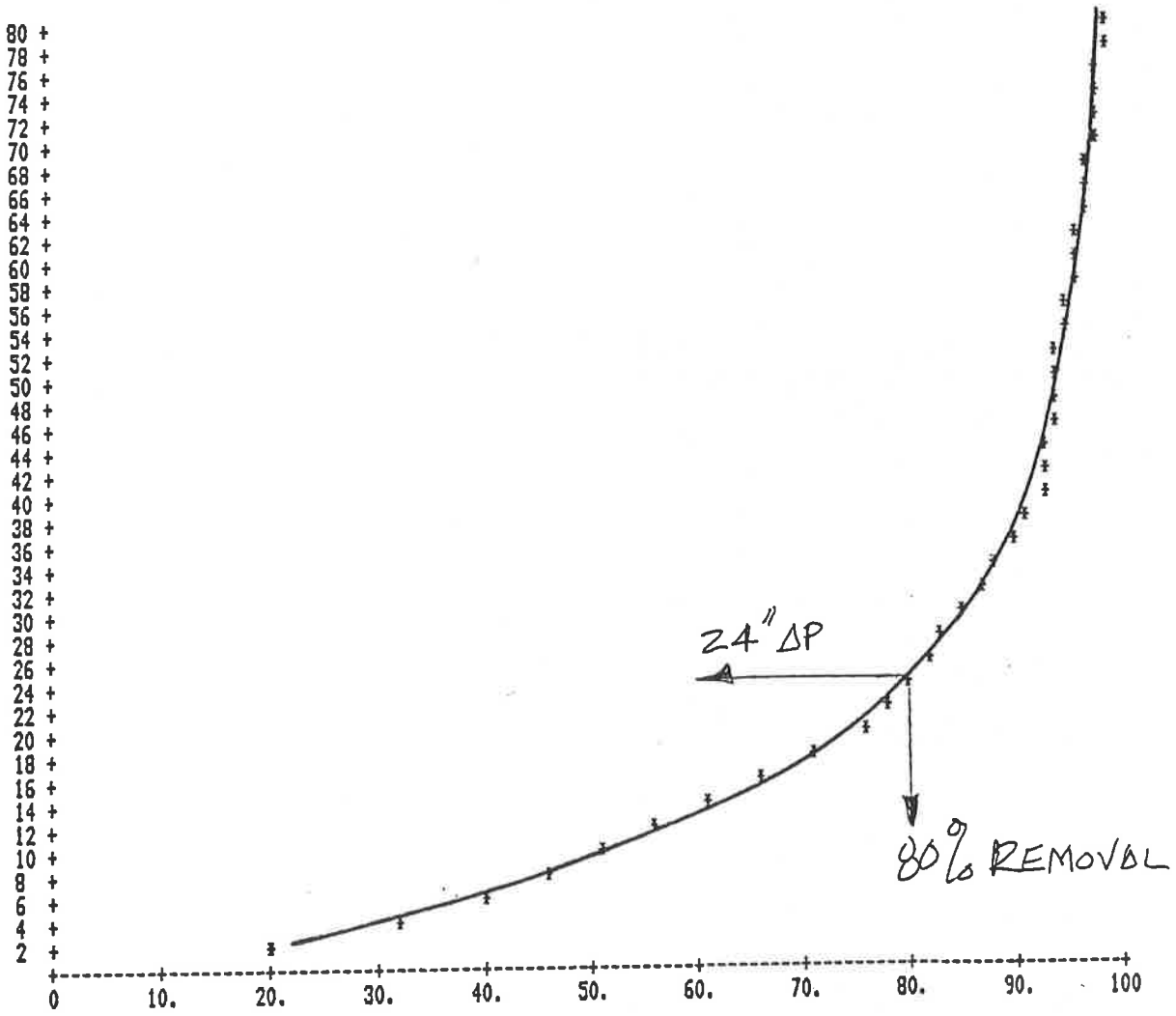


VERT AXIS: AERODYNAMIC PARTICLE SIZE (MICRONS)

HORIZ AXIS: CUMULATIVE PERCENT LESS THAN STATED SIZE
: FROM 0 TO 100 IN STEPS OF 1

FIGURE 2

VENTURI SCRUBBER COLLECTION EFFICIENCY
VERSUS
DIFFERENTIAL PRESSURE



VERT AXIS: DIFFERENTIAL PRESSURE (INCHES W.G.)

HORIZ AXIS: % COLLECTION EFFICIENCY
: FROM 0 TO 100 IN STEPS OF 1

FIGURE 3 I.D. FAN CURVE
BFI - 1350 #/hr INCIN.
MEMPHIS, TENNESSEE

DESIGN 9919. ACFM
26.0 IN. W.G. S.P.
65. BHP 63. % S.E.

ANDERSEN 2000 INC.

MODEL M-IV-22 (50%)
ARR.#9, CCW, BAU, 2300 RPM
0.0494 #/FT^3 INLET DENSITY

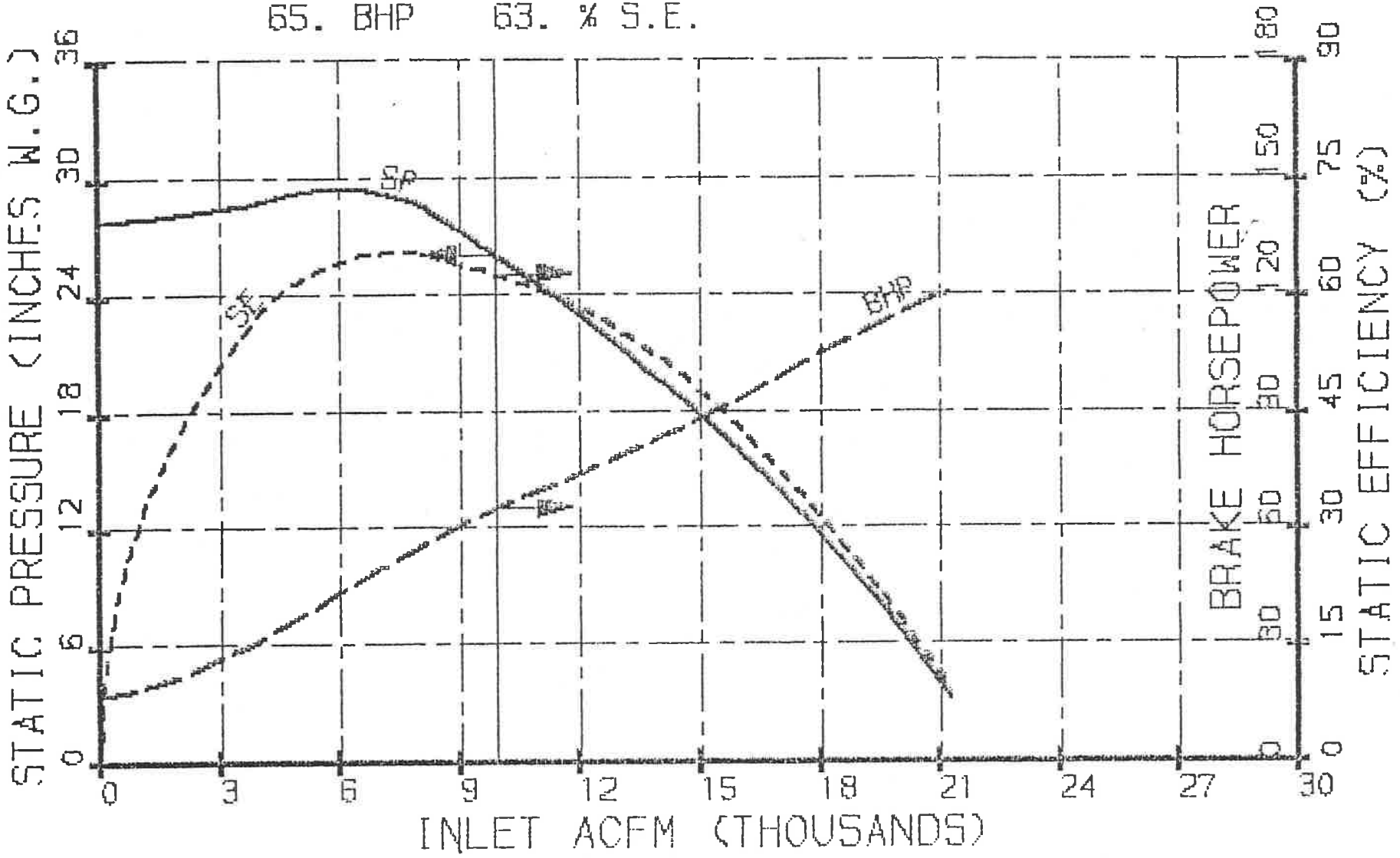


TABLE 1

ANDERSEN 2000 INC. - SOUND DATA FOR FAN

MODEL	: M-IV-22	INLET ACFM	: 9919.
NUMBER OF BLADES	: 8	RPM	: 2300.
BLADE TYPE	: RADIAL	SP (INCHES H2O)	: 26.0
WHEEL DIA (IN)	: 38.250	HOUSING THICKNESS	: 0.2500
CAPACITY	: 0.5000	HOUSING MATERIAL	: RUBBER LINED STEEL

OCTAVE BAND LEVELS

BAND NUMBER	1	2	3	4	5	6	7	8	DBA
MID FREQUENCY-HZ	63	125	250	500	1000	2000	4000	8000	

Estimated sound power level generated at acoustic center of fan. This is noise which can be expected from inlet and discharge openings within 100 feet of fan.

116. 113. 118. 111. 106. 101. 98. 97. 114.

Estimated sound pressure level in near field after attenuation by 0.2500 inch thick housing.

103. 95. 97. 88. 79. 72. 65. 61. 91.

Estimated sound pressure level at 3 feet from near field in air. (Ducted inlet and outlet.)

94. 86. 88. 79. 70. 63. 56. 52. 82.

Estimated sound pressure level at 5 feet from near field in air. (Ducted inlet and outlet.)

89. 81. 83. 74. 65. 58. 51. 47. 77.

Near field radius is approximately 2 feet and is centered on fan wheel center.

The near field is a hemispherical area around the fan where sound waves from various sources tend to interfere with each other. The boundary is related to the wavelength of the lowest frequency and to the overall size of the source.

NOTE: ALL SOUND POWER LEVELS ARE DECIBELS REFERRED TO 10-12 WATT.
ALL SOUND PRESSURE LEVELS ARE DECIBELS REFERRED TO 2x10-4 MICROBAR.

IMPORTANT - INTERPRETATION OF SOUND DATA

Data are for use by an acoustical engineer to evaluate the fan and the system in which the fan is installed. There are many varibles which can affect sound pressure levels. The acoustical engineer must take all of these variables into consideration when designing a 'quiet' system. Note that outside the near field boundary in air, if there are no obstructions, sound pressure levels decay 6 DB for each doubling of distance. All sound power and sound pressure levels listed above exclude motors or other auxillary equipment.

FORM SDF/B7/REV 6/4/85

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

STANDARD CONDITIONS OF SALE

1. **PURCHASE AND SALE.** Upon acceptance of the equipment and/or services sale proposal and quotation (the "Proposal and Quotation") of which these Standard Conditions of Sale are made a part by the Buyer (as identified on the Equipment and/or Services Quotation page), Andersen 2000 Inc. (the "Seller") shall sell and Buyer shall purchase all of the equipment (hereinafter collectively called the "Equipment") described in the Proposal and Quotation for the sale price specified therein in accordance with all of the terms and conditions hereinafter set forth, as well as with all of the other provisions of the Proposal and Quotation. Except where the context requires otherwise, the terms "herein," "hereof," "hereunder," and other words of similar import refer to the Proposal and Quotation as a whole, and not to any particular article, section, paragraph, clause, attachment or other subdivision thereof.

2. **SALE PRICE AND PAYMENT TERMS.** The sale price of the Equipment specified in the Proposal and Quotation does not include any applicable sales, use, excise or other similar taxes imposed by any federal, state, local or other taxing jurisdiction. If any such taxes are imposed with respect to the sale of the Equipment, Buyer shall pay the same. Seller may require that Buyer pay such taxes directly or, in the alternative, Seller may pay the taxes due on behalf of Buyer and obtain reimbursement from Buyer immediately upon Seller's demand. The terms of payment of the sale price of the Equipment are as set forth on the Equipment and/or Services Quotation page. All payments must be made to Seller promptly when due at its Home Office address indicated in the Proposal and Quotation.

3. **DELIVERY AND RISK OF LOSS.** Any delivery made within 30 days after the end of the respective delivery times specified on the Equipment and/or Services Quotation page is to be deemed to be timely. Subject to the Force Majeure provisions of paragraph 9 below, if Seller fails timely to deliver any of the Equipment, Buyer may cancel that portion of the Equipment which has been delayed, such right of cancellation being Buyer's sole remedy for Seller's failure or delay in making delivery. Risk of loss and damage to the Equipment will automatically be transferred and will pass from Seller to Buyer upon delivery or tender of the Equipment at the F.O.B. place of delivery specified on the Equipment and/or Services Quotation page. Except to the extent provided to the contrary in paragraph 9 below, no loss, destruction or other material damage to the Equipment will relieve the party bearing the risk of loss and damage from fully performing its obligations hereunder.

4. **INVOICES.** The Equipment may be delivered, at the discretion of Seller, in several lots under separate invoices. In such event, Buyer shall promptly pay the proportionate amount of the total sale price of the Equipment represented by each lot indicated in the invoice furnished by Seller respecting such lot.

5. **SECURITY INTEREST.** As security for the full and prompt payment of the sale price of the Equipment, as well as of all other amounts now or hereafter owing by Buyer to Seller of whatever nature, Buyer grants to Seller a present and continuing first priority, purchase money security interest in the Equipment. If Buyer fails promptly to pay, when due, any amount payable hereunder, then Seller may, without any notice or demand of any kind and notwithstanding any other provisions or agreements to the contrary, declare all amounts when owing by Buyer to Seller to be due and payable, whereupon the same will immediately become due and payable; and Seller may exercise from time to time all rights and remedies available to it hereunder or available under applicable law or in equity. Buyer shall pay all costs and expenses incurred by Seller in collecting any amount owing by Buyer to Seller (including, but not limited to, reasonable attorney's fees, if collected by or through an attorney at law).

6. **WARRANTIES.**

   (A) **Limited Warranty of Equipment Manufactured by Seller.** Subject to the limitations hereinafter set forth, Seller warrants to Buyer that all items of the Equipment manufactured by Seller will be free from defects in material and workmanship under normal use and service for a period of 18 months after the date of delivery or tender of the Equipment to Buyer, or 12 months after the date that the Equipment is ready for commencement of initial operation by Buyer, whichever occurs first; provided, however, that (i) the Equipment must at all times have been operated in accordance with Seller's operating instructions and in accordance with the conditions for which the same are designed and (ii) no alterations or substitutions have been made in the Equipment. Further, and without limiting the foregoing, the limited warranty herein given by Seller will be rendered void by the improper erection of the Equipment by parties other than Seller or by damage to the Equipment after transfer and passage of the risk of loss from Seller to Buyer (including, but not limited to, damage caused by abrasion, corrosion, excess temperature or improper use). Buyer shall make all claims of any nature whatsoever for breach of the foregoing limited warranty, regardless of whether a defect is patent or latent, by written notice to Seller within 10 days after Buyer discovers such defect, setting forth in detail the nature of defect. Buyer's right to make claims for breach of said limited warranty will terminate upon the expiration of such notice period, and all claims for defects will thereafter be barred. Upon Buyer's making a satisfactory written proof of claim with Seller, Seller may fully discharge its obligations under this limited warranty by making any necessary repairs or, at Seller's option, supplying replacement parts within a reasonable period of time thereafter, all at Seller's expense. No payment or allowance will be made for labor costs, parts or other charges of Buyer or of third parties for making repairs or replacements, nor will Seller accept Equipment returned for credit, unless written authorization is obtained in advance from Seller.

   (B) **Limited Patent Warranty Respecting Equipment Manufactured by Seller.** Seller shall defend, at its expense, any suit or proceeding brought against Buyer which asserts any claim that any Equipment manufactured by Seller infringes any United States patent which was issued as of the date of the Proposal and Quotation, and Seller shall pay any damages and costs awarded therein against Buyer up to, but not to exceed, the aggregate amount of the sale price of the infringing Equipment theretofore paid by Buyer to Seller; provided, however, Buyer must give Seller written notice of any such claim within 10 days after Buyer is notified thereof; and provided further that Buyer must thereafter fully cooperate with Seller and give Seller all authority, information and assistance as Buyer is able to give in order to allow Seller to conduct such defense effectively and efficiently. If the use of any of the Equipment is enjoined as a result of any such suit, Seller shall, at its option and at its expense, procure for Buyer the right to use such Equipment, or modify the infringing Equipment so that it no longer infringes any United States patent, or replace the infringing Equipment with non-infringing equipment, or refund the portion of the sale price attributable to the infringing Equipment.

   (C) **Equipment Not Manufactured by Seller.** All Equipment which is not manufactured by Seller is sold AS-IS and carries only such warranties as are given by the manufacturer thereof (if any), which warranties (if any) are, to the extent permitted by their terms, hereby assigned by Seller to Buyer without recourse against Seller.

7. **LIMITATION OF WARRANTIES, REMEDIES AND OBLIGATIONS.** EXCEPT AS OTHERWISE EXPRESSLY PROVIDED HEREIN, THE EQUIPMENT IS BEING SOLD AS-IS, AND SELLER MAKES NO WARRANTIES OF ANY NATURE WHATSOEVER WITH RESPECT TO THE EQUIPMENT, ORAL OR WRITTEN, EXPRESS OR IMPLIED (INCLUDING, BUT NOT LIMITED TO, THOSE OF MERCHANTABILITY AND FITNESS OF USE FOR A PARTICULAR PURPOSE); AND SELLER HEREBY DISCLAIMS ANY WARRANTY NOT EXPRESSLY SET FORTH HEREIN. SELLER'S ONLY OBLIGATIONS FOR BREACH OF WARRANTY ARE AS SET FORTH HEREIN. SELLER WILL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE ARISING IN CONNECTION WITH THE EQUIPMENT, OR IN CONNECTION WITH SELLER'S PERFORMANCE OR BREACH OF ITS OBLIGATIONS HEREUNDER, REGARDLESS OF WHETHER BASED IN CONTRACT OR IN TORT, (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, PLANT DOWN TIME, LOSS OF USE OF THE EQUIPMENT, AND CLAIMS, SUITS AND DAMAGES OF THIRD PERSONS, EXCEPT FOR U.S. PATENT INFRINGEMENT CLAIMS TO THE EXTENT PROVIDED IN

(continued on next page)

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

STANDARD CONDITIONS OF SALE (continued)

CLAUSE (B) OF PARAGRAPH 6 ABOVE). IN NO EVENT WILL SELLER'S LIABILITY FOR PERFORMANCE OR BREACH OF ANY OF ITS OBLIGATIONS HEREUNDER EXCEED THE AMOUNT OF THE SALE PRICE THERETOFORE PAID BY BUYER TO SELLER. SELLER NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION OR LIABILITY OF ANY NATURE WHATSOEVER OR TO MAKE ANY ADDITIONAL REPRESENTATION OR WARRANTY NOT HEREIN CONTAINED RESPECTING THE EQUIPMENT OR SELLER'S OBLIGATIONS. By way of illustration, and not in limitation of the foregoing, no communication, representation or statement made by any sales agent or representative of Seller respecting the performance or operation of the Equipment, or otherwise, is binding upon Seller (the sole and exclusive warranties, representations and obligations of Seller being set forth herein). Further, Seller makes no representation or warranty that the Equipment complies with, or that it will perform or operate in accordance with, the requirements of any law, code, statute, regulation, rule or ordinance of any federal, state, local or other governmental authority (including, but not limited to, any pollution control agency). Seller neither undertakes nor has any obligation to obtain permits, licenses or approvals from any such governmental authority or agency concerning the Equipment or concerning the installation, operation or use thereof. Only such safety devices as are specified in the Proposal and Quotation will be furnished by Seller to Buyer. Buyer shall, at its expense, obtain and install all other safety devices required or desirable due to the nature of the Equipment or due to Buyer's operation of the Equipment. Seller hereby disclaims, and Buyer hereby releases Seller from, all liability arising out of the improper use of the Equipment or from the absence of proper safety devices respecting the Equipment. In no event will Seller be liable for any claim, loss, damage or expense arising out of the sole or contributory negligence of Buyer, its employees, agents, engineers, architects, or other contractors, and Buyer shall indemnify, defend and save Seller harmless therefrom (including, but not limited to, payment of Seller's reasonable attorneys' fees).

8. **PERFORMANCE LEVELS GUARANTY AND ACCEPTANCE TESTS.** In the event that The Equipment and/or Services Quotation page specifies that the provisions of the Performance Levels Guaranty and Acceptance Tests are applicable and the same are included as a part of the Proposal and Quotation, but only in such event, then Seller shall perform all of the additional obligations set forth therein. If the provisions of the Performance Levels Guaranty and Acceptance Tests are applicable, then wherever possible the provisions of these Standard Conditions of Sale are to be construed so as to be consistent with the provisions thereof; but in the event of any irreconcilable inconsistencies, the provisions of the Performance Levels Guaranty and Acceptance Tests will always prevail, govern and control.

9. **FORCE MAJEURE RESPECTING DELIVERIES BY SELLER.** All deliveries by Seller are contingent upon Seller's receiving necessary materials, parts, and components for its manufacture, assembly or supply of the Equipment to Buyer; and Seller's deliveries to Buyer may be delayed, reduced or cancelled to the extent affected by delay, reduction or cancellation of shipments thereof from Seller's suppliers. Seller will not be liable for any default, delay, reduction or failure in delivery attributable thereto or attributable to strikes, lock-outs, disputes or disagreements resulting in labor stoppages, plant shutdowns or slowdowns at the facilities of Seller or elsewhere, goverment regulations, embargo, lack or failure of shipping facilities, military service, war, delays by carriers, casualties, fires, earthquakes, floods, storms, explosions, epidemics, civil commotion or disturbances, acts of God or any other causes or conditions, whether similar or dissimilar to those enumerated, beyond the reasonable control and without the negligence of the Seller. In such circumstances, the time for delivery by Seller will automatically be extended for the period of time Seller is delayed as a result thereof.

10. **MISCELLANEOUS.** All rights and remedies of Seller, whether provided for herein, or conferred by law, or in equity, or by statute, or otherwise are cumulative and not alternative, and can be enforced successively or concurrently. This Agreement cannot be amended except by a subsequent writing signed by Seller. Seller will not be deemed to have waived any of its rights or remedies hereunder unless such waiver is in writing and signed by Seller. No delay or omission by Seller in exercising any of its rights or remedies is to be deemed to be a waiver thereof, and a waiver in writing on one occasion will be effective only in that specific instance and only for the precise purpose for which given. All communications hereunder must be in writing and are to be deemed to have been duly given and to be effective upon delivery to the party to whom directed. Communications that are sent by U.S. mail, first class, certified, return receipt requested, postage prepaid, are to be deemed to have been delivered 3 days after being so posted. None of Buyer's obligations hereunder may be assigned or delegated without the prior written consent of Seller. All of the provisions hereof will be binding upon and will inure to the benefit of both parties, and their respective successors and permitted assigns. Each of the provisions hereof is severable from each of the others; and if any provision hereof is prohibited or unenforceable under applicable law, such provision will be ineffective only to the extent of such prohibition or unenforceability without invalidating the remainder thereof or the remaining provisions hereof. The captions herein are for convenience of reference only and are not to be used in construing the provisions hereof. The Proposal and Quotation is made, and the contract contemplated hereby is to be substantially performed, in the State of Georgia, and all of the provisions hereof are in all respects (including, but not limited to, all matters of construction, interpretation, validity, enforcement, performance and the consequences of breach) to be construed in accordance with and governed by the internal laws (excluding all conflict of law rules) of that State (including, but not limited to, the Uniform Commercial Code of Georgia), as from time to time amended and in effect, and the applicable internal federal laws of the United States of America, as from time to time amended and in effect.

ANDERSEN 2000 INC
306 DIVIDEND DRIVE • PEACHTREE CITY, GEORGIA 30269

II. PERFORMANCE LEVELS GUARANTY OF EQUIPMENT WHEN TESTED FOR ACCEPTANCE, AND THE TESTS AND PROCEDURES FOR FINAL ACCEPTANCE

GUARANTY: SUBJECT TO THE GENERAL CONDITIONS AND LIMITATIONS SET FORTH IN SECTIONS A AND B BELOW, ANDERSEN 2000 INC. ("SELLER") GUARANTEES THAT THE RESPECTIVE ITEMS OF EQUIPMENT DESCRIBED IN THIS PROPOSAL AND QUOTATION WILL PERFORM AT THE APPLICABLE PERFORMANCE LEVELS SPECIFIED IN SECTION C BELOW WHEN TESTED FOR FINAL ACCEPTANCE BY A MUTUALLY SATISFACTORY INDEPENDENT TESTING LABORATORY IN ACCORDANCE WITH THE ACCEPTANCE TESTS AND PROCEDURES SPECIFIED IN SECTION D BELOW: AND FINAL ACCEPTANCE OF THE EQUIPMENT, AS WELL AS PAYMENT OF THE FINAL INSTALLMENT OF THE SALE PRICE BY THE BUYER (AS SPECIFIED ON THE EQUIPMENT AND/OR SERVICE QUOTATION PAGE OF WHICH THESE PROVISIONS ARE MADE A PART) ARE EXPRESSLY CONDITIONED UPON THE EQUIPMENT MEETING SUCH PERFORMANCE LEVELS WHEN SO TESTED.

A. GENERAL CONDITIONS.

(1) Buyer shall give Seller at least 30 days prior written notice of the date when the Equipment will be ready for final acceptance testing and of the location for such testing. If the Equipment is not tested for acceptance within the shorter of the following periods of time through no fault of Seller, then the portion of the sale price of the Equipment this is otherwise due upon completion of acceptance testing will immediately become due and payable notwithstanding the fact that the Equipment has not been tested: (i) within 90 days after the date that the Equipment is ready for commencement of initial operation by buyer or (ii) within 180 days after the date of delivery or tender of the Equipment to Buyer, whichever occurs first. Although payment of the balance of the sale price becomes due as a result of the failure to test Equipment for acceptance within the foregoing time periods, Seller guarantees that, subject to the conditions and limitations hereinafter set forth, when the Equipment is ultimately tested in accordance with the Acceptance Tests and Procedures set forth in Section D below, the Equipment will perform at the applicable Performance Levels specified in Section C below.

(2) Prior to the commencement of acceptance testing. Seller may inspect the Equipment at any reasonable time. If the Equipment has been damaged after the transfer and passage of the risk of loss and damage from Seller to Buyer at the designated F.O.B. place of delivery (as specified on the Equipment and/or Services Quotation page), or misinstalled by Buyer or by its employees, agents or contractors, then Buyer shall, at its expense, restore the Equipment to operating condition satisfactory to Seller prior to beginning acceptance testing. Similarly, if the Equipment has been operated by Buyer prior to the commencement of acceptance testing, then Buyer shall, at its expense, restore the Equipment to operating condition satisfactory to Seller prior to beginning acceptance testing.

(3) Final acceptance testing will be conducted by an independent testing laboratory, mutually acceptable to Buyer and Seller. The initial battery of tests will be conducted at Buyer's expense (including, but not limited to, all fees and charges of the independent testing laboratory, as well as payment for the services, if requested, of Seller's engineers at Seller's then current per diem rate for such personnel, plus all reasonable travel expenses from Atlanta, Georgia and return, together with all reasonable living expenses while away from Atlanta, Georgia. If the Equipment performs at the applicable Performance Levels, as measured by such initial battery of tests, then Buyer will be deemed to have finally accepted the Equipment, and within 10 days after official test restults are made available by the independent testing laboratory Buyer shall pay to Seller the entire balance of the sale price of the Equipment then owing. If the Equipment fails to meet the applicable Performance Levels for reasons which are not the fault of Buyer, Seller shall make whatever changes are required to the Equipment and then, at its expense, cause the independent laboratory to conduct additional tests to determine if the Equipment is acceptable as meeting the applicable Performance Levels. However, if the failure of the Equipment to perform at the applicable Performance Levels occurs in whole or in part by reason of the fault of Buyer, or its employees, agents or contractors, Buyer shall bear the expense of such additional tests.

(4) Prior to the independent testing laboratory's commencement of acceptance testing, Buyer shall fully cooperate with Seller in conducting such preliminary tests as Seller's engineers deem appropriate. Seller and its engineers are to have access at all times to all records, reports, results and other information relative to all preliminary tests conducted, as well as to all acceptance tests conducted by the independent testing laboratory. Immediately after completion of the acceptance tests conducted by the independent testing laboratory, the Buyer shall cause the independent testing laboratory to transmit a certified, unedited copy of the test reports and results to Seller.

(5) No later than 10 days after the results of the acceptance tests are reported to Buyer by the independent testing laboratory, Buyer shall notify Seller in writing if Buyer refuses finally to accept any of the Equipment because of its failure to meet the applicable Performance Levels. In such notice, Buyer shall identify the specific performance requirement which such Equipment has failed to meet. If Buyer does not give Seller such written notice within such time period, all of the Equipment is to be deemed to have been finally accepted by Buyer, and within 10 days thereafter Buyer shall pay to Seller the entire balance of the sale price of the Equipment then owing. If Buyer does timely give Seller such written notice, then Seller may operate the Equipment with personnel of its own choosing in order to determine the cause of such nonconformity and may proceed to correct any deficiencies in the Equipment which may exist. Upon Seller's request, Buyer shall promptly make such Equipment available for inspection, repair or modification by Seller.

B. LIMITATIONS RESPECTING SELLER'S OBLIGATIONS.

(1) The applicable Performance Levels are based upon information and data furnished to Seller by Buyer concerning the operating conditions under which the Equipment is required to perform. If the actual operating conditions are materially different, then Seller will not be responsible for the failure of the Equipment to perform at the applicable Performance Levels. In such event, Seller will automatically be released and discharged from its performance guaranty obligations hereunder, and Buyer shall thereupon immediately pay to Seller the entire balance of the sale price of the Equipment then owing.

(2) After the transfer and passage of the risk of loss and damage respecting the Equipment from the Seller to the Buyer at the designated F.O.B. place of delivery (as specified on Page 1 of the Proposal and Quotation), if the Equipment is lost or destroyed or so materially damaged that it cannot be restored to operating condition satisfactory to Seller, then Seller will not be responsible for the failure of the Equipment to perform at the applicable Performance Levels. In such event, Seller will automatically be discharged and released from its performance guaranty obligations hereunder, and Buyer shall thereupon immediately pay to Seller the entire balance of the sale price of the Equipment then owing.

(3) IF ANY OF THE EQUIPMENT FAILS TO PERFORM AT THE APPLICABLE PERFORMANCE LEVELS WHEN TESTED FOR ACCEPTANCE BY THE INDEPENDENT TESTING LABORATORY IN ACCORDANCE WITH THE APPLICABLE ACCEPTANCE TESTS AND PROCEDURES, SELLER'S OBLIGATION HEREUNDER IS LIMITED AND WILL BE FULLY DISCHARGED BY SELLER'S MAKING ANY CHANGES OR ADDITIONS NECESSARY TO ENABLE THE EQUIPMENT TO MEET SUCH PERFORMANCE LEVELS OR, AT SELLER'S OPTION, BY SELLER'S MAKING FAIR AND REASONABLE ADJUSTMENTS IN THE SALE PRICE OF THE EQUIPMENT. SELLER WILL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE ARISING IN CONNECTION WITH THE EQUIPMENT, OR IN CONNECTION WITH SELLER'S PERFORMANCE OR BREACH OF ITS OBLIGATIONS HEREUNDER, REGARDLESS OF WHETHER BASED IN CONTRACT OR IN TORT, (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, PLANT DOWN-TIME, LOSS OF USE OF THE EQUIPMENT AND CLAIMS, SUITS AND DAMAGES OF THIRD PERSONS, EXCEPT FOR U.S. PATENT INFRINGEMENT CLAIMS TO THE EXTENT PROVIDED IN CLAUSE (B) OF PARAGRAPH 6 OF THE STANDARD CONDITIONS OF SALE PORTION OF THE PROPOSAL AND QUOTATION). IN NO EVENT WILL SELLER'S LIABILITY FOR PERFORMANCE OR BREACH OF ANY OF ITS OBLIGATIONS HEREUNDER EXCEED THE AMOUNT OF THE SALE PRICE THERETOFORE PAID BY BUYER TO SELLER.

ANDERSEN 2000 INC
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PERFORMANCE LEVELS GUARANTY OF EQUIPMENT WHEN TESTED FOR ACCEPTANCE, AND THE TESTS AND PROCEDURES FOR FINAL ACCEPTANCE (continued)

C. PERFORMANCE LEVELS.
The respective Performance Levels applicable to the Equipment when tested for acceptance by the independent testing laboratory are as follows:

1. The scrubbing system quoted is guaranteed to achieve an outlet particulate loading not exceeding 0.08 gr/sdcf corrected to 7% O_2 dry when the inlet particulate feed rate to the scrubber does not exceed 0.20 gr/sdcf uncorrected.

2. The scrubbing system quoted is guaranteed to achieve 85% HCl removal efficiency or a maximum HCl emission not exceeding 40 ppmv (volume) on a dry basis, corrected to 7% O_2 (volume), and 70% SO_2 removal efficiency or a maximum SO_2 emission not exceeding 60 ppmv (volume) on a dry basis, corrected to 7% O_2 (volume).

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PERFORMANCE LEVELS GUARANTY OF EQUIPMENT WHEN TESTED FOR ACCEPTANCE, AND THE TESTS AND PROCEDURES FOR FINAL ACCEPTANCE (continued)

D. ACCEPTANCE TESTS.
The equipment is to be tested for acceptance by the independent testing laboratory in accordance with the following Acceptance Tests and Procedures:

1. Particulate removal efficiency shall be tested in accordance with United States EPA Method #5.

2. HCl and SO_2 removal efficiencies shall be tested in accordance with procedures specified by the local regulatory agency responsible for permitting of the scrubbing system.

3. Minimum sampling time shall be one hour. Simultaneous inlet and outlet samples must be taken. At least three samples must be taken at each location.

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PROPOSAL AND QUOTATION NO. APCE-5520-S

III. ENTIRE AGREEMENT

THIS PROPOSAL AND QUOTATION CONSISTS OF 14 PAGES, AS WELL AS THE DRAWINGS AND OTHER APPENDICES DESCRIBED IN THE TABLE OF CONTENTS HERETO (ALL OF WHICH ARE ATTACHED AND ARE INCORPORATED HEREIN BY REFERENCE). THE PROVISIONS OF THIS PROPOSAL AND QUOTATION SUPERSEDE ALL PRIOR AND CONTEMPORANEOUS UNDERSTANDINGS, COMMUNICATIONS, REPRESENTATIONS, WARRANTIES, GUARANTEES AND AGREEMENTS BETWEEN THE PARTIES CONCERNING ALL MATTERS SET FORTH HEREIN, AND THE PROVISIONS HEREOF CONSTITUTE THE SOLE AND ENTIRE AGREEMENT BETWEEN BUYER AND SELLER WITH RESPECT TO ALL MATTERS CONTAINED HEREIN. BUYER AND SELLER EACH REPRESENT THAT IT IS NOT RELYING ON ANY WARRANTIES, GUARANTEES, PROMISES OR REPRESENTATIONS, ORAL OR WRITTEN, EXPRESS OR IMPLIED, NOT SET FORTH HEREIN. ACCEPTANCE OF THIS PROPOSAL AND QUOTATION BY BUYER IS EXPRESSLY LIMITED TO THE PROVISIONS CONTAINED HEREIN. SELLER OBJECTS TO THE INCLUSION OF ANY DIFFERENT OR ADDITIONAL TERMS PROPOSED BY BUYER IN ITS ACCEPTANCE HEREOF, AND IF ANY SUCH DIFFERENT OR ADDITIONAL TERMS ARE INCLUDED IN BUYER'S ACCEPTANCE HEREOF, A SALE CONTRACT UPON THE PROVISIONS CONTAINED IN THIS PROPOSAL AND QUOTATION ALONE WILL RESULT, UNLESS THE INCLUSION OF SUCH DIFFERENT OR ADDITIONAL TERMS IS, THEREAFTER, EXPRESSLY AGREED TO IN WRITING BY SELLER. BUYER WILL BE DEEMED TO HAVE ACCEPTED ALL OF THE PROVISIONS HEREOF AND THIS PROPOSAL AND QUOTATION WILL BECOME A BINDING CONTRACT FOR THE ENTIRE QUANTITY OF EQUIPMENT SPECIFIED UPON THE OCCURRENCE OF ANY OF THE FOLLOWING: (i) THIS PROPOSAL AND QUOTATION IS SIGNED BY BUYER AND RETURNED TO SELLER; (ii) BUYER GIVES SELLER WRITTEN SHIPPING INSTRUCTIONS RESPECTING THE EQUIPMENT HEREIN DESCRIBED; OR (iii) BUYER OTHERWISE AGREES TO THE PROVISIONS HEREOF.

ACCEPTED BY BUYER:

BFI MEDICAL WASTE SYSTEMS
(Name of Buyer) (Please Type)

By: _____
(Authorized Signature)

_____
(Name & Title) (Please Type)

SELLER:
ANDERSEN 2000 INC.

By: _____
(Authorized Signature)

Dwayne L. Sanders, Applications Engineer
(Name & Title) (Please Type)

FROM INCINERATOR

ATMOSPHERE

INCINERATOR CHAMBER

SET=200°F

TAH 100 | JS 201 | TSH 100

(3) 1½" CHEM. HOSE

SPRAYS

TANGENTS

(3) ¾" CHEM. HOSE

Z-101

Z-102

Z-103

PDIC 101

POI 102

PCV 103

TAH 105

TSH 104 | TSH 105

TE 104 | TE 105

SURFACE MOUNTED

WELL

PI 204

EMERGENCY QUENCH WATER

F.O.

FSV 407

3" SCH. 80, CPVC

1½" SCH. 40, GS

PI 113

VENT

FV 101

PDCA 101

PCV 113

SET @ 5-10 PSIG

SET @ 100 PSIG

PCV 101

AIR SUPPLY

POI 108

POI 110

ATMOSPHERE

TO STACK

TI 112

WELL

B-101

M

MS

MS 111

PCV 301

SET AT 30 PSIG

1", SCH. 40, S.S.

PI 301

TC 302

P-301

CAUSTIC HEATER

1/2 x 1

FLEX

CAUSTIC SODA TANK T-301

VENT

CONTAINMENT BASIN

HS 301

AAL 208

pH AIC 208 ON/OFF

TC 305

1/2", SCH. 40, S.S.

pH AT 208

FG 208

AE 208

1/2", SCH. 80, CPVC

T-201

LG 228

STRAINER

P-201

4" SCH. 80, CPVC

FLEX

PI 203

FCV 205

FE 205

½" SCH. 80, CPVC

TO DISPOSAL

FIC 205

I/P

FY 205

INSTRUMENT AIR

LE 403 | LT 403

PCV 405

SET @ 25 PSIG

1/2" FLEX HOSE

PUMP SEAL FLUSH

HS 201

WATER SUPPLY 50 psig

3" SCH. 40, GS

STRAINER

PI 405

FV 400

JS 201

F.O.

PUMP ON, FV-400 OPEN & TSH-100 DISABLED

PUMP OFF, TSH-100 ENABLED & FV-400 CLOSED

FE 214

FI 214

FSL 214

FAL 214

FI 402

1½" SCH. 40, GS

LCV 403

LY 403

I/P

LIC 403

LSL 224 | LAL 224

LSH 225 | LAH 225

INSTRUMENT AIR

4" SCH. 80, CPVC

TO SUMP BY CUSTOMER

KEY

POI 116	PANEL MOUNTED INSTRUMENT
TI 115	LOCAL INSTRUMENT
PAL 208	ANNUNCIATOR POINT AND ALARM
⫽⫽	PNEUMATIC SIGNAL
- - - -	ELECTRICAL AND ELECTRONIC SIGNAL
———	MECHANICAL LINKAGE
═══	HEAT TRACED AND INSULATED
CPVC	CHLORINATED POLYVINYL CHLORIDE PIPE
S.S.	TYPE 304 S.S. PIPE
G.S.	GALVANIZED STEEL PIPE

NOTE: MAX. AIR SUPPLY REQUIRED 10 SCFM AT 100 PSIG

TOLERANCE = ±	BY DR JLP	DATE 11-14-69
MATERIAL AS NOTED	CHK	
PRELIMINARY	APPD	
	SCALE NTS	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DO NOT SCALE DRAWING

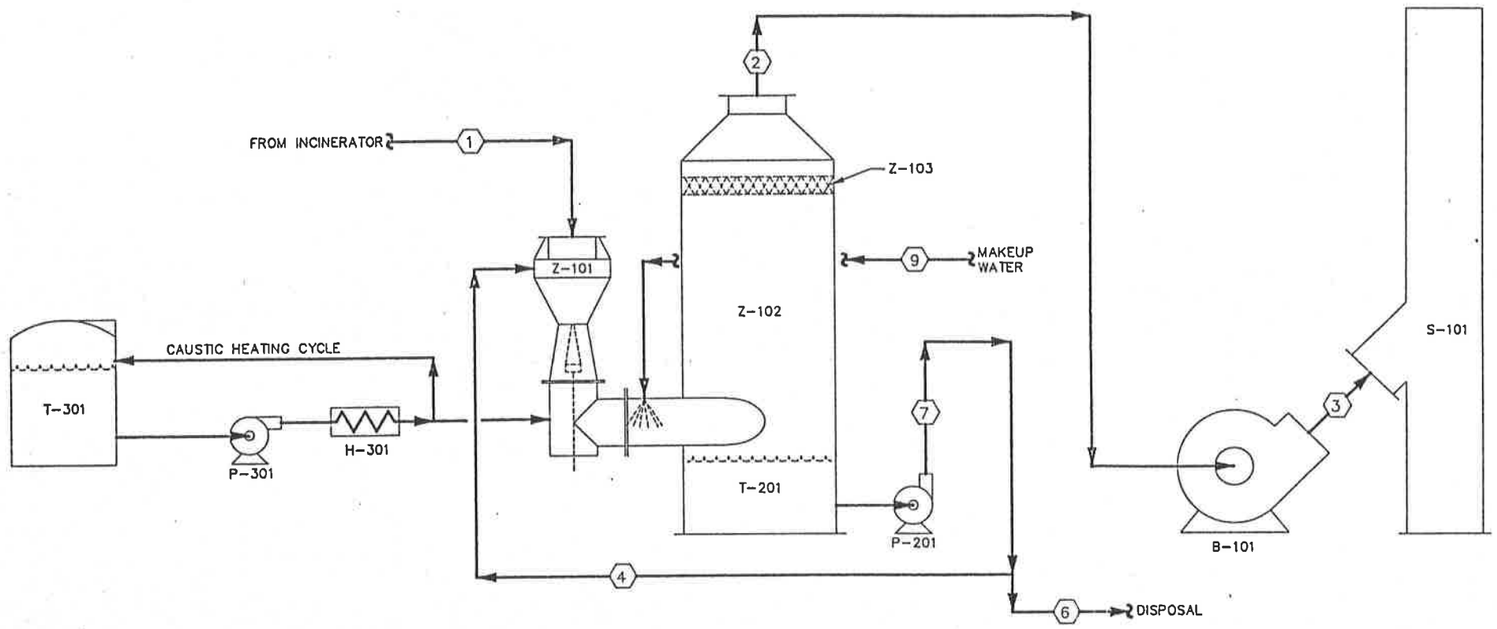
ANDERSEN 2000 INC.
AIR POLLUTION CONTROL, AIR HANDLING, HEAT RECOVERY AND SPRAY DRYING SYSTEMS AND EQUIPMENT
306 DIVIDEND DR. - PEACHTREE CITY, GA 30269

PIPING AND INSTRUMENTATION DIAGRAM FOR INCINERATOR SCRUBBING SYSTEM

PROD LINE - STANDARD

DWG. NO. P5520-3

REV.



PARTS LIST

ITEM	QTY.	DWG. NO.	DESCRIPTION	REMARKS
		Z-101	VENTURI SCRUBBER	
		Z-102	CYCLONIC SEPARATOR	
		Z-103	MESH MIST ELIMINATOR	
		P-201	RECIRCULATION PUMP	
		B-101	INDUCED DRAFT FAN	
		T-201	RECIRCULATION TANK	
		P-301	CAUSTIC PUMP	
		T-301	CAUSTIC TANK	
		H-301	CAUSTIC HEATER	
		S-101	EXHAUST STACK	

STREAM NAME AND NUMBER / PROPERTY OR COMPONENT	1 INLET GAS (ENGLISH)	1 INLET GAS (METRIC)	2 SCRUBBER OUTLET GAS (ENGLISH)	2 SCRUBBER OUTLET GAS (METRIC)	3 STACK GAS (ENGLISH)	3 STACK GAS (METRIC)
H2O----------(#/HR)-------(Kg/HR)	881.30	399.75	10051.90	4559.44	10051.90	4559.44
CO2	2306.60	1046.25	2306.60	1046.25	2306.60	1046.25
O2	2526.90	1146.18	2526.90	1146.18	2526.90	1146.18
N2	14503.00	6578.42	14503.00	6578.42	14503.00	6578.42
HCl	25.5	11.57	2.5	1.13	2.5	1.13
SO2	6.7	3.04	1.3	.59	1.3	.59
PARTICULATE	7.5	3.40	1.5	.68	1.5	.68
TOTALS---------(#/HR)-------(Kg/HR)	20257.50	9188.60	29393.70	13332.69	29393.70	13332.69
ACTUAL FLOW----(ACFM)------(AM3/HR)	19309.40	32810.53	9919.40	16855.04	9361.91	15907.75
STANDARD FLOW--(SCFM)------(NM3/HR)	4506.13	7107.06	7780.79	12271.86	7780.79	12271.86
STD. DRY FLOW-(SDCFM)-----(NM3D/HR)	4190.53	6609.31	4181.20	6594.60	4181.20	6594.60
DENSITY----(#/CU.FT.)------(Kg/AM3)	.0175	.2801	.0494	.7910	.0523	.8381
PRESSURE-------(PSIA)------(Kg/cm2)	14.624	1.0282	13.7569	.9673	14.6960	1.0333
STATIC PRESS.(in H2O)------(mm H2O)	-2	-50.8	-26	-660.4	0	0
TEMPERATURE--(DEG. F)------(DEG. C)	1800	982.30	172.5	78.06	177.7	80.95
MOLECULAR WEIGHT	28.97	28.97	24.35	24.35	24.35	24.35
HCl CONCEN.----(PPMV)------(mg/NM3)	999.31	1627.47	56.74	92.40	56.74	92.40
SO2 CONCEN.----(PPMV)------(mg/NM3)	149.74	427.61	16.83	48.05	16.83	48.05
PARTICULATE-(GR/SDCF)-----(mg/NM3D)	.2088	514.7174	.0419	103.1731	.0419	103.1731
PART.@12%CO2(GR/SDCF)-----(mg/NM3D)	.3108	766.0251	.0622	153.2050	.0622	153.2050
PART.@7%O2--(GR/SDCF)-----(mg/NM3D)	.3315	817.2716	.0667	164.3275	.0667	164.3275
HCl @ 7% O2 DRY(PPMV)-----(mg/NM3D)	1586.71	2584.11	90.37	147.18	90.37	147.18
SO2 @ 7% O2 DRY(PPMV)-----(mg/NM3D)	237.76	678.96	26.80	76.53	26.80	76.53

SCF = 70 DEGREES F & 14.696 PSIA (1.0 ATMOSPHERE)
NM3 = 0 DEGREES C & 1013 MILLIBARS (1.0 ATMOSPHERE)

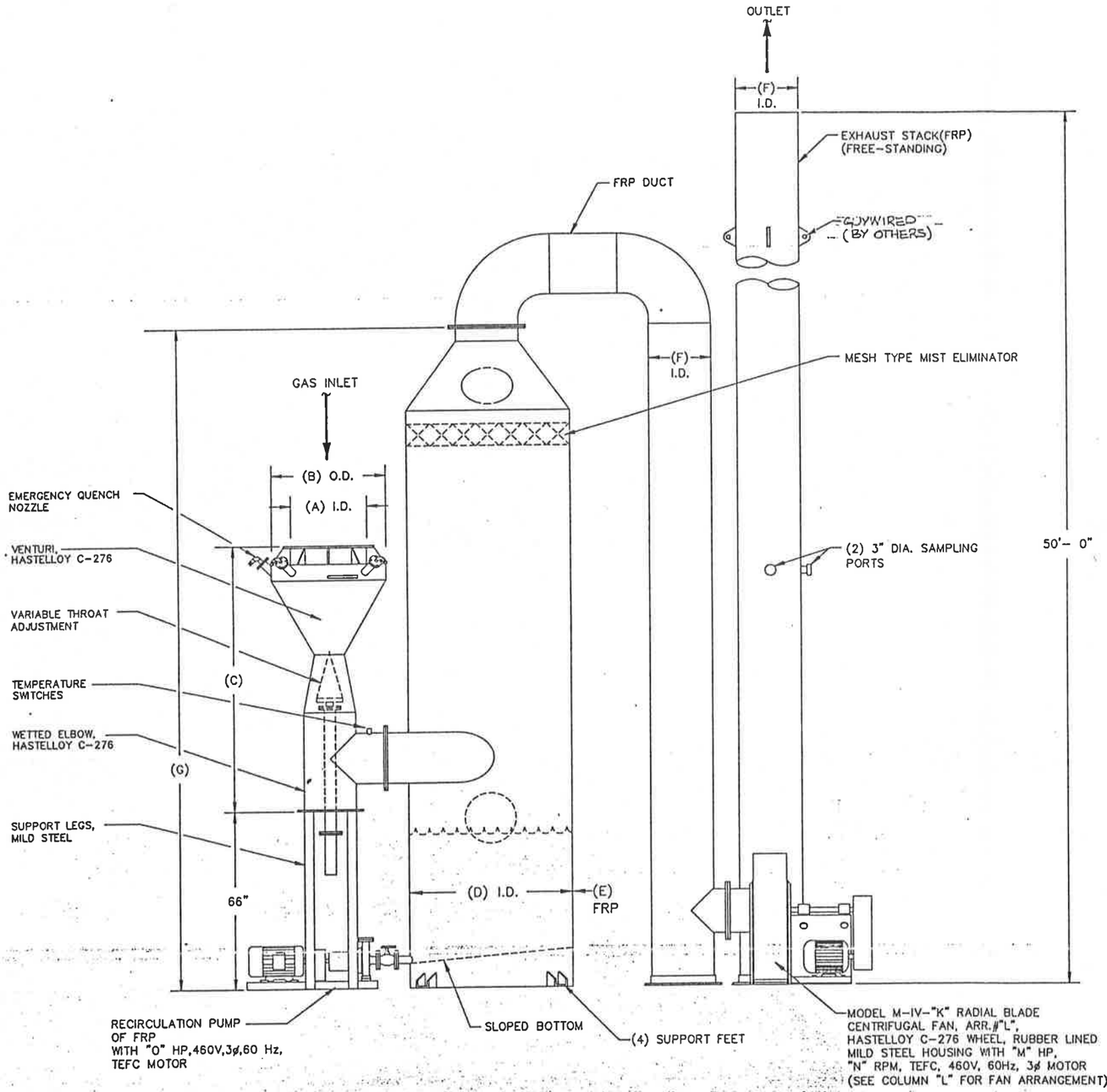
STREAM NAME AND NUMBER / PROPERTY OR COMPONENT	4 VENTURI OR QUENCH FEED (ENGLISH)	4 VENTURI OR QUENCH FEED (METRIC)	6 BLOWDOWN TO DISPOSAL (ENGLISH)	6 BLOWDOWN TO DISPOSAL (METRIC)	7 TOTAL PUMP FLOW (ENGLISH)	7 TOTAL PUMP FLOW (METRIC)	8 CHEMICAL MAKEUP (ENGLISH)	8 CHEMICAL MAKEUP (METRIC)	9 WATER MAKEUP (ENGLISH)	9 WATER MAKEUP (METRIC)
H2O----------(#/HR)-------(Kg/HR)	57305.88	25993.38	2321.22	1052.88	59627.10	27046.26	31.96	14.49	11447.00	5192.25
NaCl	910.07	412.80	36.86	16.72	946.93	429.52	.00	.00	.00	.00
Na2SO3	262.46	119.05	10.63	4.82	273.09	123.87	.00	.00	.00	.00
NaOH	.00	.00	.00	.00	.00	.00	31.96	14.49	.00	.00
PARTICULATE	148.13	67.19	6.00	2.72	154.13	69.91	.00	.00	.00	.00
TOTALS---------(#/HR)-------(Kg/HR)	58626.54	26592.41	2374.71	1077.15	61001.25	27669.56	63.91	28.99	11447.00	5192.25
FLOW---(U.S. GAL/MIN)-------(M3/HR)	115.00	26.12	4.66	1.06	119.66	27.17	.08	.02	22.90	5.20
PRESSURE-------(PSIG)------(Kg/cm2)	30.00	2.11	30.00	2.11	30.00	2.11	30.00	2.11	30.00	2.11
SPECIFIC GRAVITY	1.02	1.02	1.02	1.02	1.02	1.02	1.52	1.52	1.00	1.00
TEMPERATURE---(DEG F)-------(DEG C)	173	78.06	173	78.06	173	78.06	70.00	21.11	70.00	21.11
SUSPENDED SOLIDS (WT %)	.25	.25	.25	.25	.25	.25	.00	.00	.00	.00
DISSOLVED SOLIDS (WT %)	2.00	2.00	2.00	2.00	2.00	2.00	50.00	50.00	.00	.00
pH	6.95	6.95	6.95	6.95	6.95	6.95	>14.00	>14.00	7.00	7.00

TOLERANCE = FM
BY DR JLP DATE 11-13-89
CHK
APPD
MATERIAL SEE PROPOSAL
PRELIMINARY
SCALE NTS
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
DO NOT SCALE DRAWING

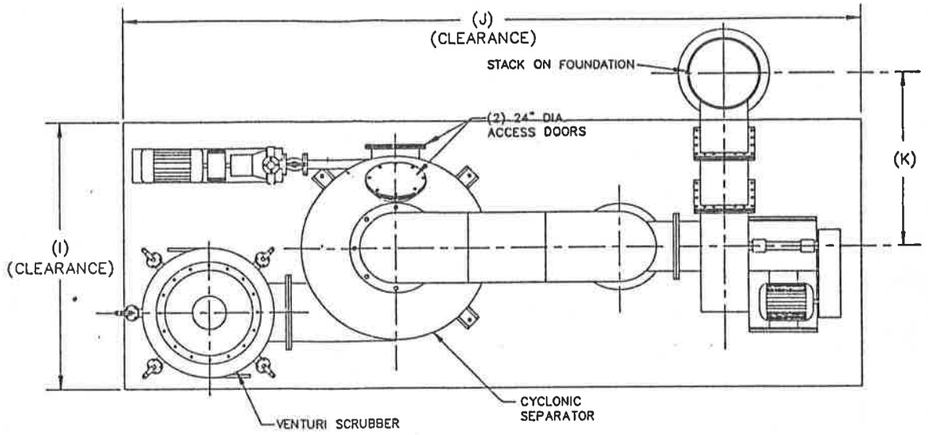
ANDERSEN 2000 INC.
AIR POLLUTION CONTROL, AIR HANDLING, HEAT RECOVERY, HAZARDOUS WASTE TREATMENT, SPRAY DRYING SYSTEMS AND EQUIPMENT,
306 DIVIDEND DR. - PEACHTREE CITY, GA 30269

PROCESS FLOWSHEET AND MATERIAL BALANCE FOR INCINERATOR SCRUBBER

PROD. LINE
DWG. NO. P5520-1
REV.



ELEVATION VIEW



PLAN VIEW

CAUSTIC TANK NOT SHOWN.
LOCATION BY CUSTOMER.
PLAN VIEW SHOWN IS FOR REFERENCE ONLY.
DUCT AND FAN CAN BE ROTATED TO MEET CUSTOMER'S REQUIREMENTS.

DIMENSIONS IN INCHES UNLESS NOTED

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
36"	48 3/8"	104"	60"	3/8"	24"	18' - 0"	72"	78"	21'- 0"	22	#9	75	1800	7 1/2

				TOLERANCE =	BY JLP DATE 11-13-89
				MATERIAL SEE PROPOSAL	CHK'D
				PRELIMINARY	APP'D SCALE NTS
				UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWING	
				THIS DRAWING IS THE PROPERTY OF ANDERSEN 2000 INC. AND IS SUBMITTED IN CONFIDENCE AND SHALL NOT BE REPRODUCED, COPIED NOR DISCLOSED TO OTHERS.	

ANDERSEN 2000 INC.
AIR POLLUTION CONTROL, AIR HANDLING, HEAT RECOVERY, HAZARDOUS WASTE TREATMENT, SPRAY DRYING SYSTEMS AND EQUIPMENT,
306 DIVIDEND DR. - PEACHTREE CITY, GA 30269

VENTURI SCRUBBER AND SEPARATOR
INCINERATOR SCRUBBING SYSTEM

PROD. LINE
DWG. NO. P5520-2
REV.

VI. Plant and Equipment Maintenance

Aside from employees the equipment utilized in the collection, treatment, and disposal of the infectious waste is the most important asset of the hospital waste disposal industry. Failure to properly maintain equipment will result in inefficient operations and the following disruptions:

Break down - resulting in costly repairs, unnecessary and unscheduled down-time, and interruption of operations.

Inefficient production - causing fuel waste, operating a less than optimum production capacity, increased cost of treatment, and increased demands on employees and equipment.

A. Equipment Maintenance

The facility has also developed a scheduled preventive maintenance program for the treatment equipment.

Scheduled preventive maintenance is divided into individual task and, depending upon the complexity of the item to be maintained, inspected or adjusted, these schedules are divided into daily, monthly, quarterly and yearly schedules.

Since some of these maintenance items require total shutdown, and possible entry into the systems, a lock-out and tag-out procedure and entrance procedure has been designed and utilized to ensure the safety and well being of personnel conducting the work.

In addition, the incinerator and boilers are required to undergo a periodic inspection by a manufacturer's representative.

All work performed, whether preventive or otherwise, is documented on work orders and records maintained.

Copies of these procedures are attached.

B. Plant Maintenance

In order to ensure the facility is maintained in a constant clean and sanitary condition, each shift

will be assigned specific duties (i.e. offices, restrooms, lunchroom, etc.) all shifts must ensure that plant floor cleaning and spill cleanups are given priority status, and continual attention.

For a detailed description of these responsibilities refer to the janitor job descriptions in Section III.

C. Vehicle Maintenance

Vehicles utilized in the collection, transportation, and disposal of medical waste will be inspected at the beginning and end of each day used. The Vehicle Condition Report will be utilized to perform this inspection to ensure the respective vehicle is in safe operating condition. any defects noted which will render the vehicle susceptible to accidents or breakdowns, will be immediately reported to the Operations Manager and the vehicle removed from service until repairs, to eliminate the problem, are completed. Defects not effecting the safe operation of the vehicle will be noted on the VCR and reported to the Operations manager who will arrange for repairs to be made as soon as possible. When repairs are completed, the driver must inspect and test the defect and insure it is repaired to his satisfaction, and sign the VCR which states that the proper repairs were made.

Vehicles will also be carried to the BFI Maintenance shop at predesignated intervals for lubrication and a preventive maintenance inspection (i.e. A or B) depending on the designated inspection and time or mileage interval.

SECTION VI - ATTACHMENTS

1. Autoclave Maintenance Schedule

    a. Daily
    b. Weekly

2. Boiler Maintenance Schedule

    a. Daily
    b. Weekly
    c. Monthly
    d. Annually

3. Incinerator Maintenance Schedule

    a. Daily
    b. Weekly
    c. Monthly
    d. Annually

4. Vehicle Maintenance Schedule

    a. Daily
    b. Weekly

5. Refrigerated Storage Trailer Maintenance Schedule

AUTOCLAVE DAILY MAINTENANCE SCHEDULE

	Y	N	Comments
1) Check door seals for cuts and wear.			
2) Clean inside door facing with wire brush (where contacts seal).			
3) Grease door seals.			
4) Pressurize autoclave and check for steam leaks.			
5) Condensate tank:			
a) Ensure motor is running.			
b) Control switch is on automatic			
6) Chart pen is legible.			

AUTOCLAVE WEEKLY
MAINTENANCE SCHEDULE

	Y	N	Comments
1) Hydraulic tanks maintain proper fluid level.			
2) Hydraulic tanks have clean filter screen.			
3) Hydraulic leaks in: Cylinders Hoses Line Connections			
4) Record hydraulic pressure (PSI)			
5) Examine conveyor rollers inside of autoclave for wear and/or replacement.			
6) Grease conveyor rollers inside of autoclave.			
7) Check door wedges and rotation ring for wear.			
8) Grease door wedges and rotation ring.			
9) Examine thermocouples for damage.			
10) Replace thermocouples if needed.			
11) Check moisture content in steam lines.			
12) Examine wear and damage on valves and valve seals.			

BOILER INSPECTION

DAILY

		Y	N	W/O No.	Comments
1.	Is the boiler room clean				
2.	Is the control cabinet closed				
3.	Are boiler room air vents open				
4.	Are inlet air filters clean				
5.	Are there any water leaks				
	a. water columns				
	b. piping				
	c. water plugs				
	d. water steam plugs				
	e. valves				
	f. Trycocks				
	g. blow-off drain				
6.	Is blow down valve working				
7.	Is blow down drain open				
8.	flue stack temperature				
9.	"Beaker Test" boiler water for impurities				

BOILER INSPECTION

WEEKLY

1. Check all burner linkages to be sure there is no change from its original marked position

2. Open blowdown valve of the low-water cut-off while the burner is running. The burner should shut down when the water level drops in the glass.

3. The blowdown valves on the water column should be operated to insure the connections are clear. The gage glass should be blown down to clean the glass. Repeated blowdowns will weaken the glass.

Y	N	W/O No.	Comments

BOILER INSPECTION

MONTHLY

	Y	N	W/O No.	Comments
1. Check ignition assembly and electrode a. inspect and clear porcelain insulators (replace if cracked) annually or if pilot fails to ignite. b. Check high tension wire between electrode and transformer				
2. Clean flame detector lens with soft cloth and check scanner cell				
3. Check air dampers and blower wheel. Remove accumulation of lint or dirt				
4. Air-Fuel Linkage a. insure linkage moves smoothly; no stress or binding b. Adjust air-damper shutters, if needed				

BOILER INSPECTION

ANNUALLY

		Y	N	W/O No.	Comments
1.	Replace vacuum tube and scanner cell in electronic controls				
2.	Replace gaskets on:				
	a. water plugs on water piping				
	b. water, steam plugs				
	c. column head				
3.	Inspect fire tubes for leaks (i.e., mineral deposit on tube interior)				
4.	Clean fire tubes (i.e., ram with brush)				
5.	Open and inspect refactory				
6.	Scrape and clean water side of boiler				
7.	Wash (using pressure nozzle) interior of boiler				
8.	Check the spark gap between the electrode and igniter body (1/16" to 1/8").				

INCINERATOR INSPECTION AND MAINTENANCE SCHEDULE

Daily

		Y	N	Comments
A.	Check for fuel leaks.			
B.	Inspect flue gas emissions for smoke and/or fly ash.			
C.	Close loader lid and access doors when unit is not in use (unless an entry is to be conducted).			
D.	Check ash Dragon for correct operation.			
E.	Check sump-pump screen and clean debris.			
F.	Check hydraulic system for leakage and repair.			
G.	Check hydraulic fluid level.			

INCINERATOR INSPECTION AND MAINTENANCE SCHEDULE

Weekly

		Y	N	Comments
A.	Grease all bearings.			
B.	Grease the guillotine door guide.			
C.	Inspect thermo couples and replace if required.			
D.	Grease ash plow shafts.			
E.	Clean ash conveyor, return chain pans.			
F.	While operating loader, inspect hoses, piping, and swivels for leakage and wear.			
G.	Clean dust from: 1. motors 2. air inlets 3. cooling fins 4. vents			
H.	Check all drive belts for tightness and alignment.			
I.	Clean the loader and surrounding area.			

INCINERATOR INSPECTION AND MAINTENANCE SCHEDULE

Monthly

	Y	N	Comments
A. Check Incinerator's: 1. auxiliary blowers 2. burners 3. temp. controllers 4. pyrometers 5. control circuit			
B. Check fasteners for tightness.			
C. Test burners and accessories for correct operation.			
D. Check primary and secondary chambers for tightness.			
E. --Test drop chutes for tightness and cracks.			
F. Inspect ash Dragon, replace worn parts, tighten loose parts, etc.			
G. Inspect and clean: 1. blower wheels 2. dampers 3. air passages			
H. Check pressure setting on relief valve.			
I. If hydraulic fluid has contaminates or change in viscosity, change fluids.			
J. Check all fasteners, tighten loose ones and replace missing ones.			
K. Check ram cylinder hoses for wear.			

INCINERATOR INSPECTION AND MAINTENANCE SCHEDULE

Quarterly

	Y	N	Comments
A. Lubricate all motors.			
B. Replace oil filter element.			
C. Clean the strainer.			
D. Inspect ram wear shoes and replace if necessary.			
E. Replace the hydraulic fluid.			

INCINERATOR INSPECTION AND MAINTENANCE SCHEDULE

	Y	N	Comments
Yearly			
A. Lubricate all motors.			
B. Add 1/4 ounce of grease per motor bearing.			
C. Check motor coupling for wear.			
D. Check hydraulic fluid for level and contamination.			

DAILY DRIVER'S INSPECTION & VEHICLE CONDITION REPORT DATE: _____
(DOT 396.11—396.13)

VEHICLE NUMBER: _____ DRIVER NAME (PRINT IN BLOCK LETTERS): _____ DIST. _____

HOURS: _____ START _____ MILES: _____ START _____ HOURS: _____ FINISH _____ MILES: _____ FINISH _____

PRE-TRIP INSPECTION - DOT 396.13 (a)

- ☐ Tires, Wheels, and Rims
- ☐ Engine Oil, Fuel, and Coolant
- ☐ Service Brakes and All Connections
- ☐ Parking (hand) Brake (s)
- ☐ Steering Mechanism (s)
- ☐ Horn (s)
- ☐ Instruments and Gauges
- ☐ Lights and Reflectors
- ☐ Emergency Equipment
- ☐ Windshield Wipers
- ☐ Rear Vision Mirrors
- ☐ Coupling Devices
- ☐ License Plate (s) and Registration
- ☐ Vehicle Damage

☐ FUEL _____ GAL. _____

☐ OIL _____ OTS _____

☐ HYD. _____

PRE TRIP CONT

- System Cycle
- Bridge Kit
- Radio Check
- Fire Ext
- Back Up Sensors
- Daily-Ob Equip

I have performed the above Inspection and found each item in proper working order or I have defects below as per DOT 396.B

_____ Driver's Signature

_____ Date

POST-TRIP INSPECTION - DOT 396.11

- ☐ Tires, Wheels, and Rims
- ☐ Engine Oil, Fuel, and Coolant
- ☐ Service Brakes and All Connections
- ☐ Parking (hand) Brake (s)
- ☐ Steering Mechanism (s)
- ☐ Horn (s)
- ☐ Instruments and Gauges
- ☐ Lights and Reflectors
- ☐ Emergency Equipment
- ☐ Windshield Wipers
- ☐ Rear Vision Mirrors
- ☐ Coupling Devices
- ☐ License Plate (s) and Registration
- ☐ Vehicle Damage

I have performed the above Inspection and found each item in proper working order or I have noted defects below.

_____ Driver's Signature

_____ Date

VEHICLE CONDITION REPORT

CHECK ALL DEFECTS

CHECK IF NO DEFECTS NOTED ☐

TIRES, WHEELS, & RIMS
- ☐ Flat
- ☐ Low Air Pressure
- ☐ Marginal Tread
- ☐ Loose Lug Nuts
- ☐ Cracks, Cuts, or Damage
- ☐ Grease Leaks

ENGINE
- ☐ Coolant Leaks
- ☐ Fuel Leaks
- ☐ Oil Leaks
- ☐ Misses
- ☐ Overheats
- ☐ Noises
- ☐ Smoking
- ☐ Low Oil Pressure

BRAKES
- ☐ Service Brakes
- ☐ Parking Brakes
- ☐ Air / Hydraulic Leaks
- ☐ Pulls to Left / Right
- ☐ Adjust All Brakes

STEERING
- ☐ Loose
- ☐ Shimmy
- ☐ Steers Hard
- ☐ Pulls to Left / Right

INSTRUMENTS AND GAUGES
- ☐ Air Pressure Gauge / Alarm
- ☐ Amp Meter / Volt Gauge
- ☐ Temperature Gauge
- ☐ Oil Pressure Gauge

INSTRUMENTS AND GAUGES (cont.)
- ☐ Speedometer
- ☐ Tachometer
- ☐ Windshield Wipers / Washers
- ☐ Horn (s)

LIGHTS
- ☐ Headlights
- ☐ Stop & Tail Lights
- ☐ Turn Signals
- ☐ Marker Lights
- ☐ Reflectors
- ☐ Dash Lights

CAB / CHASSIS
- ☐ Battery Box / Cover
- ☐ Doors
- ☐ Seat Belts
- ☐ Mirrors and Cab Glass
- ☐ Heater / Defroster
- ☐ Triangle Reflectors
- ☐ Fire Extinguisher
- ☐ Coupling Device (s)
- ☐ License Plate (s)
- ☐ Registration

SPRINGS
- ☐ Broken
- ☐ Loose U-Bolts

CLUTCH
- ☐ Noisy
- ☐ Slipping
- ☐ Adjust Clutch

REAR AXLE
- ☐ Noisy

REAR AXLE (cont.)
- ☐ Grease Leaks

DRIVE LINE
- ☐ Foreign Material
- ☐ Noisy
- ☐ Vibrations

TRANSMISSION
- ☐ Noisy
- ☐ Jumps Out of Gear
- ☐ Hard Shifting
- ☐ Grease Leaks

ELECTRICAL
- ☐ Will Not Start
- ☐ Will Not Charge
- ☐ Will Not Shut Down

BODY
- ☐ Hydraulic Leaks

Left Side	☐ Cyl	☐ Line	☐ Valve
Right Side	☐ Cyl	☐ Line	☐ Valve
Front	☐ Cyl	☐ Line	☐ Valve
Rear	☐ Cyl	☐ Line	☐ Valve
Top Door	☐ Cyl	☐ Line	☐ Valve
Rear Door	☐ Cyl	☐ Line	☐ Valve

- ☐ Will Not Pack Properly
- ☐ Damaged Pins
- ☐ Turnbuckle
- ☐ Hydraulic Controls
- ☐ Pump Leaks
- ☐ PTO Leaks
- ☐ Body Mounting Bolts
- ☐ Crack / Damage on Body
- ☐ Damaged Chains
- ☐ Micro Switches
- ☐ Control Arms
- ☐ Rear Door Seal
- ☐ Pump Noisy
- ☐ PTO Noisy
- ☐ Hydraulic Level

_____

WRITE SPECIAL INSTRUCTIONS HERE

_____

CORRECTIVE ACTION / REPAIRS MADE AS PER DOT 396.11 (1)

CERTIFY THAT: ☐ ITEMS NOTED DO NOT EFFECT THE SAFE OPERATION OF THIS VEHICLE

☐ REPAIRS OF THE NOTED DEFECTS HAVE BEEN CORRECTED

MECHANIC'S SIGNATURE: _____ DATE: ___/___/___

VEHICLE REPAIR ORDER NUMBER: _____ DATED: ___/___/___

I HAVE REVIEWED THIS VEHICLE CONDITION REPORT AS PER DOT 396.13 (b) & (c): DRIVER'S SIGNATURE: _____ DATE: ___/___/___

BFI Waste Systems
BROWNING-FERRIS INDUSTRIES
EAST CENTRAL REGION

DISTRICT NO. _____
UNIT _____
DATE _____
MILEAGE _____
HR. METER _____

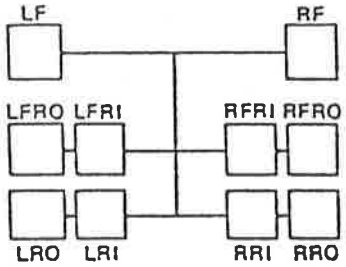
WEEKLY PREVENTIVE MAINTENANCE

A

R.O. No. _____

	OK	ADJ. MADE W.O.	NEEDS REPAIR W.O.
1. Battery Check Cables and Lines, Clean Battery.			
2. Anti-Freeze Check Condition & Setting.			
3. Check Radiator Water Level and Leaks (Clean).			
4. Check Oil Pressure (Proper Setting by Eng.)			
5. Check Air Pressure (90—120)			
6. Check Clutch Operation, Adjust to ½" Between Release Bearing Face and Front Brake Disc.			
7. Check Transmission Oil Level			
8. Check Rear End Oil Level & Steering Hub Oil Level			
9. Inspect Drive Line and U—Bolts for Movement & Tightness			
10. Inspect PTO Shaft Joints			
11. Drain Air Tanks			
12. Check and Fill Hydraulic Oil			
13. Chassis Lubrication			
14. Grease all Body & Hoist Fittings			
15. Check Brake Adjustment and Operation			
16. Check Tire Inflation Pressure With Air Gauge (110 - 125) Tread Depth Min. 4/32's			
17. Check Bridge Kit and Back Up Sensors			
18. Check all External Lights			
19. Check Trans Mounting Bolts & Insulators			
20. Check Registraton/Permits, etc.			
21. Check Safety Items/Fire Ext., etc.			

Air Pressure/Tread Depth Chart



COMMENTS: _____

INSP. COMPLETE AND WORK ORDER WRITTEN, Mech. _____

BFI Waste Systems™
BROWNING-FERRIS INDUSTRIES

INSPECTION
REFRIGERATION UNIT

UNIT# _____

DATE _____

MILEAGE/HOURS _____

DAILY 50 HR. 600 HR.

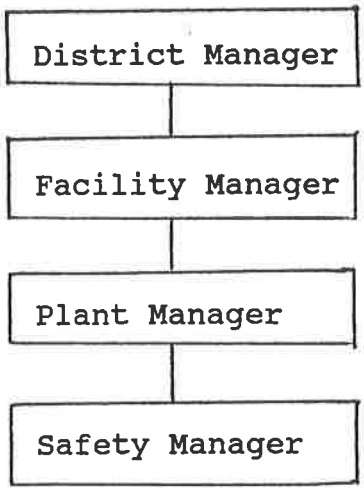
	O K	Serviced	Repair/Rq.	Mech.
	DAILY			
1. INSPECT ENGINE AIR CLEANER				
2. CK LUBE OIL				
3. CK RADIATOR COOLANT LEVEL				
4. CK ENGINE HOUR METER (OPERATION)				
5. CK ALL BELTS AND PULLEYS				
6. CK FUEL LEVEL				
	50 HR.			
1. PERFORM DAILY INSPECTION				
2. CK BATTERY FLUID LEVEL				
3. BATTERY TERMINAL CONNECTIONS				
4. CK TENSION ALL BELTS				
5. CK FOR LUBE OIL LEAKS				
6. CK ALL WIRING –TERMINALS– CHAFING				
7. CK RADIATOR FOR CLEANLINESS				
8. CK UNIT MOUNTING BOLTS				
9. CK CLEANLINESS OF EVAPORATOR COIL				
10. CK STAND BY MOTOR SHAFT BEARINGS				
11. RUN UNIT IN COOLING MODE				
12. CK FOR CLUTCH SLIPPAGE				
13. CK FOR BELT SLIPPAGE				
14. CK FOR UNUASUAL NOISE OR VIBRATIONS				
15. CK EVAPORATOR FAN MOTOR				
16. CK CONTROLLER OPERATION				
17. CK MANUAL DEFROST				
18. CK THERMOMETER CALIBRATION				
19. CK REFRIGERANT LEVEL				
20. RECORD INSP. ON UNIT				
	600 HR.			
1. PERFORM 50 HR. INSPECTION				
2. CK COMPRESSOR OIL				
3. CK ENGINE OIL				
4. CK AIR SWITCH SENSING TUBES				
5. CK DEFROST AIR SWITCH				
6. CK EVAPORATOR DRAIN TUBES				
7. CHANGE LUBE OIL & FILTER				
8. REPLACE FUEL FILTER				
9. CLEAN CRANKCASE BREATHER				
10. CK FAN MOTOR BRUSHES				
11. CLEAN BATTERY TERMINALS				
12. CK GLOW PLUGS				
13. DRAIN WATER FROM FUEL TANK				
14. SET ENGINE VALVE LASH				
15. RECORD INSPECTION ON UNIT				

Comments _____

VII. Preparedness, Prevention, and Contingency Plan

A. Organizational Structure

1. The organizational structure for implementation of the PPC Plan is as follows:



2. The PPC organization has the responsibility and authority to develop, implement and maintain the PPC Plan. Duties of the PPC organization include materials inventory, risk assessment, establishment of spill reporting procedures, visual inspection programs, review of past incidents and spills, and countermeasures to be utilized. The PPC organization is also responsible for the coordination needed to implement the goals of the Plan, coordination of activities for spill cleanup, notification of authorities and establishment of training programs for facility personnel as described in Section VIII. The PPC Plan will be reviewed annually and revised as required. It will also be revised in the event of the following: regulations are revised; the Plan fails in an emergency; physical changes at the facility; the changes in emergency coordinators or emergency equipment changes. The PPC Plan and make recommendations to management on related matters.

B. Material and Waste Inventory

1. A complete description of waste types handled at the Facility is provided in Sec. II of the Operations Plan. Other chemicals kept on-site

4. Waste held overnight is placed in a locked refrigerated storage area, or in locked trailers.

5. The site will be inspected daily and cleared of litter and other debris.

6. All supplies will be stored in a neat and orderly manner. The housekeeping program will be continually monitored for required additions.

H. Security

The facility is operated as described in Section V of the Operations plan. The following personnel will have access to the facility through the possession of keys: District Manager, Operations Manager, Sales Manager, Shift Supervisor and Safety Manager.

Access to the site from the public road is limited by a single roadway. All equipment is housed in a building and protected by doors. The facility is usually operated 24 hours a day, but in the event of closing, all doors and access routes will be locked. The entire site is enclosed with 6 feet high security fencing.

Fire protection is accomplished by smoke detectors, sprinkler systems and visual detection. General purpose fire extinguishers are located throughout the facility.

I. External Factors

Power outages, strikes, floods, severe snowstorms, etc. would cause operations at the facility to cease, but the facility will be secured prior to closing. Power outages can cause visual emissions from the incinerator. In this event, the incinerator will be controlled manually to minimize such emissions.

J. Communications or Alarm Systems

External communications at the facility are via regular telephone services. Telephones are located in the facility office and at the loading docks. The system provides external communications including the reporting of emergencies to local

police, fire departments, and medical facilities. Internal communications between the office and incinerator are accomplished via intercom. Other internal communications are by voice and an audible alarm system.

K. Employee Training Program

The Training program is designed to ensure that facility personnel will be able to respond effectively to an emergency and will be able to perform their daily functions in a manner which minimizes the risk of an emergency occurring. This training program will be directed by BFI personnel.

Employees involved in waste processing will be trained and experienced operators. An employee training program consisting of an initial orientation and monthly training meetings will be held for all personnel. These monthly meetings will provide additional information necessary for employees to perform their job safely. Fire protection, health and hygiene, emergency evacuation plans, alarms and emergency telephone numbers will be periodically reviewed as part of the training program.

L. Emergency Coordinators

In the event of an emergency, the individuals shown below will act as emergency coordinators. The primary coordinators, who will be notified first, are chosen on the basis of familiarity with the facility and immediate access to the plant.

NAME	TYPE	OFFICE PHONE	HOME PHONE

(Names to be added once facility is constructed and operating.)

M. Duties and Responsibilities of the Emergency Coordinator

The Emergency Coordinator will be notified of a possible emergency situation by, 1) the sounding of the emergency alarm, 2) telephone from an individual person, or by 3) personal contact.

Whenever there is an emission, discharge, fire, or explosion, the Emergency Coordinator must immediately estimate the character, exact source, amount, and aerial extent of emitted or discharged materials. He may do this by observation or review of records and, if necessary, by chemical analysis.

Concurrently, the Emergency Coordinator must assess possible hazards to human health or the environment that may result from the emission or discharge, fire, or explosion. This assessment must consider both direct and indirect effects of the emission, discharge, fire or explosion.

If the Emergency Coordinator determines that the installation has a situation which could threaten human health or the environment, he must immediately notify the applicable federal/state/local authorities and indicate if evacuation of the local area is advisable. Emergency escape routes for plant personnel are posted throughout the facility. Should the emergency warrant contact with government agencies, the following information will be given:

1. Name of the person reporting the incident.

2. Name and location of the installation.

3. Phone number where the person reporting the spill can be reached.

4. Date, time and location of the incident.

5. A brief description of the incident, nature of the materials or wastes involved, extent of any injuries, and possible hazards to human health or the environment.

6. The estimated quantity of the materials or wastes spilled.

7. The extent of contamination of land, water, or air, if known.

During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, reoccur, or spread to other materials or wastes at the installation. These measures shall include, where applicable, stopping processes and operations, collecting and containing related materials or wastes, and removing or isolating containers.

If the installation stops operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildups, or ruptures in valves, pipes, or other equipment wherever this is appropriate.

Immediately after an emergency, the Emergency Coordinator, with the proper regulatory approval, must provide for treating, storing, or disposing of residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the installation.

The Emergency Coordinator must ensure that, in the affected areas of the installation, no material or waste incompatible with the emitted or discharged residues is processed, stored, treated, or disposed of until cleanup procedures are completed; and, all emergency equipment is cleaned and fit for its intended use before operations are resumed.

Within 15 days after the incident, a written report on the incident will be submitted to the Tennessee Department of Health and Environment. The report must include the following information:

1. Name, address, and telephone number of the individual filing the report.

2. Name, address, and telephone number of the installation.

3. Date, time and location of the incident.

4. A brief description of the circumstances causing the incident.

5. Description and estimated quantity by weight or volume of materials or wastes involved.

6. As assessment of any contamination of land, water, or air that has occurred due to the incident.

7. Estimated quantity and disposition of recovered materials or wastes that resulted from the incident.

8. A description of what actions the installation intends to take to prevent a similar occurrence in the future.

A copy of the report will be retained as a part of the operational records for the facility.

N. Line of Authority

District Manager --------
Plant Manager ----------
Operations Manager ------
Safety manager ----------

O. Agencies to be Notified

If the Emergency Coordinator determines that a situation will threaten human health, safety, or the environment, he must notify the regulatory agencies. This is accomplished by calling both the Tennessee Division of Solid Waste number and the national Response Center, run by the Coast Guard. Also, useful emergency information can be obtained by calling CHEMTREC, the Chemical Transportation Emergency Center in Washington, D.C. These numbers are:

Memphis Field Office of Tennessee Department of Health and Environment	(901) 543-6695
Memphis/Shelby County Emergency Management Agency	911 or 0
National Response Center ----------	(800) 434-8802

Others, if necessary:

CHEMTREC ----------	(202) 483-7616
Local Fire Department ----------	911 or 0
Local Ambulance Service ----------	911 or 0
Tennessee Highway Police ----------	911 or 0
Memphis Police Department ---------	911 or 0

P. Emergency Equipment

1. The following equipment, as a minimum, is kept on site in the storage room for use as needed in case of an emergency.

   a) 5 spare uniforms or coveralls in case of personal spill
   b) 1 shovel
   c) 1 case of red bags (250)
   d) 1 broom
   e) 250 boxes
   f) 10 rolls of tape for boxes
   g) 5 rolls of paper towels
   h) 1 set of emergency instructions
   i) 1 First Aid Kit
   j) 1 eye wash
   k) 1 pair of scissors
   l) 1 roll of Duct tape
   m) 1 gallon of disinfectant concentrate
   n) 1 - 3 gallons of sprayer

o) 1 drum of absorbent material
p) 1 plastic coated absorbent drop cloth
q) 1 germicidal soap and waterless hand "degermer" solution
r) 1 hooded, booted tyvek suit
s) 2 respirators (dust/mist and organic vapor cartridges) in plastic bag
t) 6 pairs of gloves - heavy plastic (PVC)
u) 6 pairs of extra work gloves
v) 1 case of surgical gloves - Latex - (use as liner underneath other gloves) - nonsterile
w) 3 reflective triangles
x) 1 gallon TB effective germicide
y) 6 extra goggles
z) 1 fire extinguisher
aa) 1 roll of barricade tape - Hazardous - DO NOT ENTER

2. Respirators

a) Must fit properly - there should be no leakage of air. Beards are prohibited since they prevent the respirator from fitting properly and, therefore, reduce the effectiveness. Anyone who is issued a respirator or is expected to use a respirator will be trained and fitted first, and will receive a pulmonary function test annually.

b) Filters or cartridges must be replaced according to the manufacturer's time limit written on the package. Use organic vapor cartridges and HEPA Cartridges Spare cartridges should be kept in a plastic bag.

c) Filters or cartridges must be replaced immediately if they become wet from condensation or rain.

d) Respirators should be cleaned after use, in accordance with the attached respirator program.

e) All equipment will be tested and maintained as necessary to assure its proper operation at time of emergency. After an emergency, all equipment will be decontaminated, cleaned, and fit for its intended use before normal operations resume.

Q. Evacuation Plan

Evacuation plans for personnel are posted throughout the facility, and employees have been trained to use the prescribed escape route. A copy of the evacuation plan is included as an attachment.

R. Emergency Response Contractors

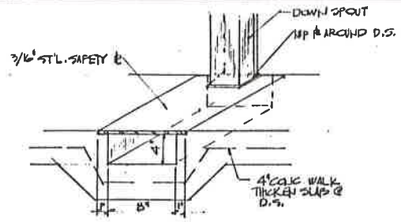
1. Radioactive Waste - ACCO Service, Inc.
   Tinley Park, IL (312) 429-1660

S. Pollution Incident History

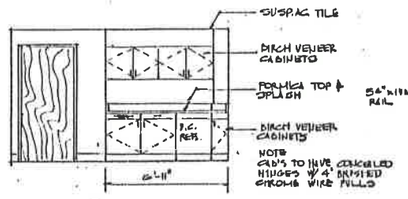
There have been no previous pollution incidents at this facility.

T. Implementation Schedule

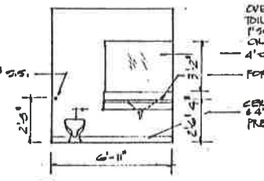
The PPC Plan is complete, therefore an implementation schedule is not required.



DRAIN AT DOWNSPOUT IN WALK
1½"=1'-0"

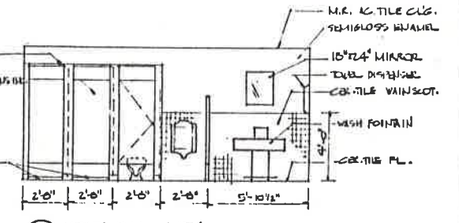


3 / A2 EAST WALL - BREAK
½"=1'-0"

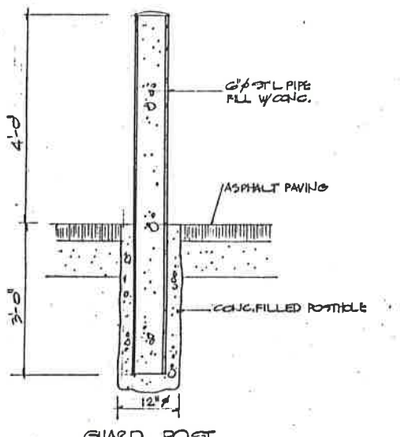


OVERHEAD DUCTED SHOWER & TOILET COMPARTMENTS PSOLID PHENOLIC MFR'S. ORDERED BY CAPITOL PARTITIONS INC.
4'-0" X 3'-6" MIRROR
FORMICA TOP & 4" SPLASH
CER. TILE FLOOR & 4" BASE PRECAST RECEPTOR

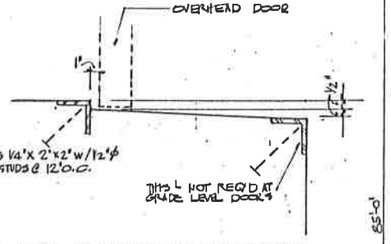
2 / A2 WEST WALL - HANDICAP TOILET
½"=1'-0"



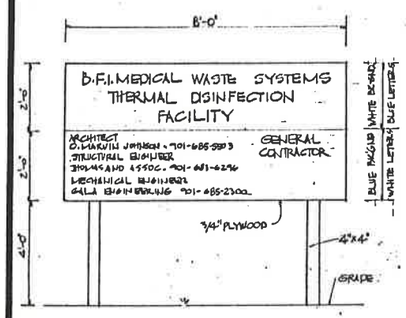
1 / A2 NORTH WALL - MEN
¼"=1'-0"



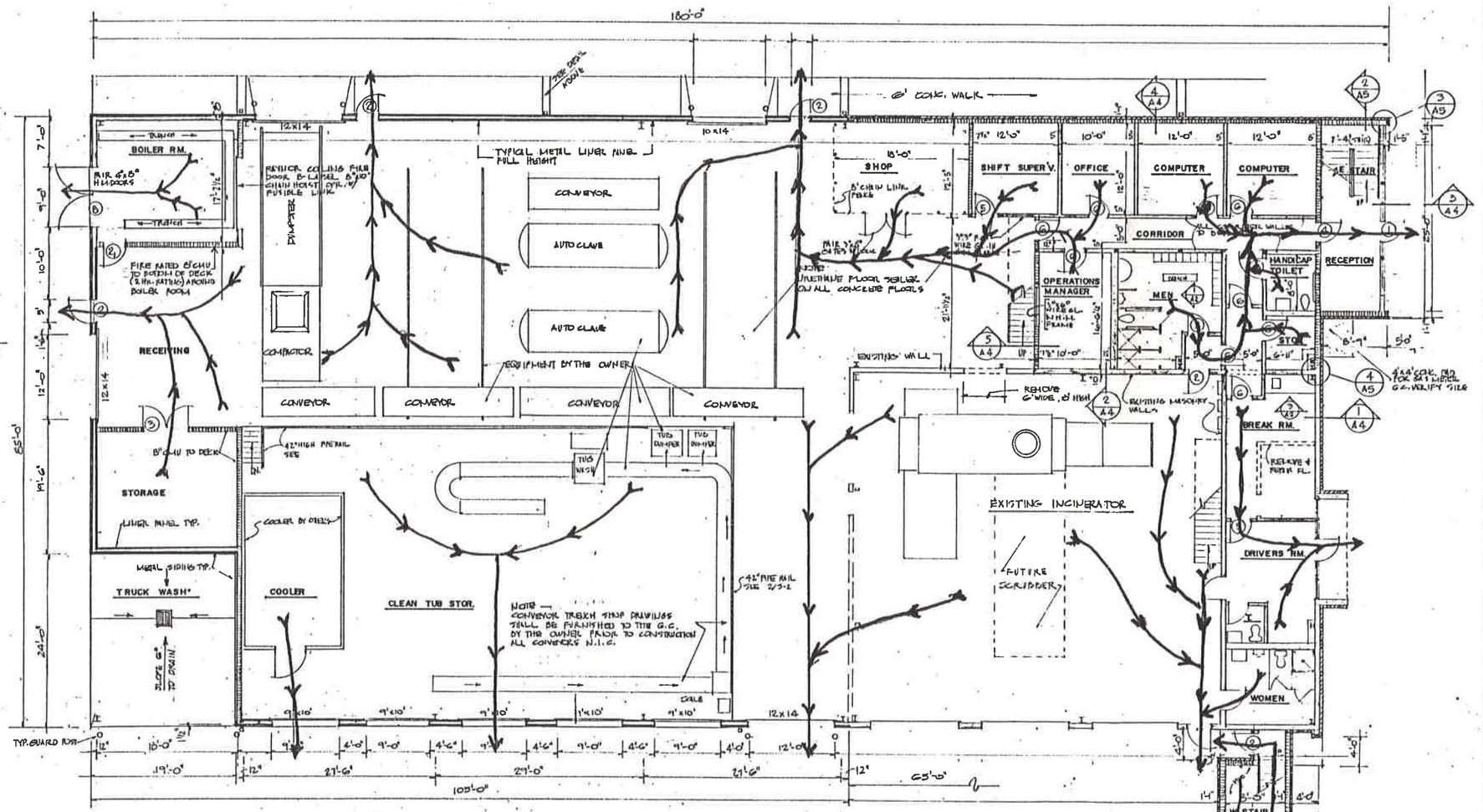
GUARD POST
3/4"=1'-0"



SILL AT UPWARD ACTING DOORS
3"=1'-0"



PROJECT SIGN
½"=1'-0"



GROUND FLOOR PLAN
1/8"=1'-0"

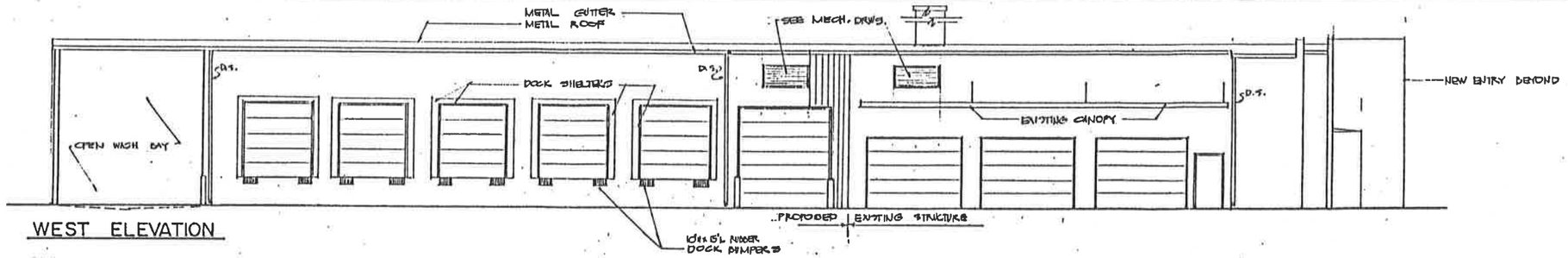
REVISIONS	BY

O. MARVIN JOHNSON
ARCHITECT
5583 MURRAY RD. SUITE 201
MEMPHIS, TN 38119
901-685-5503

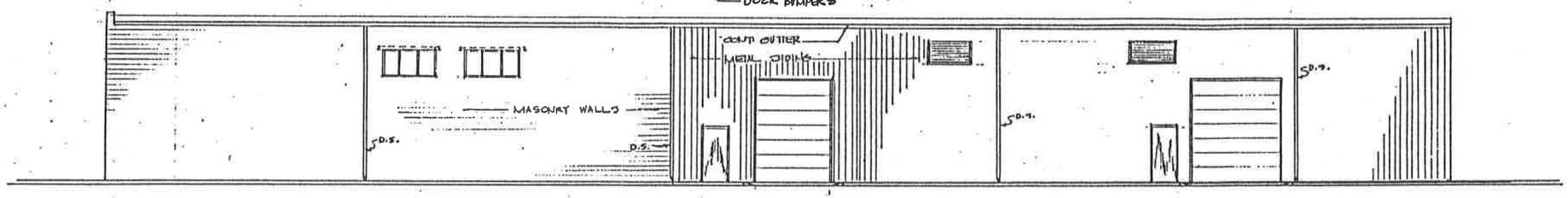
B.F.I.
MEDICAL WASTE SYSTEMS
540 RIVERGATE RD. MEMPHIS, TN.

DRAWN	OMJ
CHECKED	
DATE	8-15-89
SCALE	1/8"=1'-0"
JOB NO.	89-05
SHEET	A-2
OF	6 SHEETS

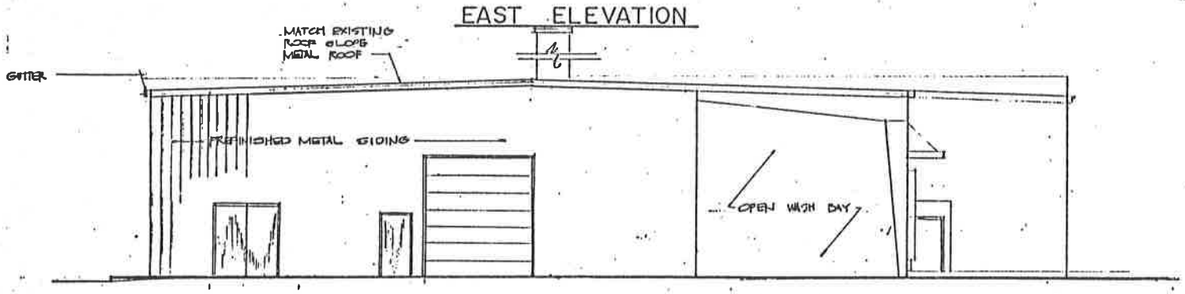
P 2233



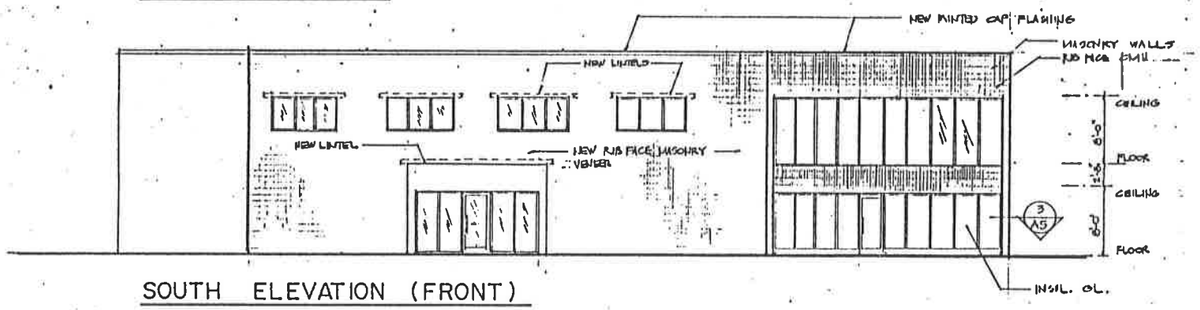
WEST ELEVATION



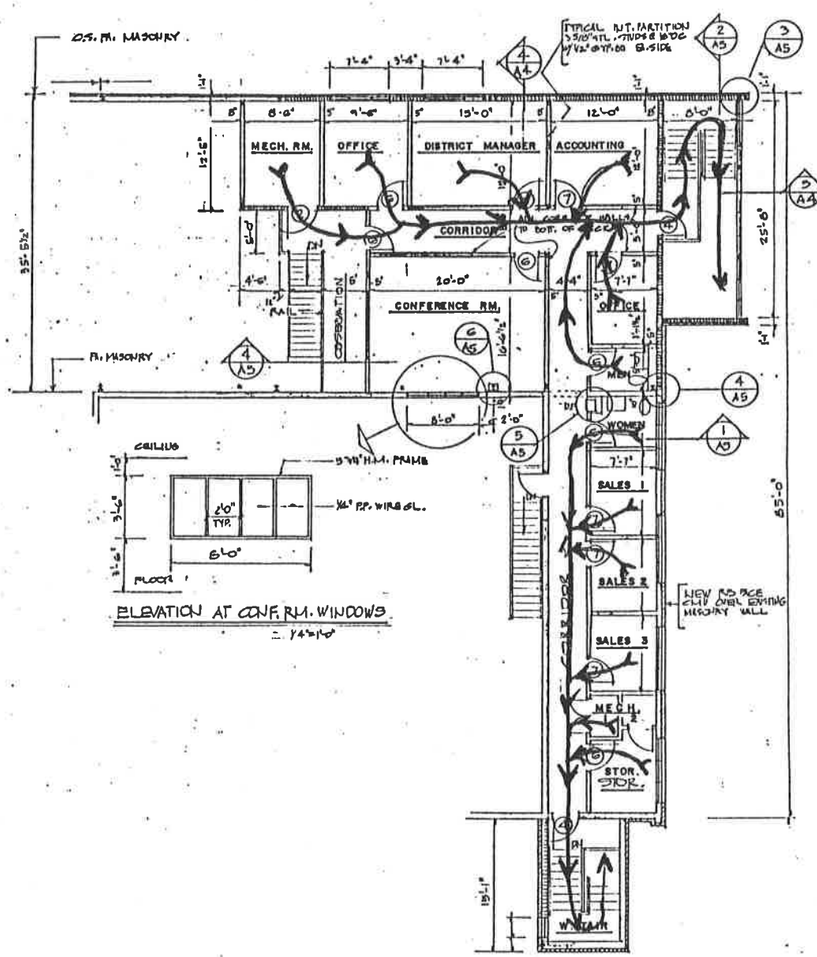
EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION (FRONT)



ELEVATION AT CONF. RM. WINDOWS

SECOND FLOOR PLAN

2231 SQ. FT.

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B.F.I.
MEDICAL WASTE SYSTEMS
240 RIVERSIDE RD.
MEMPHIS, TN.

DRAWN	OMJ
CHECKED	
DATE	8-15-89
SCALE	1/8"=1'-0"
JOB NO.	89-05
SHEET	A-3
OF 6	SHEETS